How frequent are prescribing errors and near misses among traditional and non-traditional prescribers and how are they experienced?

Lynne S Paterson

Doctorate in Professional Health Care Practice
(DMedSci)

The School of Nursing & Midwifery

March 2013

Acknowledgements

There are many people to thank for their help and support during the long process of undertaking my degree programme.

I am indebted especially to my supervisors Dr Mary Cooke and Dr Tony Blackett, without your continual words of support and pearls of wisdom, I doubt if I would have made it this far. Thank you for being honest as well as encouraging, Universities need people like you guys and students like me really value your gentle approach.

I would also like to thank my friends and family who have been quietly encouraging in the background, willing me to get to the end so that I can get my degree but more importantly, so that I have free weekends again!

Thanks to my critical reader Mike who waded through the whole thing providing practical advice along the way and persuaded me that I was 'almost there'.

Finally to David, my lovely partner, you will be glad that my 'homework' is finally complete and also that you can have my undivided attention once more; you have been my rock.

How frequent are prescribing errors and near misses among traditional and non-traditional prescribers and how are they experienced?

Abstract

Background

Nurses, midwives, health visitors, pharmacists, chiropodists and others have all begun to assume the role of prescriber of medicines. However, little work has been done comparing how effective these prescribers are in relation to the medical or traditional prescribers; and even less looking at the overall safety of prescribing in relation to errors and near misses. This study examines the safety element to prescribing and encompasses training to prescribe, prescribing in practice, support required, errors and near misses and the experience of both traditional and non-traditional practitioners.

Methods

Embedded single case study analysis was used which included three subunits; analysis of one year of reported errors and near misses, semi-structured interviews with each group of prescribers and a review of archival records of prescribing. Prescriptions were analysed using a validated error tool and interviews were analysed using Colazzi's procedural steps (1978); all data were then reviewed using the Brunswikian lens model (Scholz & Tietje 2002).

Results

All prescribers wanted better initial prescribing education and continual updates once qualified.

Non-traditional prescribers made fewer errors than traditional prescribers, though they do have a higher near miss rate than traditional prescribers.

Prescribers use a range of staff for support, though non-traditional prescribers are more likely to use their peer group.
Traditional prescribers have a more relaxed attitude to mistakes.
Prescribing staff do not trust the incident reporting system primarily since there is no useful feedback given which would improve prescribing practices.

Conclusions

The trust needs to work with educational institutions to improve prescribing training for all staff. They also need to ensure that there is some method available for all prescribers to be regularly updated or tested on their ability to prescribe.
Errors or near miss incidents involving prescribing must be shared with all prescribers so that everyone can learn from them.
This information is transferable to other, similar institutions.

Figures:

Tables:

Abbreviations:

ACE	Angiotensin-converting
BBC	British Broadcasting Company
BNF	British National Formulary
DH	Department of Health
ENT	Ear, Nose and Throat
FTSTA	Fixed term speciality training appointment of up to one years duration in the early part of training
FY	Foundation Year doctors
GCSE	General Certificate of secondary education
MAI	Medication appropriateness index
NCCGS	Non-consultant career grade staff
NCCMERP	National co-ordinating council for medication error, reporting and prevention in America
NHS	National Health Service
NRLS	National reporting and learning service
NPSA	National patient safety agency
RCP	Royal College of Physicians
RLO	Reusable learning object
ST	Specialist trainee
UK	United Kingdom

Chapter 1 – Introduction

1.1 Introduction

Prescribing and medication management has traditionally been the domain of medical and dental staff. This dominance is being eroded as various other personnel within health care begin to assume the role of prescriber in their own particular specialist areas. These include nurses, midwives, health visitors, pharmacists, chiropodists, podiatrists, physiotherapists, radiographers and optometrists, collectively known as non-medical or non-traditional prescribers (Department of Health (DH) 1986, DH 1989, DH 1991, DH 1999a, DH 1999b, DH 2000a, DH 2000b, DH 2003, DH 2005, MHRA 2006). In these fields prescribing practice was developed out-with its traditional sphere to foster better team working, to make better use of the skills of personnel which already existed within the National Health Service (NHS) and to improve patient care (DH 2000b, DH 2003, DH 2006, DH 2009). These alterations are not confined to the United Kingdom (UK) alone; there are different models of prescribing in countries worldwide including Australia, Canada, New Zealand, Ireland and Sweden (Creedon et al 2009, O'Connell et al 2009, Drennan et al 2009, Kroezen et al 2011). This shift in practice began with nurses in the UK in 1994 and developments have continued until the present date among a variety of other health care workers.

There are several areas of non-traditional prescribing which have been the subject of research, particularly within the professions of nursing and pharmacy (Luker et al 1997, Luker et al 1998a, Luker et al 1998b, Brooks et al 2001a, Brooks et al 2001b, Nolan et al 2001, Rodden 2001, Otway 2002, Sodha et al 2002, Harrison 2003, Fisher 2004, Lewis-Evans & Jester 2004, Latter et al 2004, Bradley et al 2005, Travers 2005, Berry et al 2006, George et al 2006, Hall et al 2006, Hobson & Sewell 2006, George et al 2007, Latter et al 2007, Lloyd & Hughes 2007). This research has covered the areas of education, confidence to prescribe, impact on relationships,

lack of funding, stakeholders perspectives on prescribing, the negative impact on other professions, prescribing practices and benefits of non-medical prescribing.

Despite the fact that this research has all concentrated on prescribing and in the main, on how useful and important this new development has become, there are gaps in the evidence. It is not known how safe prescribing is when directly comparing it to those who traditionally undertook prescribing versus those who have now taken this skill on. In turn there is little evidence looking at the impact non-traditional prescribing has had on the current patient safety agenda in terms of its effects on errors and near misses. Since prescribing is the single most common form of treatment given in the NHS (Barber, Rawlins and Dean Franklin 2003), and it is now being undertaken by not just one group of professionals, but several groups; it is essential that its safety is researched thoroughly.

The following chapter gives background information relating to prescribing in the context of the study presented. The reader should note that previous literature reviewing has taken place and has been reviewed and marked elsewhere as part of the DMedSci thesis; thus the following is a shortened version. Updated literature has also been added since the initial literature review took place.

1.2 Initial background and rationale for the study

Prescribing is one of a range of skills which is currently being adopted by many practitioners in the NHS. This recent change began in the UK with nurses as far back as 1986 when Baroness Cumberledge, supported by the Royal College of Nursing (RCN), first identified that community nurses could and should be afforded limited prescribing authority in order to make their role more efficient and in order to make more effective use of resources as well as skills and competencies which already existed (DH 1986, DH 1999

Cumberledge 2003, Jones 2004). A few years' later a seminal report by June Crown (DH 1989) concurred with this view and following a favourable cost-benefit analysis (DH 1991), nurse prescribing began in earnest with pilot sites in 1994. Subsequently prescribing has developed quickly with initial supplementary authority prescribing now changed to independent prescribing which incorporates primary care (or care in the community) as well as secondary care (based in hospitals). The number of amendments to policy and legislation altering the amount and type of drugs which can also be prescribed by non-traditional practitioners has been extraordinary and the range of areas where non-traditional prescribers can practice is increasing. Today non-traditional nurse prescribers can prescribe, with one or two minor exceptions, almost any drug contained within the British National Formulary (BNF).

This alteration to practice was driven on two fronts, firstly by nursing staff who desired to increase their potential within their profession and provide a more holistic approach to patient care (Jones 1999, Barber 2009) and secondly by the DH, who wished to utilise the skills of all professions to improve patient access to care as well as reduce costs (DH 1999a, DH 1999b, DH 2000a, DH 2000b, DH 2006, DH 2009). An additional motivation was, as some suggest, to diminish the power held by the medical fraternity (McCartney et al 1999, Coyler 2004, Cooper et al 2008a). It also sought to legitimise, particularly in nursing, practices which have been described elsewhere as prescribing by proxy (Bradley et al 2005, Siriwardena 2006, Bradley, Hynam & Nolan 2007, Cooper et al 2008a); where experienced nurses essentially decided what medication and dose was required for a patient and the medical staff merely signed a pre-written prescription authorising it.

1.3 Evidence to support prescribing being undertaken by nurses

The first alternative group, other than medical staff, to prescribe in the UK were nurses. There are some useful papers which indicate why nurses were initially chosen to advance their role into prescribing. These identify that other traditional medical skills have been adopted by nurses with good results (Sakr et al 1999, Wilmshurst et al 2000, Venning et al 2000, Aubrey & Yoxall 2001, Lee et al 2001, Miles et al 2002, Leslie & Stephenson 2003). These papers provide evidence that nurses can perform at a level either equivalent to or in some cases, more effectively than the comparable medical staff used in these studies. This evidence is based on several areas including comparison of the management of patients with minor injuries by nurse practitioners versus junior medical staff (Sakr et al 1999); a comparison of the cost of care provided in a medical centre by general practitioners versus nurse practitioners (Venning et al 2000); the provision of quick and effective thrombolysis therapy by a medical team versus a trained nursing team (Wilmshurst et al 2000); a comparison of specialist nurses versus senior house officers providing care for women at a genitourinary medical clinic (Miles et al 2002); and the resuscitation, transfer and examination of newborn infants by advanced neonatal nurse practitioners versus trainee paediatric medical staff (Aubrey & Yoxall 2001, Leslie & Stephenson 2003, Lee et al 2001).

Collectively the results of the research from these papers are favourable towards the nursing staff as well as being safe. The inclusion of another traditional medical skill, that of prescribing, into the repertoire of nursing appears to be a natural step forward and it is perhaps not surprising that nursing has been given the authority to advance into this area.

1.4 Nurse prescribing evidence

Many papers have been published regarding the advent and progress of nurse prescribing in the UK, though these have been mainly exploratory or qualitative in nature and rely on nurses', stakeholders' or patients' subjective accounts of either their prescribing experiences or their concerns around prescribing. Several of these suffer from methodological weakness such as small sample size and reporter bias (Luker et al 1997, Luker et al 1998a, Luker et al 1998b, Brooks et al 2001a, Brooks et al 2001b, Nolan et al 2001, Rodden 2001, Otway 2002, Sodha et al 2002, Hall et al 2003, Harrison 2003, Lewis-Evans & Jester 2004, Latter & Courtenay 2004, While & Biggs 2004, Bradley, Campbell & Nolan 2005, Davies 2005, Fisher 2005, Kimmer & Christian 2005, Travers 2005, Berry et al 2006, Bradley, Blackshaw & Nolan 2006, Hall et al 2006, Courtenay & Berry 2007). Due to this it is difficult to assess how good nurses are at prescribing where there is a valid clinical indication or indeed if they are prescribing accurately from the available evidence. The majority of research subjects have been nurses working in the area of primary care since prescribing was initially developed in this field and as such evidence from secondary care is lacking.

These research studies indicate that nurses' observations of their prescribing have been, in the main, positive, with results including improved ability to provide holistic care, increased communication with colleagues, better use made of their time and improved patient experiences; which are in keeping with the original aims from 1986 (DH 1986, DH 1999 Cumberledge 2003, Jones 2004). Nurses also identify however, restrictions in their prescribing abilities due to the limited formulary, lack of appropriate education within current academic provision and knowledge and under confidence as being some of the negative aspects to their new prescribing responsibilities; all of which could be detrimental to their practice.

Whilst patients highlight that nurse prescribing has afforded them quicker access to and enhanced continuity in their pharmacological care, they also identify disadvantages such as concerns with the training that the

prescribers receive as well as how this alteration in role will ultimately affect their relationships with nurses. A number of them would also prefer to see a doctor or at least continue to see their doctor for care of more serious conditions or for medication supervision, believing that the management of these are outside the capability of the nurse (Brooks et al 2001a, Brooks et al 2001b, Harrison 2003, Berry et al 2006).
Despite the available evidence pointing to some benefits of nurse prescribing there are also concerns, some of which are related to safety or confidence in the nurses' ability to perform to the same standard as traditional prescribers. Therefore evidence which looks specifically at the nurses' ability to prescribe safely is lacking from the literature.

Subsequently, as more nurses became qualified as non-traditional prescribers research began to emerge which included national surveys and also studies in secondary care and within particular specialist areas. These also addressed the various alterations in prescribing practice and as such included various titles such as supplementary prescribing, independent extended nurse prescribing, extended formulary nurse prescribing and also independent prescribing (Latter et al 2005, Courtenay et al 2006, Bradley & Nolan 2007, Carey et al 2007, Courtenay et al 2007a, Courtenay & Carey 2007, Latter et al 2007a). Again, despite much of this research being self reported, they continued to demonstrate that nurses were prescribing relatively frequently, they were positive in their prescribing experiences and also fairly confident to prescribe as well as having the underpinning education to do so.

Few papers looked specifically at safety in nurse prescribing, though several alluded to it (Harrison 2003, Bradley & Nolan 2005, Courtenay et al 2006, Latter et al 2007a, Jones et al 2007, Bradley, Hynam & Nolan 2007, Pontin & Jones 2007). These once more included small sample sizes, much evidence was self reported and related to more specialised fields including

education, mental health, diabetes, paediatrics and dermatology and as such are perhaps not capable of being generalised to other areas.
Two further papers published by Latter and colleagues (2007b, 2007c) utilised a variety of methods to address how accurate nurse prescribers in nurse-led clinics were in their prescribing consultations as well as their ability to utilise concordant strategies with their patients. They identified that nurses in this study, whilst demonstrating that they were making clinically correct prescribing decisions, did not indicate that they were doing this in partnership with their client group as previously suggested. Despite not highlighting safety as a focus for these papers, it is apparent that they demonstrate that in the majority of cases, medication was being prescribed appropriately and that there was an indication for it, it was an effective prescription for the condition, it was not being duplicated with other medicines and the dosage was correct. Thus, these papers in themselves, relate directly to the safety of nurses prescribing as an alternative to medical staff (Latter et al 2007b, Latter et al 2007c).

In relation to medication errors and prescribing Courtenay and colleagues (2007b), when looking at diabetes specialist nurses in one UK district general hospital, used medication errors as one of their primary outcome measures when identifying what effect this role had on in-patient care. This topic was perhaps chosen due to the fact that there are already known to be many errors in the prescribing of insulin in the UK and the fact that the DH wishes to reduce all medication errors by forty percent (DH 2001, DH 2003, NPSA 2007a). Therefore it was a useful indicator to apply. Courtenay and colleagues identified that the diabetes specialist nurses in this study made fewer prescribing errors and that this in turn was reflected in a shorter hospital stay for their patients and a reduced overall hospital cost for the NHS. This was probably one of the first studies to look at prescribing errors among non-traditional prescribers and despite demonstrating increased safety among diabetes specialist nurse prescribers in particular, the overall

topic was still lacking in evidence which could be applied to other areas. It was also not clear from this study how the errors made by the group of traditional and non-traditional prescriber varied.

More recently there have been several other research papers published looking at specific aspects of nurse prescribing (Stenner & Courtenay 2008, Courtenay & Carey 2008, Cooper et al 2008b, Creedon et al 2009, O'Connell et al 2009, Goswell & Siefers 2009, Courtenay, Stenner & Carey 2009, Rana et al 2009, Courtenay & Gordon 2009, Downer & Shepherd 2010, Stenner, Courtenay & Carey 2010, Stenner, Carey & Courtenay 2010a, Stenner, Carey & Courtenay 2010b, Courtenay, Carey & Stenner 2011, Jones et al 2011). These again looked at prescribing in other areas including diabetes, dermatology, pain and mental health and also looked at continuing professional development needs, the implementation of prescribing into new areas, independent as well as supplementary prescribing and also the assessment of accurate prescribing practice. These papers studied not only prescribers themselves but medical staff who they work with, nurse prescribing leads and patients whom they manage. This time the papers were more scientific, and although some did still suffer from small sample sizes and self reported data, there were more robust investigations coming to the fore.

Several of the papers outlined that nurses are taking on the role of prescribing particularly effectively in the field of diabetes, especially in the light of independent prescribing due to the fact that they work in areas where their roles were already well established, they are very familiar with the medications used there, they work closely with their medical colleagues and have good support. They also believed that they were able to incorporate the prescribing role seamlessly and without making their practice medicalized. The patients also supported the role since they believed that they had a better relationship with the nurse prescribers, they were better able to obtain information on their disease and treatment and

their access to medication was improved (Stenner, Courtenay & Carey 2010, Stenner, Carey & Courtenay 2010a, Stenner, Carey & Courtenay 2010b).

Finally, Latter et al (2010) undertook an evaluation of nurse and pharmacist independent prescribing between 2008 and 2010. This was a large and comprehensive study in which the assessment of quality and safety of prescribing was one of its main aims. Using a variety of methods including national questionnaires, interviews and case studies they found that despite these prescribers not always using the best assessment and diagnostic skills and not always prescribing the cheapest drugs or those consistent with national guidance, their prescribing practice was considered safe and clinically appropriate (Latter et al 2010). In this study the information was gained by using methods other than self reported and as such makes this more valid than other studies which have gone before.

One further paper, worthy of note, was undertaken outside of the UK, but has some relevance since their introduction was undertaken in a similar fashion. Drennan and colleagues (2009) undertook a large evaluative study looking specifically at nurse and midwife prescribing following its introduction to Ireland. They had multiple aims during the study but one specific aim was to look at the safety of nurse prescribing in the two years since it began. Using a combination of tools which included examining patient consultations, an audit of written prescriptions and a survey of patients who had received medication management from a nurse or midwife prescriber, the study examined the introduction of non-traditional prescribing. Despite some issues related to the lack of a comprehensive recording of all aspects of consultations with patients, making sure that the duration of therapies was highlighted and ensuring that drugs did not interact with other concurrent drug therapies which the patient was taking (or if they were given for a risk versus gain reason that this itself was well documented), the study concluded that prescribing in this instance was

appropriate and safe. Despite providing an indication that nurse prescribing was safe, what was lacking was a comparison of nurse prescribing to any of the other staff groups who prescribe in Ireland.

1.5 Other non-traditional prescribers' evidence

Since nurses were not the only group to have taken on the role of prescriber, it was appropriate to consider other groups of non-traditional prescribers and review the research to establish if safety had featured in these.

The literature available on other non-traditional prescribers prior to the study was focused on the role of pharmacists. This has been relatively sparse since the authority for pharmacists to prescribe was established in 2003 (Child 2001, Buckely et al 2006, George et al 2006, George et al 2007a, George et al 2007b, Hobson & Sewell 2006, Lloyd & Hughes 2007, Tonna et al 2007, George et al 2008, Stewart et al 2008).

Many of these papers were self reported by pharmacists who were either undertaking training or who were prescribing in practice and as with the nursing literature there are methodological weaknesses contained within them.

These papers concluded that pharmacists, whilst agreeing that taking on the prescribing role would ultimately improve patient care, also believed that there were several issues which needed to be addressed. These included lack of funding, the lack of recognition for taking on the role, the negative impact on other professional groups, the deskilling of junior doctors and inadequate training provision for their needs as well as continuing professional development (Buckely et al 2006, George et al 2006, George et al 2007a, George et al 2007b, Hobson & Sewell 2006, Lloyd & Hughes 2007, Tonna et al 2007, George et al 2008).

Nurses also identified that there may be some further difficult issues with pharmacist prescribing since they were often unfamiliar with the patient

(Child 2001). Patients' in Scotland, despite being positive about this prescribing development, were more likely to continue to seek advice from a doctor if they were given a choice (Stewart et al 2008).
Some of the evidence is similar to that found in the nursing studies and correspondingly there is also little definitive evidence regarding how effective pharmacists have been in taking on this new role. There is also nothing which measures safety within these particular papers, albeit their history in prescribing is shorter than that of nurses.
The negative issues found here were also not dissimilar to the issues raised initially with the implementation of nurse prescribing (McCartney et al 1999, Duffin et al 2002, Bradley & Nolan 2004, Ryan 2004, While & Biggs 2004), yet little further investigation has taken place to assess if these concerns have been substantiated in either group.

More recently further papers by Stewart et al (2009a, 2009b), Cooper et al (2008b) and Guillaume et al (2008) which included pharmacist independent prescribing which was authorised in 2006, have outlined that despite there being a slight increase in pharmacists who undertake this role, there are still some concerns in relation to barriers to its implementation. In particular, this is in relation to pharmacists' competence to undertake a comprehensive physical examination. Whilst there appears to be widespread support for the role, there are also recurrent concerns over continuing prescribing educational needs. Similar to the nurse prescribing literature, there is still a dearth of evidence looking at the safety of pharmacist prescribing, though Stewart and colleagues (2010) have recently been piloting a tool for use with pharmacist prescribing consultations and it has been identified by a subsequent paper that drug safety is something that should be further researched (Stewart et al 2011). No studies have looked specifically at pharmacy prescribing errors and safety and as such there also remains a gap in the non-nurse, non-traditional prescribing literature related to this topic.

1.6 Prescribing errors and patient safety

When attempting to measure the effectiveness of prescribing by non-traditional individuals, based on the information from the above studies, it seems appropriate to investigate it in relation to patient safety as many of the concerns are either directly or indirectly related to the ability of the new non-traditional prescribers to perform adequately. Prescribing errors are a major element within this safety culture, particularly as they make up the majority of medications errors yet they are the most avoidable type (Dean et al 2002a, Dean et al 2002b), with Bates (2000) identifying that between twenty-eight to fifty-six percent of all adverse drug events are preventable. This is particularly relevant in today's climate as the Government set up the National Patient Safety Agency (NPSA) in 2001 with one of its main drivers being the overall reduction of all types of medication error. However, data is not available on the exact type and number of medication errors made in the United Kingdom, with most current estimates having been based on United States figures (Dean et al 2000, Dean et al 2002, DH 2003, Banning 2005, Ghaleb et al 2005), there is no research evidence combining these errors with the new prescribing initiatives, despite some being available which accounts for errors among the traditional prescribing population (Dean et al 2002a, Dean et al 2002b). In order to assess the effectiveness of prescribing among non-traditional prescribers, errors as well as near misses are an appropriate means of establishing this whilst making some comparisons to the traditional prescribers.

1.7 Traditional prescribers and errors

The traditional prescribers themselves, despite having undertaken this role for many hundreds of years are also subject to error. Little is known about the total extent of prescribing errors in the UK among this particular population or why they occur though several studies have identified errors which can provide some indication (Dean et al 2002a, Dean et al 2002b,

Barber et al 2003, Gray et al 2007, Dornan et al 2009). These papers describe a wide error prescription rate from as little as one percent of all prescriptions examined to a maximum of forty-five percent of all prescription examined. Fewer errors were identified from all of the in-patients in a large bed teaching hospital versus those identified within one acute emergency admission unit. Thus it does not always mean that a larger institution will have a greater number of errors. Reasons given as to how prescribing errors occur include workload, lack of knowledge of particular drugs, lack of knowledge of what constitutes an error, lack of communication within teams, lack of concern about the importance of prescribing and inadequate training (Dean et al 2002a, Dean et al 2002b, Barber et al 2003, Gray et al 2007, Dornan et al 2009).

The Department of Health outlined in 2003 that pharmacology teaching to undergraduates should be strengthened since so many medication errors are preventable. However, several years' later two studies by Han and Maxwell (2006) and Tobaiqy et al (2007) provided further evidence that this has not yet occurred.

Han and Maxwell (2006) surveyed one hundred recently graduated doctors and identified that the majority lacked confidence in both their ability to prescribe as well as their knowledge to provide information to patients in order for them to make informed decisions about their care.

Tobaiqy et al (2007) undertook a survey of ninety foundation year one doctors and discovered that many of them had been involved in prescribing which had resulted in adverse drug reactions and drug-drug interactions and that only thirty percent of the participants rated their knowledge of clinical pharmacology and therapeutics as good. Although these are small sample sizes, they do give some indication as to what problems are faced by traditional prescribers in today's climate and despite the public believing them to be better prepared than some of the other non-traditional prescribers, this may not actually be the case.

1.8 The extent of drug errors

Medication errors themselves have been highlighted within the public domain as a result of high profile cases such as those involving wrongly administered intrathecal drugs leading to convictions, as well as new national guidance (BBC 2001, BBC 2003, DH 2000c, DH 2001); thus they have become a matter of acute interest to professionals and the public alike. As a result of this interest the manner in which drugs are prescribed, dispensed and administered has become increasingly scrutinised within the literature (Bates 2000, Nebeker et al 2002, Armitage 2005, Banning 2005, Cousins et al 2005, Armitage & Chapman 2006, Miller et al 2007, Wolf 2007), yet with the on-going modernisation of prescribing practices, many aspects of this are as yet unresearched.

As drugs become more complex medication management has also recently become more intricate, patients are aged, polypharmacy is increasing meaning that patients, particularly the elderly, are prescribed multiple drugs to be taken together, as a result there is currently a greater potential for drug incidents of any kind to occur (Aronson 2006). It is reported that there are two and a half million medications prescribed every day in both primary and secondary care in England and Wales (NPSA 2007b). It has also been estimated that each year there will be 10,000 serious adverse reactions to medications reported with one fifth leading to clinical negligence claims (DH 2000c). The NPSA (2007a) outline that all avoidable medication errors (dispensing, prescribing and administering) from in-patients stays and their related litigation costs may be somewhere in the region of four hundred and fifteen million pounds lost each year to the NHS.

There will also be many more drug errors which are prevented and will be classed as near misses. Whilst some of these errors will be related to dispensing and administration, there will still be a percentage which will be caused by an initial prescribing problem. The empirical evidence relating to the extent of errors in the UK is in the main estimated, but from a recent survey of medication related incidents reported via the National Learning

and Reporting System (NLRS) for the period of 2005-2006 in England and Wales, sixty thousand incidents were voluntarily reported (NPSA 2007b). From this total two thousand three hundred and ninety-one caused moderate harm, fifty-four caused severe harm and thirty-eight deaths were caused in the patient population (NPSA 2007b). Within this group the largest cause of medication error, fifty-nine percent, was related to administration with sixteen percent directly related to prescribing. Whilst this provides some account of the spread and type of medication errors which currently exist, it is not a sufficiently scientific study on which to base any clinical guidelines since Trusts had the choice of reporting their incidents, thus many will remain unaccounted for. Furthermore the extent to which any of these incidents are attributable to either the traditional or non-traditional prescribing population is not known, neither is the affect that either role may have on preventing similar medication errors.

One recently published paper however, does provided some clearer information as to what the separation of these individual figures look like. Dornan and colleagues (2009) looked at the causes of prescribing errors among foundation year one trainees (FY1) in relation to their education and subsequent socialisation. Within this study one hundred and twenty four thousand, two hundred and sixty prescriptions were analysed for error and a total of eleven thousand and seventy-seven errors were found. The error rate of prescriptions written by a number of personnel were identified which demonstrated some interesting variation, see table 1.1.

Table 1.1: Percentage of prescribing errors per group (from Dornan et al 2009)

Personnel	Percentage of prescription errors
Foundation year 1	8.4%
Foundation year 2	10.3%
Fixed term speciality trainee	8.3%
Non-consultant career grade	6.8%
Consultants	5.9%
Pharmacists	0%
Nurses	6.1%

This demonstrates that from this one study the non-traditional prescribers; particularly the pharmacists have a low prescription error rate (Dornan et al 2009). It was the first study to look comparatively at non-traditional prescribers with traditional prescribers and to date there has been no other similar work.

This was therefore an area worthy of further investigation and was particularly relevant within the Trust being investigated in this study as it had a total of eight hundred and twenty-five medication errors reported between the years of 2006-2007, when this study was being developed.

1.9 Human error theory

If we look at errors themselves they can be considered as an inherent part of human performance (Reason 1990, Reason 2000, Reason 2001). Since prescribers are human it is inevitable that errors will be made, though these can be minimised given the correct support including guidelines, processes and training.

Initial health service incident frameworks looked at humans as being responsible for these errors and a blame culture was normal (Reason 2000,

Armitage 2005, Armitage & Chapman 2006, Knudsen et al 2007, Wolf 2007). However there are several other issues to consider.

Reason (1990) identifies that human errors can generally be categorised into three; skill based errors, rule based errors and knowledge based errors. These take various forms and include such activities as lack of attention, constant interruptions, taking shortcuts and overconfidence (Reason 1990). Collectively these are described as 'active failures' (Reason 2000, p769) and institutions have traditionally not looked beyond this for any other causative factors. However, according to Reason (2000) this is also exacerbated by another layer which he describes as 'latent conditions' (p769). Latent conditions are those situations which may lie undetected until they combine at a certain point with active failures and cause a major event to occur. Latent conditions include design faults, poor management decisions, training shortcomings and ill-conceived procedures (Reason 2000). This is what Reason (2000) refers to as the 'Swiss Cheese' model of error; that is, these holes in the system may not cause any problems for many years, but once all conditions are optimal they line up causing a 'trajectory of accident opportunity' (p769). Thus it is important in any organisation that the potential for errors which may occur in this fashion are identified and limited.

Reason (2000) suggests that health care institutions are 'high reliability organisations' (p770) and as such should ensure that their systems, which take into account human activity as well as non-human activity (such as computers for example), should be as robust as possible in order that errors are minimised. This requires a review of on-going processes and this is complemented by using staff who are themselves involved in the processes as they are often the very people who can identify not only the errors which do occur but the potential for error (Robinson 2004). This is essential in setting up safer systems in the future. Dean et al (2002b) used Reason's human error theory and applied this to a group of forty-four traditional prescribers whom they interviewed in 1999. Their results demonstrate that

not only did they include many of the active and latent factors categorised by Reason (1990) but the prescribers themselves could easily isolate situations which led to the occurrence of the errors.

Similarly Marck et al (2006) used practitioners when attempting to utilise restoration science to improve medication safety in Canada. This was in keeping with the processes used in the maintenance of the ecosystem which specifically involve efficiency, effectiveness and sustainability. These practitioners were able to identify several areas which were altered as a result increasing the compliance with safety practices as well as improved medication safety knowledge among staff.

Staff are therefore important collaborators within any related error research. Researching prescribing errors is a complex process requiring many different issues to be addressed, not least human error theory. Identifying current problems and cataloguing potential problems demands a close examination involving research as well as root cause analysis. This was highlighted in Knudsen et al (2007) when looking at transcription errors; where they identified that using this process can prevent these same errors being repeated in the future. Utilising staff would help foster a proactive approach rather than a reactive approach to future prescribing training and education, applicable to a variety of personnel.

1.10 Knowledge gap and need for research

Despite the Governments drive towards safety with medications there is still little concrete data as to the exact number, type and personnel responsible for errors as well as near misses which occur. Together with the growing diversity in prescribing practice also being under-researched, there is a gap in our current knowledge. It is important that the public have some evidence that these new initiatives are as safe as previous practice and also it is important for the professionals that they have their practice evaluated and that they are involved in this process. Especially given current evidence

suggesting that in some cases education to prepare doctors, nurses and pharmacists in particular for prescribing, has been inadequate for their needs (Otway 2002, Larsen 2004, Courtenay et al 2006, George et al 2006, Hobson & Sewell 2006, Skingsley et al 2006, Tobaiqy et al 2007, Dornan et al 2009).

Safety within medication management includes several aspects such as the initial education to prescribe, prescribing in practice, errors made when actively prescribing for patients, which staff group makes them, what type of errors occur, how we learn from them and how safety can be increased further in the future. As demonstrated, there is a gap in the current literature putting all of these elements into one study is still relevant today.

The following thesis outlines one embedded single case study which looks at the safety of prescribing among traditional staff as well as non-traditional staff in order to provide some evidence as to its efficacy in one acute Trust in the north of England. It is anticipated that this data may help prevent many of the same errors reoccurring in the future and that this information will also be useful to other, similar, organisations and practitioners.

1.11 Research Question

The specific question which will be answered within this study is as follows: *How frequent are prescribing errors and near misses among traditional and non-traditional prescribers and how are they experienced?*

The key objectives are:

- To assess the number and type of prescribing errors and near misses made by traditional as well as non-traditional prescribers in one trust in the north of England.

- To understand how prescribing errors and near misses are experienced by the prescribers themselves.

- To apply a known tool which is capable of categorizing errors in prescription charts.

- To identify any recurrent issues which may affect prescribing within this trust among all of those who prescribe.

1.12 Definitions

There are several terms used continuously throughout the thesis and it is essential that these are clarified so that they remain constant throughout the study and there is consistency in their interpretation.
The definition of 'error' and 'near miss' is as follows and is used in this context throughout:

An error is said to be:
...'*any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of health professional, patient or consumer*'...(DH 2003, p20).

This definition, whilst being adopted from the National Coordinating Council for Medication Error Reporting & Prevention in America (NCCMERP), is also one that is already used widely by the NPSA in the UK (DH 2004).

An example of this within a prescribing and patient care situation could be one where a patient has been given the wrong dose of a tablet since both the person prescribing it as well as the person administering it did not calculate the dose appropriately. This would have been preventable had it been calculated correctly. This may paradoxically either cause harm or no

harm depending on the type of drug and the degree of overdose or indeed under dose given.

A near miss is said to be:
...'a situation in which an event or omission, or a sequence of events or omissions, arising during clinical care fails to develop... thus preventing injury to a patient...' (DH 2000c, p13).

Again, this definition has already been used within error and near miss reporting in the UK literature and was appropriate for use with this research.

An example of this within the same context could be one where a patient has been prescribed the wrong dose of a drug but when the person comes to administer it checks the dose to be given, they find it to be wrong and they then ask the prescriber to rewrite the prescription order. This error has then been intercepted and the patient will come to no harm as a result.

On occasion both the terms error and near miss are collectively used together under the term 'mistake'.

Also a working definition of what constitutes both a traditional prescriber and a non-traditional prescriber within the remit of this study needs to be clarified.
In this case, a 'traditional prescriber' is a member of the medical staff, since they have historically been the main prescribers of medication within secondary care sites, where this study is set. Dentists would also be considered as traditional prescribers but none were involved in the research undertaken.
A 'non-traditional' prescriber, in this study, is a nurse, midwife or pharmacist; as this covers all the specialities of non-medical prescribers that practice within the Trust being studied.

Finally the incident reporting system used within the Trust studied is the Datix reporting system. This is a proprietary brand name of the software used for electronic incident reporting, registered in the trade name of Datix Software Limited, London, thus incidents are generally referred to as 'Datix' incidents.

Chapter 2 - Methods and Methodology

2.1 Introduction

The following chapter outlines the design of the study and how it was performed taking into account the underlying philosophical position and design of the study. The beginning of the chapter also contains a schematic diagram of the methodology which helps explain the interrelationships of the methods utilised, figure 2.1. Schematics within this type of research provide a visual representation of the key concepts and as such help to increase the overall auditability of the process and thereby the rigour of the study (Rosenberg and Yates 2007).

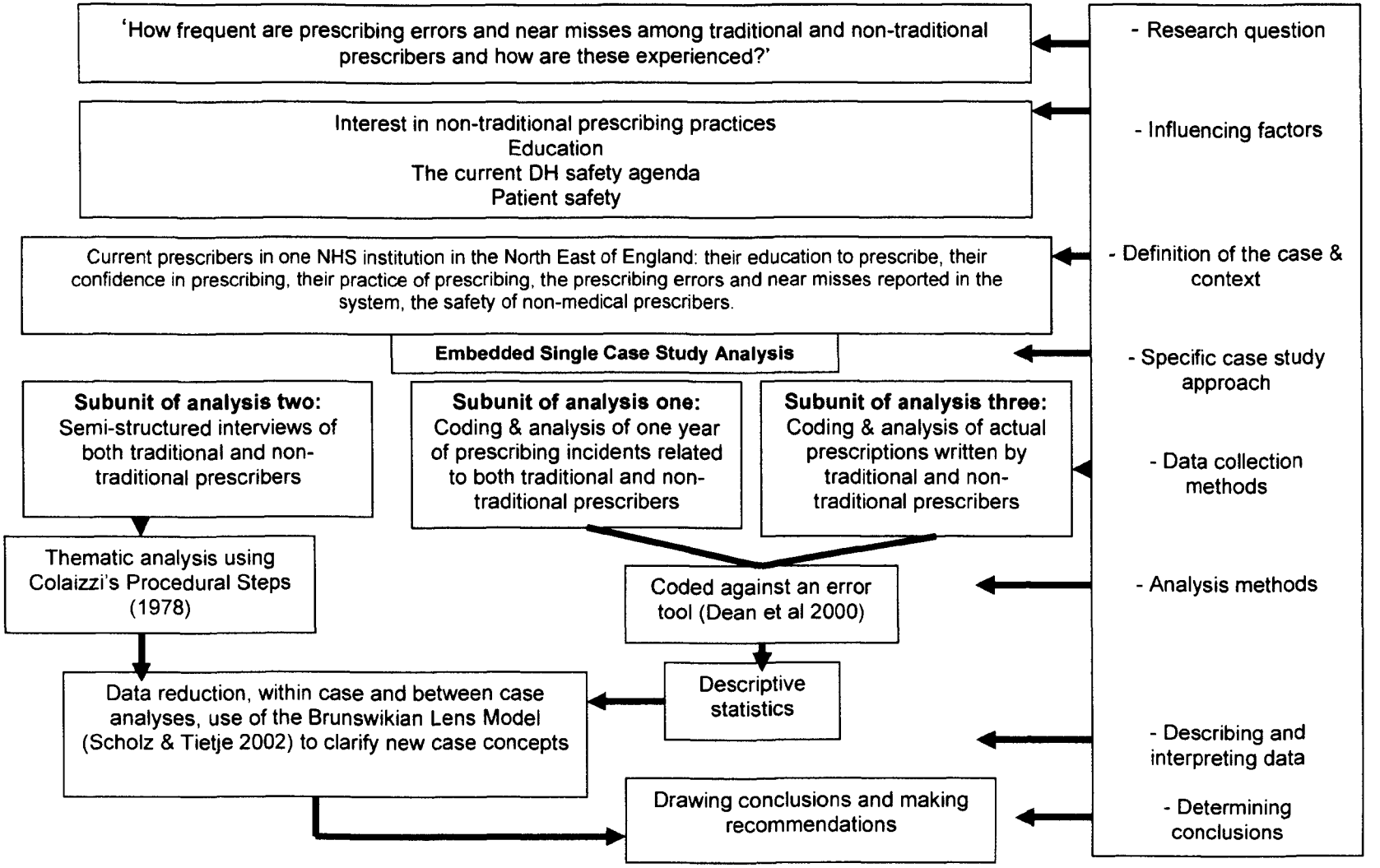


Figure 2.1 – Methodology Schematic

2.2 Philosophical Position

When the study was conceived it was designed to include both quantitative as well as qualitative elements due to the nature of the research question; though it was primarily constructed within the qualitative paradigm.

The qualitative paradigm is based on our understanding of the world and how that understanding is translated into meaning. This paradigm sits within interpretivism with the main tenet being that reality is socially constructed and there are many different realities to be interpreted, each one being interpreted differently depending on who is investigating them and when they are investigated (Sale et al 2002). Thus the interpretation is described as being intersubjective and is just one of the ways that sense is made of the social situation (Blaikie 1991). This interpretation involves the researcher becoming part of the research (Gray 2009) and as such is well suited to those research situations where the researcher may already be included or previously involved.

Mason (2006) suggests that researchers using a primarily qualitative framework when considering social encounters, such as the experience of prescribing, are in a good position to also consider mixing methodologies. This is in part due to the belief that if social studies are viewed from only one perspective they can cause our whole understanding of complex exchanges to be deficient and one dimensional (Mason 2006). However, this demands that not only is there a mixing of methodologies but the underlying philosophies must also be mixed; therefore elements of positivistic research as well as interpretive research will co exist within the same study; a position which causes great debate within the research literature (Blaikie 1991, Rolfe 1994, Woods 1997, Kirkham & Anderson 2002, Patton 2002, Sale et al 2002, Gilbert 2006, Bryman 2008, Lipscomb 2008).

Rolfe (1994) and Foss and Ellefson (2002) advocate that when researching in the social sciences, philosophies other than positivistic ones should be applied in order that the people involved can actually be treated as human beings. Thus the subject matter, people and the worlds they inhabit, are essentially different to that of the natural sciences (Bryman 2008). Indeed Rolfe (1994) believes that settling on one particular research stance is unhelpful and that positivism and phenomenology are at either end of the same continuum. Whilst Bryman (2008) lists similarities between quantitative and qualitative research and describes them as not being as completely different as they are generally portrayed within the literature. One could argue that all research is interpretive in nature as data are always looked at and decisions made about what they mean. However, studies conducted in a purely positivist framework identify relationships which occur between variables which are defined clearly before the study begins and are not altered by a different interpretation by the researcher during the study (Stake 1995). It would therefore be impossible to conduct this study purely in a positivistic manner as the interest lies essentially with the actors and the part that they play within the social circumstance of prescribing.

It has been suggested by some that the philosophical stance of the research design is the most important aspect of the study (Sale et al 2002), with Appleton and King (2002) believing that philosophical underpinnings are an important factor in order to be able to assess its quality and that researchers should not dissociate this from the research question. However, some authors believe that not only is the philosophy not thought through carefully beforehand, in some cases it may not even have been considered at all (Appleton & King 2002, Sale et al 2002, Gilbert 2006).

Alternatively, the use of a fixed philosophical position is perhaps not entirely necessary since this merely results in the research being too inflexible and as Woods (1997) and Kirkham and Anderson (2002) suggest, is simply a

trend associated with previous historical research positions or methodological fashion.

Doyle et al (2009) identify mixed methods research as being seen as the 'third methodological movement' (p175) and consider this to be a relatively new approach whilst Blaikie (1991) and Freshwater (2006) point out that mixed methods research is not new but something that social scientists have been doing for many years and Howe (1988) was writing about some twenty two years ago.

Mason (2006) postulates that for researchers, their starting position when looking at any research comes from the philosophy that they are more familiar with. Whilst Green and Caracelli (2003) believe that the researchers' understanding of the underlying philosophies associated with each paradigm, whilst important, are not in reality what drives research decisions. Rather they are led by the issues being investigated and how best they can be approached (Green & Caracelli 2003). Oakley (1999) outlines various other aspects which may in fact have more importance including finance, politics, what is in vogue at the time and complex interpersonal research relationships; thus suggesting that the philosophical identification is not necessary or that their mixing is acceptable.

However, there is also a view by some that research paradigms cannot and should not be mixed (Blaikie 1991, Sale et al 2002, Lipscomb 2008). Sale et al (2002) describe the mixing of research paradigms as being impossible since they are essentially 'incommensurate' (p50) and Lipscomb (2008) suggesting that pragmatists who utilise research methods unscrupulously in this manner may be in danger of losing research validity. Also, traditionally, each paradigm has its own set of conventions which include the language used, the design and the methods (Howe 1988, Sale 2002, Johnstone 2004), thus could be considered as reasons why they cannot be mixed. However, although there are accepted standards within these paradigms, it does not mean that they cannot be altered and changed or indeed

challenged in the quest to identify appropriate methods for illuminating complex problems in health care, as long as the purpose is fully rationalised.

There is therefore a paradox, researchers are caught between creating a research study from a purist paradigmatic position in order to maintain a strict philosophy versus undertaking a rigorous and complete study which attempts to investigate phenomena using the most apt approach. Resulting in a belief by some, that these two cannot be mutually compatible (Blaikie 1991, Appleton & King 2002, Sale et al 2002, Lipscomb 2008).

There are also other authors (Howe 1988, Oakley 1999, Doyle et al 2009) who believe that the perceived incompatibilities of mixing philosophies are generally not true and that they are merely reinforced by the personal beliefs of research purists, some have concluded (Robson 2002, Johnstone 2004) that in unique research topics the use of a fixed philosophical position or theory may be elusive.

Ultimately there is no correct recipe or formula for either decisions to be made about which methodology to use or indeed which data to collect within any research (Patton 2002), allowing the researcher to be creative within their own study. The long held beliefs about the separateness of positivism and interpretivism have been disentangled in recent times and there is a more open approach to mixing methods within research studies which incorporate elements of them both (Howe 1988, Oakley 1999, Johnstone 2004, Doyle et al 2009, Gray 2009).

Whilst it is agreed that paradigms and philosophical positions do have an impact on research and what approach is taken, researchers should endeavour to explain their underlying rationale rather than feel that they should be constricted by using only methods which are historically congruent with one particular philosophical stance (Green & Caracelli 2003, Maxcy 2003, Gray 2009).

Pragmatic researchers therefore, will make research decisions based on the most appropriate approach in order to get the job done and in order to keep sight of the research question (Oakley 1999, Robson 2002, Morse & Niehaus 2009).

In this case it was important to ensure that the action of prescribing was investigated from more than one perspective and this necessitated looking at both quantitative data as well as qualitative data within the same study. It would have been pointless considering the number of errors and near misses made within prescribing without attempting to qualify this within associated educational and social prescribing experiences. Thus a mixed philosophical approach was used as the best fit with the research question, though the underlying principle was still one of interpretivism.

Interpretivism asserts that all knowledge is related to the interpretation of how people experience their world (Lazar 2004, Bryman 2008, Gray 2009). It is anti-positivist in that it does not use measurements or comparisons of data and is more concerned with scientific reality and social reality as being different entities (Gray 2009). This is described by Crotty (1998) as individual interpretations of the social life world which are derived from each person's cultural and historical exposure.
Max Weber, a German sociologist, was one of the founder members of the interpretivist tradition. Weber believed that human action was fundamentally subjective and that actions undertaken by them required interpretation, though this would not produce absolute truths about their meaning, rather it would provide some understanding (Lewis 1975, Lazar 2004, Bryman 2008). It was Weber who was responsible for introducing the concept of empathy into the social sciences and thus advocated the use of the researcher both as research instrument as well as interpreter (Patton 2002). This ultimately means that the data collected and interpreted would be subjected to the understanding as well as personal judgement and

biases of the people involved (Patton 2002). This means not only the participants but the researcher themselves or as Darke et al (1998) describe, interpreting other peoples' interpretations.
In keeping with the interpretivist position the data collected within this study was collected and interpreted by one researcher and their meaning analysed in relation to the act of prescribing and in particular, out-patient prescribing. This was performed using a mixed methods design.

2.3 Study Design

Since the research question considered both quantitative as well as qualitative aspects, a design was required which would not only contain both but would enable the data from them to be collated and measured together in some way in order to gain understanding. There were several possible methods which could have been used to undertake this, including mixed methods, multiple methods, triangulation or case study analysis. However, since case study analysis positively advocates mixing of data from different paradigms and allows for the research question to be actively investigated within a given context as well as environment (Simons 2009, Yin 2009), it was chosen as the best fit.

Case study analysis has been defined by Yin as an empirical investigation which looks at a current phenomenon within its real life context where its boundaries are not apparent (2003). According to Innes et al (2000) case studies aim to produce ideas particularly in situations where there is no existing benchmark; as such they are suited for exploratory studies. Walshe et al (2004) believe cases studies to be useful for real life situations where the focus of the study is on the success or failure of a new intervention, thus they are particularly useful when undertaking an assessment of something new (Darke et al 1998). This is consistent with the research topic, whilst there is some work which identifies and classifies errors made within the

traditional prescribers group (Lagerlov et al 2000, Dean et al 2002a & 2002b, Ghaleb et al 2005, Tobaiqy et al 2007), there is nothing in the literature which looks at these in the context of both traditional and non-traditional prescribing practices. Or anything which takes into account how these were experienced; or indeed if there is any real difference between the two.

Case studies have been used in a number of fields including medicine, law, business, education, politics and social work (Stake 1995, Darke et al 1998, Innes et al 2000, Gomm et al 2002, Walshe et al 2004, Scholz & Tietje 2002, Yin 2003, Price 2008), and historically in nursing itself from as early as the 1920's (Burns & Grove 1999). Anderson et al (2005) advocate case study as a research approach which is especially suited within a health care setting which it is complex and interrelated. Whilst some authors suggest that the approach is beneficial particularly in the end of life and palliative care specialities (Walshe et al 2004, Payne et al 2007). Payne et al (2007) however, recognise that nursing interventions, such as mouth care for example, do not exist on their own and that they form part of a larger, intricate and tangled pathway of care and that case studies therefore are suited to studying smaller interventions in a more inclusive way. In this case, prescribing as well as the situation or environment where it takes place can all be scrutinised together. One of the strengths of case study research is that it allows a matrix of evidence to be linked together and examined. Gillham (2000) suggests that since humans are inextricably part of the environment where they exist, the case study method allows for these features to be studied in context. Ultimately this allows the unique characteristics of a particular group to be captured (Hammersley & Gomm 2002) and can be described as being both deductive as well as inductive (Gray 2009).

There is no recognised, agreed definition of what a case study is and what it should look like in practice (Woods 1997, Bergen & While 2000, Zucker 2001, Jones & Lyons 2004, Anthony & Jack 2009, Simons 2009), though there are several opinions. This is one reason that it has been described by some as 'elusive' (Bergen & While 2000, p927). There is also some confusion over whether this is an approach or a method (Gilgun 1994, Dooley 2002, Gomm et al 2002, Anaf et al 2007, Yin 2009). Walshe et al (2004) identify that to them, case study is an approach or a strategy but definitely not a methodology and that it is most suited for investigating practices within the clinical field. Darke and colleagues (1998) are also of the opinion that this is a research strategy and one that can be effective if rigorously applied. Alternatively Yin (2009) describes case study research as a definite method using a pre-specified set of procedures, which includes the design or format for the research. Whilst Jones and Lyons (2004) believe that case study analysis is a comprehensive research strategy which incorporates both design as well as method. Gray (2009) suggests that case study research should be used to explore rather than confirm whilst Payne et al (2007) believe that the method is suitable for investigations from which there is no necessity to effect a change. Scholz & Tietje (2002) suggests that it enables us to gain insight into a phenomenon in order to develop a model, hypothesis or theory.

Stake (1995) outlines that case studies can be intrinsic, collective or instrumental and are used to study 'particularity' (pxi), whereas Yin (2009) outlines that they can be either exploratory or descriptive in nature depending on the topic being studied.

Eisenhardt (1989) and Dooley (2002) both highlight case studies for use in theory generation, though this requires more than one case or at least a single case with several mini cases to research within it. Others advocate linking it together with both systems theory (Anaf et al 2007) and complexity theory (Anderson et al 2005) in an attempt to enhance its investigative potential. Meyer (2001) describes case studies as having little guiding

theory, which makes them paradoxically both strong as well as weak as a research strategy. Weak, since with little guidance some researchers may undertake implausible, poorly thought out studies and strong since they can be flexibly applied to unique situations where rigid methods would inevitably fail. In conclusion it would appear that case studies are different things to different researchers however this should be viewed as a positive thing, they are flexible and encompassing, the only caveat being that whatever particular approach is taken must be made explicit and any audit trail made absolutely clear in order to maintain its rigour.

One view of case study research would be that it is a strategy similar to that of the medical case study. When investigating the cause of a particular symptom or sign, a variety of tests may be instigated, the results of which will all be looked at together to get an overview of what condition the patient may have. This takes into account both quantitative testing (for example, blood results) and qualitative testing (information regarding quality of life taken from conversations with the patient). When put together a more cohesive and inclusive view of the patient's condition and its effects can be assessed. When applying this analogy to case study research several aspects of a case can be looked at together in order to get a better and more defined overview of the whole case and situation in order to come up with some conclusions. This can apply equally to an individual patient or several, similar to the single case study or multiple case studies.
For this particular research project an 'embedded' case study approach was used which is advocated by Scholz and Tietje (2002) especially for use with complex and contextualised problems. This allows for single cases to be researched in depth, using a multiplicity of evidence as well as a variety of analytical tools (Scholz & Tietje 2002). The case itself was broken down into several subunits or variables in order that these could be analysed in great detail enabling a within case as well as a cross case analysis to be made. As Tietje and Scholz (2002) suggest, this allows for different

significant aspects of the case to be investigated rather than focusing on just one. In medicine, the unique case or individual presentation has been reported on for centuries and used in the context of education (Sharp 1998, Scholz & Tietje 2002, Walshe 2004); this was also the premise with this case.

Case study is not however, unproblematic. Yin himself (2009) a vigorous advocate of case studies has outlined that one pitfall of undertaking this design is that due to the multiple data collected and also due to the number of potential subunits which can be involved, the researcher fails to return to the focus of the research to answer the research question. Payne et al (2007) also recognise that undertaking research in the form of case studies can be time consuming as well as generating large amounts of data, as such case studies are difficult to both undertake as well as interpret. Conversely Giddings (2006) hypothesizes that mixed methods approaches are quicker and require less expertise in methodology. Though this is in sharp contrast to many proponents of case study research, where mixed methods are positively advocated and their use is described as being difficult requiring a skilled researcher (Eisenhardt 1989, Stake 1995, Zucker 2001, Gomm et al 2002, Jones & Lyons 2004, Anderson et al 2005, Flyvbjerg 2006, Gangeness & Yurkovich 2006, Luck et al 2006, Ruddin 2006, Rosenberg & Yates 2007, Simons 2009, Yin 2009). Yin (2009) echoes this by simply stating that case study research is one of the most 'challenging' of all undertakings in social research (p3).

One further issue is that case study has been viewed synonymously with poor research or research which has undisciplined designs (Gilgun 1994, Bergen & While 2000, Jones & Lyons 2004, Jensen & Rodgers 2001, Meyer 2001, Scholz & Tietje 2002, Luck et al 2006, Yin 2009). This may be in part due to the previous discussion around the fact that it is misunderstood and that as there is no one definition of case study research or one clear method

of how to undertake it; sceptics are not convinced that it is rigorously undertaken and so are unconvinced of the results. Conversely to this Anthony and Jack (2009) undertook a critical analysis of forty-two published nursing papers which had utilised qualitative case study methodology and identified that despite some differences in terminology; many of the studies were of a high quality.

It should therefore be made very clear why case study was used and exactly what its purpose was (Meyer 2001). Or as Jones and Lyons (2004) explain, must make explicit how the multiple sources of data used have contributed to the study findings. Yin (1981) further concludes that unless a clear conceptual framework is used from the beginning, undertaking the research as well as reporting it will be very difficult. (The conceptual framework used for this study can be found in appendix one and other references to the models used for analysis of the data are found in schematic form in appendix ten as well as in figure 2.1).

Alternatively, and one of the positive concepts within this particular study, is its ability to rationalise the use of both quantitative and qualitative approaches in order to bridge the gap between both perspectives and in the process, address multifaceted issues (Innes et al 2000, McDonnell et al 2000, Robson 2002, Scholz & Tietje 2002, Jones & Lyons 2004, Gangeness & Yurkovich 2006, Luck et al 2006) thus avoiding a one dimensional view of a complex matter (Innes et al 2000). The case study approach makes sense in many situations but particularly in areas that require methodological overlap (Ellis 2003) as seen here; there would be no point in counting the number of prescribing errors if it was impossible to begin to unpick who made them and what the contributing factors may be. Similarly, there would be little point in talking about errors with prescribers when there were no data available as to how often they were made as well which group was responsible for them. As outlined by Price (2008) case studies are fundamentally about making sense of a situation, in this instance the

researcher interprets their version of the truth. Stake (1995) determines that it is this interpretation which is at the forefront of case studies and that sophisticated researchers will present not only their view but a variety of views which occur within the research. However, following this each reader will recreate their own interpretation of its meaning as there is likely to be more that one truth or postulated conclusion (Rolfe 2006a, Rolfe 2006b).

2.4 Situating Oneself in the Research

Within any study which involves the use of qualitative data and interpretation, there are different methods of situating oneself as the researcher. Some suggest that it is the researcher's role to be totally separate from the actual research and encourage a process of bracketing or separating out any assumptions or preconceived ideas about the research topic in order that the data is not contaminated, particularly during the analysis phase (Husserl 1962, Meyer 2001, Yegdich 2000, LeVasseur 2003, Gearing 2004). Whilst others believe that this is not possible and that conversely the active involvement of the researcher and their experience is what causes a rich production of data (Koch 1994, Schutz 1994, Ashworth 1997b, Parahoo 1997, Koch & Harrington 1998, Ahern 1999, Long & Johnson 2000, Northway 2000, Cutcliffe & McKenna 2002, Bradbury-Jones 2007). Indeed some propose that the bracketing process is nonsense and go as far as to say that they do not trust anyone who says that they are actually able to achieve this in order to avoid tainting their data (Rolfe 2006b).

The use of this reflexivity in qualitative research is well established (Schutz 1994, Koch & Harrington 1998, Northway 2000, Cutcliffe & McKenna 2002, Freshwater 2005, Rolfe & Gardener 2005, Mantzoukas 2005, Rolfe 2006). This is where the researcher has a relationship with the object of the research as well as its interpretations and conclusions (Robson 2002, Bradbury-Jones 2007, Gray 2009). Where the researcher cannot remain

neutral but is implicated in the resultant knowledge that is constructed (Gray 2009). Many studies come directly from questions driven by researchers and as such they have already used their own knowledge and experience from which to frame these ideas.

Stake (1995) suggests that humans are inquisitive and have a certain impulse to investigate. He believes that many case studies will be borne from what he describes as an 'intrinsic' interest (p3). Whilst Koch and Harrington (1998) outline that it is the very nature of the researcher's role within the topic area, often very familiar to them, which leads to good research questions.

Cutcliffe and McKenna (2002) describe the process of the researcher coming together with the researched as a craft whereby the raw materials of the data are woven together using the cerebral, inventive, interpretive and diagnostic prowess of the researcher. This person is seen as integral to the overall process and without their input, the interpretation would be meaningless. Whilst Schutz (1994) postulates that undertaking research is an extremely personal activity and that the researcher will undoubtedly use their own experience or socialisation in the interpretation of the data comparing this with situations, which are familiar to them. Dooley (2002) outlines that this personal involvement should be written explicitly within the research paper. However, he also warns of the dangers of incorporating too much self-disclosure in the research as this may be off-putting for the reader (Dooley 2002). In essence the researcher cannot be a neutral observer but is implicated in knowledge which is constructed from any qualitative research (Gray 2009). This does however lead to an ironic situation where the researcher is in a position to both bias as well as enrich a study. However, Ashworth (1997b) suggests that data collected within a qualitative study are in fact the product of both the researched as well as the researcher and that this is fundamentally its strength. The researcher's interpretation will also go on to be reinterpreted anew each time it is read by a different reader (Rolfe 2006a, Rolfe 2006b).

2.4.1 Putting 'Myself' in the Research

The topic area of the study was not new for me as the researcher. I have had an interest in this field for several years and have indeed previously studied nurse prescribing internationally to see if this could inform prescribing in the UK (Paterson 2004, Paterson 2005). I would have found it impossible to remain impartial to the work that I have done as well as the literature that I have become immersed in over this time period. I also work within a role which is concerned with the prescribing and administration of drugs and the staff who undertake it and as such this has afforded me insight as well as access into its associated issues. My experience therefore, was one of an insider, I knew and understood some of the aspects of the study and the participants were also colleagues within the institution. This does not mean that I knew them prior to the study, but it did mean that we already had a certain degree of camaraderie since we were all working within the same organisation and for the same employer. Taking these issues together it would be wrong to suggest that they had not affected my research approach nor influenced the analysis of the data. There were also several other issues which were influential to the topic area and how this was researched, I have outlined these within a conceptual framework and this can be found in appendix one.

2.5 Ethical approval and confidentiality issues

Ethical approval for the study was obtained from both the supervising university as well as the local Trust ethics committee (County Durham and Tees Valley 2 research Ethics Committee reference number: 08/H0905/90). Possible participants were sent an invitation letter and also an information leaflet and were asked to contact the researcher if they were interested in taking part using a letter of interest. Copies of the invitation letter, letter of interest and participant information leaflet are in appendices two, three and four. Written consent was obtained from all participants and they were

aware that they could withdraw from the study at any time (an example of the consent form is in appendix five).

Confidentiality was maintained by several methods. Written data and documentation were stored in a locked and secure cabinet accessible only by the researcher. Documentation pertaining to the individual participants was anonymised using a code known only to the researcher.
Digital recordings of interviews were downloaded from the digital recorder directly following interview to a password protected computer. Digital files were anonymised by code and access was restricted to the researcher only. Files on the digital recorder were then deleted.
Once the digital files were transcribed and validated by the participants themselves digital recordings were deleted from the computer.
All data will be finally destroyed following the completion of the degree.
There was however, one main issue with confidentiality requiring that some special measures be put into place. This was around the possibility that any one of the participants disclosed that they undertook practice considered to be 'poor' or 'unsafe'. A decision was made with the ethics committee that if this occurred, then the researcher had to escalate this to the appropriate channels. Therefore this was written into the protocol, discussed with each participant and added to the consent form.
The decision about whether practices were considered to be poor or unsafe was not left entirely to the researcher to establish, rather Trust guidelines were followed.
Within the Trust all staff are governed by policies and procedures, which ensure that patients as well as staff are safe, and protected from harm. All of the relevant policies relating to the prescription of medicines are highlighted within the policies G34 (2007), G34B (2007) and G34F (2007) and G34G (2007). Staff must observe these policies and procedures which are collectively highlighted within the Trust Policy P7, Code of Conduct (South Tees NHS Hospitals Trust 2008). Any breach of this code is

considered a potential disciplinary matter. Therefore, any member of staff who is shown to deviate from these policies and procedures, without prior arrangement, will be subject to further action by their line manager.
To define this further, the Trust policy P8, the Lack of Competency framework (2006) was also utilised. This policy provides a fair and consistent approach when handling staff who have demonstrated a lack of competency in their performance, whilst affording them the opportunity for further training. It defines competence as being assessed with regard to the knowledge, skills (physical and mental) and aptitude required to consistently and effectively perform all the duties required of the role, to a standard acceptable to the organisation in a reasonable and timely fashion (South Tees NHS Hospitals Trust 2006).

The Royal College of Nursing (2007) as well as the Nursing and Midwifery Council (2006) also clearly state that nurses and midwives have a duty of care to their patients who are entitled to safe and competent care. As such, the researcher, covered by these guidelines, was duty bound to report any practice which did not adhere to this. Medical staff have similar guidance to nurses and midwives given to them by the General Medical Council who state that one of the duties of a doctor is to 'act without delay if you have good reason to believe that you or a colleague may be putting patients at risk' (2006, p2). The Royal Pharmaceutical Society of Great Britain also guide pharmacists in their Code of Ethics (2007) to put patient safety at their centre; taking appropriate action should a colleague be putting anyone at risk.
Since every participant in the study was working within these boundaries, this was discussed clearly at consent and agreed to beforehand. Services of a Trust counsellor were also made available in the case of support being required.
Subsequently all twenty of the participants consented to the study and did not reveal anything of this nature.

2.6 The Study Site and Context

The research study was performed in one split site Trust in the North of England. This particular Trust was chosen as the researcher is employed there and as such access was unproblematic.

This Trust is described as a sub-regional hospital which provides up to 178 475 days of in-patient activity annually (South Tees NHS Hospitals Foundation trust 2011). It has a total of 1200 beds, 7000 staff (with another 2000 working within the surrounding community) an annual budget of £523 million pounds and provides health services to 1.5 million people in the neighbouring districts. It was therefore large enough to enable research to be easily performed there.

Since this was an embedded case study it was also important that it was performed within a tightly specified environment and that the context was clear. This helps to guide the researcher as well as the process of the study (Gangeness & Yurkovich 2006).

The case in question here was the experience of traditional prescribers (medical staff) and non-traditional prescribers (nurses, midwives, allied health professional) of prescribing errors and near misses within one institution.

Also contained within this was their experience of learning to prescribe as well as how well prescriptions were written and how prescribers were and continue to be supported to do this. Patient safety was the overarching theme.

There was therefore one overriding case with three subunits of analysis contained within it.

2.7 The Subunits of analysis

In keeping with case study research data were collected in a variety of different ways (Scholz & Tietje 2002, Simons 2009, Yin 2009) and within

three connected subunits. This included data from archival records in the form of electronic incident reports or Datix forms, documentation in the form of prescriptions and also incorporated semi-structured interview data. These three forms of data collection are termed subunits one, two and three.

2.7.1 Subunit one

Within this organization incidents are monitored via the Datix system. This works by each individual member of staff being able to access the electronic system via the Trust intranet homepage. No password is required and anyone who has either been involved in an incident (such as a needlestick injury), who has witnessed an incident (such as violence from an intoxicated patient in Accident and Emergency concerning other patients or staff) or who has discovered an incident (such as a drug error), as well as anything in between can access the system and complete a form. The form has prompts on it which will take the user through a series of questions and screens to ensure that all the requisite information for the incident to be investigated is completed. This includes when it occurred, which patients, staff or visitors were involved, an outline of the incident itself, what was done about it as well as what the outcome was. These forms are then electronically submitted to the Trust risk department and they are dealt with in a variety of ways. Copies of the incident form are also sent electronically to senior members of the team involved which includes managers and matrons. The senior member of the team will undertake a local investigation and will look at what needs to be done and what lessons need to be learnt, thus using the information as a learning tool for staff. The risk team will use this information to compile themes and trends, data are also used to populate the system for the NPSA. The risk team will also identify which issues may require further attention in the form of a root cause analysis or possible referral to other departments such as the Strategic

Health Authority, in the case of any Serious Untoward Incidents. There is also some trust guidance around incident reporting available for staff, though this is not exhaustive and includes only basic user information. Subunit one involved collating data from electronic incident report forms for one year (a representation of these electronic forms is provided in appendix six).

These incident forms or Datix reports were scrutinised first within the study in order for the remaining two subunits to be better informed. Electronic data from the incident forms is held centrally and this was collected and analysed for descriptive data as well as themes within errors and near misses as matched with the validated error tool (Dean et al 2000).

During the twelve months from April 2008 to March 2009 a total of one hundred and seventeen Datix forms were analysed. These were also subsequently reviewed by a trust pharmacist in order to ensure that they were coded correctly for errors and near misses which were out with the ability of the researcher. These included errors and near misses from prescriptions written in any area in the hospital where they had been reported and were not restricted.

The data from subunit one, outlined the number of errors and near misses that were reported thus afforded an idea of how often this occurred as well as providing information on who was responsible. Other information gained included what types of errors and near misses were made, if there were any patterns being made in the types of errors and near misses and also which drugs were involved in the prescribing errors. Information was also sought to assess if any patients had come to harm as a result of any errors made. Once this data were analysed it provided a more coherent overview of prescription errors and near misses within the trust and enabled the researcher to cross check with data from the participants during the semi-

structured interviews. The following two subunits were then both undertaken together.

2.7.2 Subunit two

Subunit two involved recruiting, consenting and interviewing twenty participants. Ten traditional as well as ten non-traditional prescribers were included. Semi-structured interviews were performed using an interview schedule and this was then correlated with the information gained from subunit one.

2.7.3 Subunit three

Subunit three involved collecting evidence in the form of the participants' prescriptions and matching these against the error tool for errors and near miss data. These were restricted to out-patient prescriptions only. This restriction was due to the fact that it was felt that consent was required to look at any prescriptions within the organisation, since they were viewed to be the property of the prescriber. Therefore the researcher needed to gain the consent of every prescriber who's records may potentially have been investigated, which was not seen as possible within the given study constraints. An alternative to this was to gain consent from the participants' who were approached to be interviewed, thus gaining consent for interview together with agreement that their prescriptions could be viewed and examined. Prescriptions from out-patients do not get filed into the patient's notes as they remain in pharmacy and as such were more easily obtained within the time constraints of the study. The prescription collection took place between November 2009 and March 2011. A sample only was included within this, rather than every prescription written since they were collected by various personnel within the pharmacy department, not all being familiar with the study. Again these were independently reviewed by a Trust pharmacist in order to ensure that they were coded appropriately.

2.8 The prescription error tool and definitions

Since there are variations in how medication errors are described as well as discrepancies in what personnel will choose to call them, their definition can be subjective depending on who is coding it (Dean et al 2000, Dean Franklin et al 2005, McLay & Ross 2008, Lisby et al 2010). Therefore for the purpose of the research clear definitions of what constituted an error as well as a near miss needed to be definite and used consistently throughout and the method of collecting these also needed to be exact.

As previously highlighted, the definition of an error used within this research was:

'any preventable event that that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of health professional, patient or consumer'...(DH 2004, p20).

The definition of a near miss was:

...'a situation in which an event or omission, or a sequence of events or omissions, arising during clinical care fails to develop... thus preventing injury to a patient...' (DH 2000c, p13).

This definition is used by the National Patient Safety Agency (NPSA) in the UK and whilst it provides a framework on which to base an error it is not specific in terms of what constitutes an actual prescribing error. The difficulty with this was identified in a systematic review undertaken by Tully et al (2009) when they attempted to categorise the causes of prescribing errors in hospital in-patients and encountered enormous variations in definition.

When this research was undertaken there were very few tools available to match medication errors against and the work undertaken by Dean et al in

2000 provided a useable and validated tool and as such was adopted to provide uniformity.

The tool came about when a multidisciplinary group of health care staff including physicians, surgeons, pharmacists, nurses and risk managers undertook a two stage Delphi technique assessing the level of agreement when rating scenarios which outlined prescribing errors (Dean et al 2000). Thus a level of consensus was reached and a definition was created which could be used clinically as well as within research.

Within the tool it was possible to measure errors within three potential groups. Those which were classed as types of errors and included those 'errors in decision making' as well as 'errors in prescription writing' (p234); those which were classed as 'situations that may be considered prescribing errors depending on the individual, clinical situation' (p235) and 'situations that should be excluded as errors' (p235) (Dean et al 2000). Within the tool there was also a further list of possible explanations for the error which made categorising them easier, this included such things as 'omission of the prescriber's signature' and 'prescription of a drug to which the patient has a documented, clinically significant allergy' (Dean et al 2000, p234).

The coding of near miss events however was not so clear and also did not form part of this tool, since the main aim for its development was to categorise medication errors. In order for near miss events to be captured and analysed within the study a further section was added to the tool by the researcher in order that these could be collected and later analysed. Details for this included the event itself, which group of staff identified it and also any action that was taken as a result. A copy of the tool used can be found in appendix seven.

The use of the tool provided consistency in the identification and analysis of the medication incidents but this was undertaken by a researcher who had a background in only one speciality. Therefore a senior Trust pharmacist was also included in both in the coding and analysis phase of the study in order that the findings were legitimised by a specialist in the field of medicines

management. This provided internal validation that the data were coded appropriately by the researcher.

2.9 Recruitment of the Participants

In order to ascertain the best way of identifying participants who would be most likely to represent exactly what was being studied, a sampling framework was created. See appendix eight.

The non-traditional prescribers were approached first since they were the smallest sample to recruit from and it was essential to identify which of these potential participants undertook out-patient prescribing. A central register is also kept within the Trust of non-traditional prescribers and as such made their identification more accurate. It was more appropriate to identify this group initially in order that the traditional prescribers could then be matched with them, as the non-traditional prescribing group currently only work in discreet sections of the trust.

A non-random sampling approach was taken which meant that participants were not chosen by chance but rather volunteered following an invitation letter to participate.

In May 2009, there were forty-three non-traditional prescribers registered on the Trust list as being qualified in non-medical prescribing. On closer inspection, two members worked within the primary care trust and as such were not covered by the ethical approval; they were thus excluded, leaving forty-one. All forty-one were approached and asked about their prescribing practices as well as their willingness to participate in the study.

A follow-up reminder was sent two months later.

An overall response rate of forty-nine percent was achieved, that is twenty from the forty-one approached. From these twenty, there were twelve non-traditional prescribers who fitted the inclusion criteria, which was that they prescribed out-patient medications specifically. One was opted out as they

were helping with the study, due to their expertise in pharmacy and one further member was leaving the trust, so they were also opted out. This left ten. All ten of this total population were recruited into the study.
The ten non-traditional participants covered a range of seven specialist areas including cardiology, diabetes, urology, infectious diseases, wound care, ophthalmology and cardiothoracics. The non-traditional sample were all registered nursing staff.

Initially, a pragmatic approach was taken to sample size due to the relatively low numbers of non-traditional prescribers. McDonnell et al (2000) describe this situation as an uneasy relationship whereby researchers have to balance their design by not only considering their theoretical stance but also how realistic this is to undertake in the real world.
Therefore the ten participants from the non-traditional group who prescribed out-patient medications were all recruited and this was then matched with ten traditional prescribers.

According to Burns and Grove (1999) when using samples in case studies they tend to be small as generalization as well as sampling error has little relevance within this domain.
Since this was a case study the sample size itself is less important than ensuring that the personnel included had the specific experiences as well as special expertise being studied. Scholz and Tietje (2002) outline that in embedded case studies specifically a number of units of analysis will be used to illuminate the case itself and that there is no specific number on this, merely that enough data is generated to increase understanding. Whilst Yin (2009) agrees that since 'sampling logic' (p58) does not apply here those typical arguments over sample size also cannot be utilised. Similarly Jensen and Rodgers (2001) imply that when a 'macroentity' is being studied, such as an organisation or a policy, as is the case here that this counts as a single data point within the analysis and no adjustment for

sample size is required (p240). Rather the researcher needs to concentrate on gaining enough data to ensure that the overall phenomenon of the case is investigated fully. Embedded case study includes looking at several sub-units within one case and since its point is to examine a multitude of variables, numbers are unimportant provided the data help understand the case being studied (Scholz & Tietje 2002).

The participants for the traditional part of the study were initially identified from the non-traditional prescribers themselves. They highlighted to the researcher prescribers whom they worked with most closely and who would write prescriptions for similar drugs. These were the most appropriate clinicians who could be used to make prescribing comparisons in the study. Recruitment was conducted in a consistent manner by initially sending out letters of invitation as well as follow up reminders to thirty identified medical staff. Follow up reminders were also sent out two months later.
From the initial group of thirty, a response rate of thirty percent was achieved, that is nine personnel. One of these did not wish to be included, thus from the remaining eight, who all fitted the inclusion criteria, all were recruited.
In order to achieve the ten requisite traditional participants, two further members were required. This initially proved difficult and required that a broader selection strategy was used. Further possible participants were identified by clinical directors working within the same specialist areas as the non-traditional sample group. A further eight potential participants were approached and finally two from this group were recruited, making a total of ten traditional participants. This group worked within three of the same seven specialist areas as the traditional prescribing sample which were infectious diseases, cardiology and diabetes.

Since prescribers were being studied and in particular, prescribers who were actively prescribing within out-patient departments, only these specific

personnel were approached. Therefore a purposive sample was used for the study. Purposive sampling is where the researcher intentionally chooses participants on the basis that they will be the most likely to provide the required data (Parahoo 1997, Patton 2002). Generalising from this type of sample is not the intention here but rather that a greater understanding of a phenomenon can be obtained (Parahoo 1997, Patton 2002). Robson (2002) describes purposive sampling as a method whereby participants are chosen using the researcher's judgement as to who will be the best informants due to address the topic being examined. Patton (2002) outlines that purposive sampling when used to select information rich cases, are the cases that we can learn an immense amount from as they are the ones most likely to be of central importance. This approach has been criticised within the literature since it may introduce bias to the study (Ingleton 1998, Seale & Filmer 1998, Burns & Grove 1999, Robson 2002). And it has also been described as 'second best' (Seale & Filmer 1998, p139). However, others argue that this can be addressed, especially within a case study context, if the researcher is rigorous in the explanation of the case as well as the methods chosen to study it (Woods 1997, Sharp 1998, Zucker 2001, Luck, Jackson & Usher 2006, Rosenberg & Yates 2007, Anthony & Jack 2007, Yin 2009). Rosenberg and Yates (2007) suggest that one method of providing conceptual and procedural clarity as well as ensuring methodological rigour is to utilise schematics to provide a more user friendly and visual representation of the entire study. Simons (2009) concludes that purposive sampling is the only method to choose when insight into a particular issue is required within case study research and there are key personnel involved whose perspective will be invaluable.

The primary rationale for using this type of sample was in order to reach only those participants who could provide a clear insight into what was being researched; education to prescribe as well as the prescribing activity itself.

2.10 Interviews

All participants were interviewed using a semi-structured interview technique which included an interview schedule. These interviews were also taped. No extra field notes were taken by the researcher during the interviews.

In semi-structured interviews the researcher is generally familiar with the content as well as the phenomenon that is of interest in the research (Rose 1994) and as such is able to discuss it with some degree of knowledge. The control over the whole process by the researcher is often relatively high in order that the main concepts can be investigated. Semi-structured interviews use a data collection tool called an interview schedule which has broad based questions which can be added to by the researcher (Parahoo 1997, Robson 2002, Gray 2009) or indeed changed and altered as the situation arises during the interviews (Robson 2002, Gray 2009). In this type of interview the participants are all asked the same questions but the order in which they are asked can be flexible and words can be altered to ensure meaning (Barriball & While 1994, Parahoo 1997, Gray 2009). Using the semi-structured method, the researcher is free to probe and elucidate comments which are of particular interest to the study (Rose 1994, Gray 2009); this will in turn help to keep the dross (trivial or unrelated research material) rate low. Thus as Holloway and Fulbrook (2001) suggest, a more meaningful discussion directly related to the research can ensue. However, Parahoo (1997) suggests that the probes used should be limited to achieving clarification and in gaining a more complete answer to a particular question rather than uncovering new data. Thus according to Rose (1994) the role of the researcher within this type of interview is to provide some direction to the proceedings in order that shared meaning can be achieved. The semi-structured interview therefore allows the researcher to cover concepts that are pre-determined and allows these to be investigated thoroughly through the use of flexible, open questioning, thus interesting

comments can be teased out to increase the richness of the data (Gray 2009).

The interview schedule was the initial point where these pre-determined concepts were generated by the researcher and were based on the overall objectives of the research (Gray 2009) a copy of which can be found in appendix nine.

2.11 Pilot study

Pilot studies can be useful when determining several aspects of a research project. They are however, often not undertaken within the case study situation since this may be too difficult to arrange especially if there is only one case to be used within the whole investigation (Robson 2002) or if time is limited. Other criteria which make piloting all individual aspects of a case study difficult include gaining access to particular areas and developing relationships with staff who are to be included (Robson 2002); thus these are perhaps best left to be incorporated into the study proper. Other aspects however, such as the interview questions can and should be piloted (Robson 2002, Simons 2009).

Since it would have been impossible in this instance to pilot all aspects of the study and due to the time constraints of completing work for an academic award, the interview schedule was the only part of the study to be piloted. This was undertaken by using it to interview a non-traditional prescriber who was not taking part in the main study itself.

Robson (2002) suggests that pilot interviews can help with the training or assessment of the interviewer and allow an evaluation to be made of the overall performance. Whilst Parahoo (1997) identifies that questions asked may be perceived differently among participants than they are by the researcher. This process helped to assess the validity and reliability of the data collecting tool by demonstrating that what was being asked was not

ambiguous and also that it captured data which was that intended by the researcher.

The pilot study allowed the questions within the interview schedule to be used within in a real situation and consider if they were in the correct place or if they needed to be moved or altered. It also afforded the use the recording equipment to ensure that it was up to the task of recording clearly and effectively.

Following this interview and the transcription of the data the only thing to be altered was moving a couple of the questions around in a different and more constructive order on the schedule; otherwise the content remained the same. The recording equipment required to be fairly close to the interviewee and was very sensitive to all other sound in the room.

The data from this interview is not included within the research analysis.

2.12 Analysis of the data and rigor of the Study

Initial data from the first subunit were outlined in a descriptive fashion, as described previously. The date from both subunits one and three were matched against a validated error tool (Dean et al 2000) and verified by a pharmacist, generating information on the number of errors and near misses made, who made them, which drugs the errors occurred with and whether any patient came to any harm as a result. This use of an expert together with a previously validated error tool ensured a greater degree of reliability. That is that the consistency with which both observers arrived at the same conclusions about the data (Silverman 2011). There were similar conclusions between researcher and pharmacist.

Data from subunit two, interview data were transcribed verbatim. There are several views about how interview transcription should be done and also what the final result of this should be called (Poland 1995, Sandelowski & Barroso 2002, Robson 2009, Frost et al 2010, Hammersley 2010).

Hammersley (2010) suggests that interview data are not data at all as they are essentially interactions that have been constructed into text by the researcher and as such terms them 'constructions' (p563). These are then inherently controlled by the researcher and often not reviewed for quality or accuracy before appearing in the final research report (Sandelowski & Barroso 2002, Shenton 2004, Robson 2009). Robson (2009) identifies several imperfections when humans analyse interview data, these include the importance placed on first impressions, an inability to include unique findings and a certain conceit in their own judgement. Thus a one sided view of the findings of the interview will be presented which may not necessarily be replicable should another researcher analyse the same interview script. This is identified by Frost et al (2010), who found in their work that researchers using a thematic analysis approach tended to favour a style that was consistent with their way of thinking. This was further alluded to by work performed by Sandelowski and Barroso (2002) who reviewed ninety-nine qualitative works related to women with HIV and had difficulty identifying the findings within the studies due to problems with reporting, analysis, misuse of quotes and an overall lack of clarity.

Others believe that the text is merely one dimension of the interaction that occurred during the interview and that using this alone as data will miss out many aspects of what was being alluded to (Poland 1995, Sandelowski & Barroso 2002, Robson 2009).

In order to address some of these issues the digital recordings were repeatedly listened to, thus enabling the researcher to put the comments into a context, which was particularly useful in the absence of field notes. Remarks were then added to the transcribed notes prior to the final analysis.

2.12.1 Thematic analysis

Interview data were then analysed using Colaizzi's procedural steps (1978) in order for themes to be identified. This is essentially a seven step process and involved the following:

i) Reading all of the transcripts to acquire an understanding of them.
ii) Extracting statements relevant to the phenomenon being studied.
iii) Extracting meanings from these statements.
iv) Fitting all meanings into themes, being mindful of those that did not fit.
v) Integrating this together into an exhaustive description of the study topic.
vi) Reducing the complexity or volume of data and identifying the structure of the phenomenon.
vii) Returning data to the participants for validation.

Thematic analysis was therefore the method utilised here. This is a commonly used method of analysing qualitative interview data using pattern matching (Parahoo 1997, Sandelowski & Barroso 2002, Fereday & Muir-Cochrane 2006) in order to identify recurrent relationships (DeSantis & Ugarizza 2000, Cao 2007). It was used in this study to develop meaning as opposed to another method of data analysis such as content analysis or discourse analysis.

Content analysis is generally a fairly rigid method of analysis where codes or categories are developed in advance of the analysis so that items can be counted and grouped into manageable pieces (Silverman 2011). Whilst this may be useful in confirming reliability, since individual researchers should reach the same numerical conclusions, it did not provide enough flexibility to provide rich descriptions of the participants' experiences in this particular study.

Alternatively, discourse analysis is often used when there is naturally occurring talk within social settings as opposed to non-naturally occurring talk as seen in interviews (Silverman 2011). This is undertaken within real

time situations and within real social interactions in order to capture not only the discussion but also the context (Gray 2009). This was also therefore not the best fit when analysing the interview data seen here as it was interviewer led and guided by a series of open ended questions and prompts. This type of pattern matching is felt to be less likely to produce thick descriptions of the data (Braun & Clarke 2006).
It was therefore important to use a method to analyse the interview information which was more comprehensive and for this reason thematic analysis was chosen.

Thematic analysis is a method of categorising data. It is outlined as both a method (Braun & Clarke 2006) and a process (Boyatzis 1998, Fereday & Muir-Cochrane 2006) in its own right within qualitative analysis approaches. It is used for coding data and in particular, in the identification of links or relationships which help to explain a particular phenomenon (Aronson 1994, Boyatzis 1998, Braun & Clarke 2006, Fereday & Muir-Cochrane 2006). Researchers typically study qualitative data and become immersed within it, with the final result being that they are able to interpret what they have seen and heard into themes or recognizable patterns (Boyatzis 1998, Braun & Clarke 2006, Fereday & Muir-Cochrane 2006). Thus whilst it is implied that the themes 'emerge' from the data, they are actually drawn out by a long mental process of reading and re-reading until patterns emerge, meaning is given to the initial research questions and propositions within the case and ideas which may have seemed incongruent; became united. Thus as Boyatzis (1998) describes, it is 'a way of seeing' (p1) which is outlined by the researcher themselves.
However, some would argue that the steps taken during this analysis are not well documented or understood (DeSantis & Ugarizza 2000, Attride-Stirling 2001, Sandelowski & Barroso 2002, Horsburgh 2003, Braun & Clarke 2006), thus thematically analysed studies lack the necessary rigor to establish them as valid studies. Indeed Sandelowski and Barroso (2002)

state that most researchers do not define what constitutes a theme within their particular work or even how they came to categorise them, whilst Silverman (2011) urges that the analysis of interview data is challenging since it is incapable of including what was discussed within the correct circumstances or context. This lack of explicitness or secrecy can therefore lead to misrepresentation of the data (Rappert 2010) and also renders the research incapable of being precisely replicated.
It is therefore appropriate that the entire pathway taken to derive the themes is made explicit, thus affording one method of monitoring rigor (Fereday & Muir-Cochrane 2006). Rosenberg and Yates (2007) outline one such method within the design of case study research whereby schematics are utilised in order to demonstrate not only how the study was performed but also to reveal the actual analysis process in order that novice researchers can gain a better understanding of the methods. Similarly Attride-Stirling (2001) also advocates that illustrations are used in order to establish exactly how the steps in any thematic analysis were undertaken.

Within the context of this study a theme is defined in the following terms:

'an abstract entity that brings meaning and identity to a recurrent experience and its variant manifestations. As such, a theme captures and unifies the nature or basis of the experience into a meaningful whole' (DeSantis & Ugarizza 2000, p362).

2.12.2 Propositions

A series of propositions were used within the case study in order to undertake a secondary type analysis. These are often a feature of case studies (Dooley 2002, Scholz & Tietje 2002, Simons 2009, Yin 2009) and in this research were used in combination with the Brunswikian Lens Model (Scholz & Tietje 2002).

These propositions were pre-written prior to the research being undertaken and were used within the data analysis process to interrogate the conclusions in order to ensure that the case was consistent with the projects initial aims and ideas. According to Yin (2009) these propositions help to form the research proposal, help to inform the data collection and also have a role in guiding the data analysis process. They are also described as theoretical orientations (Yin 2009), helping to provide structure to the study. Propositions can also illuminate the context by ensuring that any composite relationships are identified, stated and also discussed as part of the overall analysis of the case (Dooley 2002). Simons (2009) outlines that a good place to start in the design of a case is to consider how to refine the research question. During this process a number of propositions should be considered and utilised to help construct the design. Documenting these can aid in keeping the researcher on track (Simons 2009).
According to Eisenhardt (1989) however, they should not be used as examples of hypotheses to test during the course of the study since this may influence the ability of the researcher to reach an unbiased conclusion. Though Darke et al (1998) acknowledge that both data collection and analysis are still subject to the researcher's interpretation.

The propositions chosen within the study came from a general interest in the topic. Reading the available related literature encouraged questions to emerge as to how or why events occur within prescribing errors. If these were felt to be important to consider during the process of the research, they were included as propositions. Some of these ideas had already shaped the research question as part of the researcher's prior knowledge and interest in nurse prescribing and some came directly from the literature. There were seven propositions used in total, which are statements rather than questions. Their source is outlined below.

There is a pattern in the type of prescribing errors made within this Trust.

In 2000, the DH published its paper 'An Organisation with a Memory'. The main thrust of which was to highlight that learning from mistakes was not being disseminated to other parts of the NHS and to outline a process whereby this would improve. They highlighted that similar mistakes were common across establishments and that better acknowledgement of this would reduce the likelihood of the same or similar errors being replicated (DH 2000c). Unfortunately literature outlining medication errors as well as prescribing errors correlate with this document demonstrating that errors among certain drugs do indeed reoccur (Ridge et al 1995, DH 2000c, DFH 2004, Dornan 2009). In order to make the research useful to the particular organisation where it was undertaken, the researcher wanted to ensure that any repetition of errors was captured and highlighted within the report, in order that some benefit would be gained locally, therefore this proposition was included.

There is no difference in the type and amount of prescribing errors among traditional and non-traditional prescribers.

When nurse prescribing was being considered in the UK and subsequently when it was introduced, one of the overriding issues in relation to how well this was being done was its relation to cost (McCartney et al 1999, Venning et al 2000, Duffin & Yu 2002, Keighley 2006, Siriwardena 2006). That is, if the costs of nurse prescribing had meant increases, then there would have been some consideration given as to whether or not this had been a useful initiative.

However to me as a researcher it was not cost that mattered, rather it was safety to the patients involved. Therefore when considering what aspects influenced the case study, prescribing errors was one of the main ways of investigating. In its most basic form, the difference in the number of errors made within the two groups was a specific consideration. There was also little in the prescribing literature which looked at this particular aspect thus it

was important to include this as one of the propositions of the study as it was relatively unique.

Self-awareness related to prescribing problems is different between traditional and non-traditional prescribers.

This particular proposition was included since the literature points to a clear demarcation between the groups of health service personnel who are responsible for reporting errors (Vincent et al 1999, Waring 2005, Evans et al 2006, Armitage et al 2007, Rowin et al 2008, House of Commons 2009, Hutchinson et al 2009, Travaglia et al 2009). This demonstrates that nurses and midwives are generally the groups most likely to report incidents of any kind whereas the medical staff are the least likely to report incidents. However, the literature has also revealed that staff in the workplace are in the best position to see where accidents are most likely to be caused and as such are in a prime position to help reduce them (Reason 2000, Lawton & Parker 2002). This led to an interesting concept, that perhaps staff who are more self aware in relation to mistakes are less likely to make any errors, they may also be more self assured in prescribing. Within the interview schedule this was included as a question in relation to how confident the participants felt when prescribing. Within the propositions this was a more generic topic so that the all of the data could be analysed and a correlation could be made regarding confidence, awareness and errors.
It was also felt that this may help explain any differences within the two groups included in the study and as such would benefit the organisation in the future in terms of targeted training.

There are commonalities among traditional and non-traditional prescribers in their experience of prescribing education.

The educational literature in relation to initial training of medical and nursing staff have outlined that we must focus on practitioners who are fit for purpose (Wass 2005, Bradshaw & Merriman 2008), that is, practitioners

who are fully prepared for all aspects of their role and are able to perform effectively. It seemed natural therefore that we would want similar standards for prescribers of medicines, especially in relation to safety. Since in my role as a neonatal nurse I already knew that prescribing education was not specific to my needs and that of my peers, as it is generic and not speciality specific, I also wondered if this was the case for others. Also did this lack of appropriate education make prescribing more difficult than necessary and add to the potential risk for errors to occur, since staff may be ill prepared for their role.

The literature demonstrated that there was similarity among both nursing and medical fraternities and that they both felt that their initial education could be improved in order to make them better prescribers (Morrison-Griffiths 2002, Maxwell & Walley 2003, Travers 2005, Han & Maxwell 2006, Coombes et al 2007, Medical Schools Council 2007, Tobaiqy et al 2007, Heaton et al 2008, Lyme et al 2008, Ross et al 2008).

It was therefore important to include this proposition within the study as this could then help to shape the analysis of the data and the results could then be applied locally to both the Trust and the institutes of higher education.

Non-traditional prescribers have more insight into near misses than traditional prescribers.

During the literature review on incident reporting it became evident that nursing staff, which form part of the non-traditional group of prescribers, report incidents more commonly than the medical staff (Vincent et al 1999, Waring 2005, Evans et al 2006, Armitage et al 2007, House of Commons 2009, Hutchinson et al 2009), and that some of these are near misses. This outlines practice but does not explain why this should be the case.

The literature also outlines that near misses can be used to teach staff about any weaknesses which lies within systems and which can cause mistakes to happen in the future (Stanhope et al 1999, Jeffs et al 2008). It was also therefore important to identify if staff can recognize near misses

and if they have an awareness of them since they are then more likely to have safety as a focus during their work. This was included within the proposition so that the safety awareness of prescribers could be identified from the data collected and any differences between groups assessed.

All prescribers within the Trust outline similar issues which they feel affect how drug errors occur.

Within the safety literature there is an acknowledgement that employees in organisations do not deliberately make mistakes and that these occur due to the human condition (Reason 2001, Reason 2004). However, there is also a belief that the very same staff are also in a position to be able to identify situations considered to be unsafe, thus are crucial to reducing risk (Reason 2004, Marck et al 2006, NPSA 2008a).

It was therefore important to look at the prescribing staff's own perception of what they felt caused drug errors to occur in order that this insiders information could be used positively within the organisation being studied to improve prescribing safety. Therefore a proposition around this issue was included to identify this and to also compare the insight of both groups of prescribing practitioners.

Drug errors and near misses are not affected by sex or number of years experience.

The literature on errors has often portrayed the people responsible as being careless and in the past blame was used liberally in relation to medication incidents, especially concerning nurses and administration errors (Reason 2000, Anderson & Webster 2001, Mayo & Duncan 2004, Schelbred & Nord 2004). There is also an assumption that the less experience you have as a practitioner, the more mistakes you are likely to make. This has been discussed in the literature in relation to the level of experience which staff have who make not only medication errors but also in relation to which staff works in hospitals at night and during the weekend. With the literature

uncovering that there are more patients put at risk or who die as a result of fewer senior staff being available (O'Shea 1999, Bell & Redelmeier 2001, Becker 2007, Bailey et al 2008, Laupland 2008).
More recently there is a suspicion that more errors occur due to the clinicians lack of math ability and the theory that errors have occurred simply because the personnel involved cannot count (O'Shea 1999, Wright 2009). Reason (2009) however has maintained that it is often the best people who make the worst mistakes and that any error caused bears no relation to the expertise or years of practice. However, it was important to look at these characteristics and attempt to apply them to the data in the study. The addition of gender was also included within this proposition since traditional prescribers, or medical staff are commonly male and non-traditional prescribers, or nurses are more commonly female. This provided another comparison which could easily be made within the study and was likely to add another dimension to the analysis.

A full view of the lens model, the propositions and an analysis of the interview data are outlined in appendix ten. This describes exactly the steps taken within the thematic analysis to both outline and defend some of the criticisms listed above and also ensure the trustworthiness of the data.

2.12.3 Maintenance of rigor

Trustworthiness is a term used within qualitative research to ensure that certain steps have been taken to prove the quality or rigor of a study (Shenton 2004)
Credibility, dependability and transferability are all concepts which have been used to outline the trustworthiness of research outcomes in qualitative designs (Graneheim & Lundman 2003, Gray 2009), thus demonstrating a certain parity with concepts used in quantitative research, albeit using a different terminology.

The use of varied methods of data gathering and analysis, as seen in this mixed method design, is one way of establishing credibility (Gray 2009). Also, as part of thematic analysis, interview data were returned to the study participants for validation. It has been suggested by Horsburgh (2003) that this type of validation is unnecessary and that it may indeed by unhelpful as the researcher and the participants will have different agenda's driving their involvement and analysis. However, the participants here were invited to review their own transcripts and the themes that had been taken from this by the researcher in order to establish that this did demonstrate accurately the points that were being made during their interview.
One further aspect of trustworthiness is reliability. Reliability was increased within the study by using multiple methods of data collection taken from multiple sources and analysed using a variety of methods (Gray 2009).

2.12.4 The Brunswikian Lens Model

Finally, all of the data from the three subunits were analysed using the Brunswikian Lens Model (Scholz & Tietje 2002).
Egon Brunswick was the psychologist responsible for this model. It is based on the human ability to perceive with its foundations on how an individual is able to visualise something, involving not only one's ability to see via the eyes but also use other interrelated aspects of discernment (Scholz & Tietje 2002). Brunswick was fascinated with the human ability to take in the many different facets or the chaos of the environment and fashion them into something that was clearly understood and comprehended (Scholz & Tietje 2002). This includes how the relationships with other variables or cues within the environment are perceived by the individual and how these are processed, using value judgements to create order (Wigton 2008). During this process many influences enter the body in order for a smaller, clearer picture to be processed in the mind. Thus the Brunswikian lens itself is

generally shown similar to that of an eye with a lens capable of processing information.

Within the context of the study, this involved breaking down or deconstructing all of the composite parts of the case, then assessing the analysed evidence relating to each identified issue. The information was then synthesised together as a whole through the lens in order that a new conception of the case emerged. This was done using a set of predetermined propositions or assumptions which had been set at the beginning of the study, and as such secondary analysis was also possible. In order to do this the issues involved were deconstructed and propositions were posed from various perspectives of the case, that is, things which the researcher thought were important or were perceived as issues within the study as well as essential elements from the literature. These were used to interrogate the data in its entirety both within the subunits and between the subunits and then a new way of looking at the data emerged. The Brunswikian lens and the model utilised can be found in schematics appendix ten.

The following chapter concentrates on how this data was analysed and what results were gained as a result.

2.13 Writing up the case study report

There are several theories regarding how case studies should be written. This is generally based on who the targeted audience is as well as the type of case study that was undertaken.

Gray (2009) suggests that single case studies should be reported by merely outlining a description followed by an analysis. Alternatively, Yin (2009) advocates that one of six types of compositional structure is used to report case study data and these include linear-analytical, comparative, chronological, theory-building, suspense and unsequenced. Simons (2009)

proposes that researchers should not be constricted by the traditional concepts of report writing and describes more artistic representations such as poetry and dance or the use of pictures and videos.

What all authors agree on is that it must be structured to include the information that the intended audience would wish to see (Gary 2009, Simons 2009, Yin 2009).

This report was composed in a more traditional linear-analytical structure but was also combined with some schematic representations of how the study was both conducted and analysed. This particular design was utilised for several reasons but primarily because the study was being written for an academic readership. It is acknowledged within the literature that academics expect to see research studies written in a more conventional way (Robson 2002, Gray 2009, Simons 2009, Yin 2009).

In contrast to this convention, schematics were also included in order to both increase the ease in understanding the study as well as augmenting the methodological rigour (Rosenberg & Yates 2007).

However, this was also the best fit with what was being portrayed within the study since it followed a logical order, setting out the topic initially and then outlining how the study was undertaken and what the overall results and conclusions demonstrated. This will enable the report to function as a working document, used and understood by clinicians, with utility in practice.

Chapter 3 – Analysis and Results

3.1 Introduction

The study set out to answer the question and related aims as profiled on page twenty-seven.

As outlined previously within the methodology chapter, the study was divided into three different subunits for data collection. This included using different forms of data which is advocated in embedded case study analysis of this nature (Scholz & Tietje 2002, Yin 2009) and incorporated archival records, medicine prescriptions and semi-structured interview data.
During the analysis phase the three subunits were analysed individually, with the prescription data being matched against a validated error tool published by Dean et al (2000) and the qualitative data being thematically analysed using Colaizzi's procedural steps (1978).

Subunit one included the coding and assessment of one year's worth of prescribing incident reports sent via the Trust Datix electronic reporting system. Subunit two involved the semi-structured interviews of ten traditional prescribers and ten non-traditional prescribers. And the final subunit involved coding and analysing 'real time' prescriptions which prescribers had consented to scrutiny.
Each subunit, once complete, was then analysed with the other and any patterns that emerged were identified.
Secondary analysis then took place using the Brunswikian lens and the predetermined propositions which were set at the beginning of the study. A schematical representation of all of the analysis can be found in appendix ten.

3.2 Analysis of subunit one of the study - incident reports.

Incident forms (Datix forms) relating to prescribing incidents were retrospectively analysed for one year covering the period from April 2008 to March 2009. There were one hundred and seventeen in total and all were matched against a validated medication error tool published by Dean et al (2000) and subsequently analysed. Table 3.1 shows the spread of errors and near misses.

Table 3.1: Spread of errors and near misses by group

Group	Errors	Near Misses	Discarded
Non-traditional Prescribers	0	3	2
Traditional Prescribers	49	58	5
Totals	49	61	7

Putting this in context within the organisation, one hundred and seventeen reported incidents is not a large number when compared with the number of prescriptions which are written each month within a Trust this size. On average, two thousand prescriptions are generated each month, giving a total of twenty-four thousand annually. This includes in-patient and well as out-patient prescriptions.

The Trust has no typical figures for the number of in-patient prescriptions which are written by traditional and non-traditional prescribers. This is simply due to the fact that there is some variation regarding where non-traditional prescribers practice. Some wards work almost exclusively with specialist nurses who are non-traditional prescribers and within these particular departments one hundred percent of the in-patient prescriptions will be written by non-traditional prescribers. However, other areas may have very few or indeed no non-traditional prescribers and as such one

hundred percent of these in-patient prescriptions will be written by the traditional medical staff. Other areas have more of a mixture of traditional and non-traditional prescribers and again the numbers of in-patient prescriptions written by each group will vary. Therefore no mean value for either group would provide an accurate measurement across the whole organisation.

In relation to out-patient prescriptions, which were specifically looked at within the second and third subunit of this study, there are around five hundred and thirty out-patient prescriptions written each month (six thousand, three hundred and sixty annually) with ninety-six percent being attributed to traditional prescribers and four percent to non-traditional prescribers. See table 3.2 below. Therefore the vast majority of out-patient prescriptions continued to be written by traditional prescribers at the time of the research.

Table 3.2: Out-Patient prescribing in context

Out-Patient Prescriptions		**Prescribed by traditional prescriber**	**Prescribed by non-traditional prescriber**
Monthly Figure	530	96%	4%
Annual Figure	6360		

3.2.1 Non-traditional Prescribers Datix Data

There were five incidents coded to the non-traditional prescribing group. Two of these were coded wrongly since one was related to wrong information given to a patient via a telephone call and the other related to an administration error rather than the prescription; as such these were discarded.

The other three were near misses rather than errors as both were identified prior to them ever reaching a patient.

3.2.2 Prescribing near misses

Two near misses involved drugs used in diabetes and both could be coded as 'prescribing a drug, dose or route that is not that intended' (Dean et al 2000). In fact milligrams were prescribed rather than micrograms. Both incidents related to drugs used in diabetes.

The third near miss was coded as 'not taking into account a potentially significant drug interaction' (Dean et al 2000). This involved the prescription of an oral dermatology drug.

These occurred in three different specialist areas dermatology, neurosciences and acute medicine. Two near misses were identified by pharmacy whilst the third was identified by the nursing staff.

Over one year there were very few non-traditional prescribing errors reported. However, the trust had only very recently begun to code errors described as 'non-medical' separately from all other prescribing errors. Since the year examined included such a small sample, the next year of reports from 2009-2010 were also viewed electronically. In this year there were no other reports of non-traditional prescribing errors which could be analysed.

Since the study began the numbers of non-traditional prescribers within the trust has risen by one hundred percent and in this time the number of prescribing incidents from this group has not increased, according to the incident reports. There is therefore, a tenuous assumption, based on the incidents recorded via the electronic reporting system that non-traditional prescribing remains safe.

Due to the small number of prescription incidents reported which were available to analyse among this group, a description of the data was used across both groups as it was not possible to analyse them statistically.

3.2.3 Traditional Prescribers Datix Data

There were one hundred and twelve reported traditional errors on the Datix system.

Four were duplicates and were discarded. One further incident was not an actual incident since it was for a patient who was sent home without antibiotics, but the physician in question decided that the patient did not require them anyway. This left one hundred and seven for review.

From this fifty-eight were near misses and forty-nine were errors affecting patients. Within the forty-nine errors, nursing staff identified the error in twenty-one cases but in a further twenty-one it was also not possible to tell who had identified the error as there was not enough information on the form. However, there were some that were identified by the pharmacist, some by the patient themselves and also the patient's family. The errors are outlined in some detail below.

3.2.4 Prescribing Errors

The most common error to occur in the traditional group was those relating to 'prescribing a drug, dose or route that is not that intended' (Dean et al 2000). There were fourteen errors of this nature and they pertained to a variety of drugs including prednisolone, opiates, antibiotics, tegretol, perindopril and dalteparin. In five cases the drug involved was not mentioned in the incident report. Seven were related to overdoses of the drug, two were under doses of the drug concerned, one patient was prescribed the wrong antibiotic, one patient was prescribed a drug which was for another patient and in three of the cases no further information was given.

In five cases the incidents related to 'prescribing a dose that is either above that recommended, not recommended for the formulation prescribed or one that cannot readily be administered' (Dean et al 2000).
The drugs involved here included antibiotics, fentanyl, heparin and calcium. In these cases four of the patients received an overdose as a result and the final patient received an under dose.
A further six incidents pertained to 'prescribing two drugs for the same indication when only one of the drugs was necessary' (Dean et al 2000). Two related to prescriptions of morphine for patients who also had working epidurals. One related to a prescription for co-dydramol, co-codamol and paracaetamol; all of which were prescribed four times per day and at the same time providing a large overdose of paracaetamol as well as codeine. The fourth also related to paracaetamol since a patient was prescribed this in hospital and then also by their GP, they had taken both and were admitted to the accident and emergency department with an accidental paracaetamol overdose. The fifth related to giving a patient a loading dose and then maintenance dose of clopidogrel despite the patient already being on this drug, thus an overdose of the drug; whilst the fifth incident did not have any details listed.

Another five incidents included 'writing an ambiguous medication order' (Dean et al 2000). As a result this involved a patient missing out on medication they should have received, three patients getting an overdose of their medication, leading to hypoglycaemia in one and confusion in another patient requiring pain management. Drugs included here were morphine, insulin, prednisolone, dexamethasone and ceftriaxone.

There were four related to 'unintentionally not prescribing a drug for a clinical condition for which medication is indicated' (Dean et al 2000). This

included a dexamethasone and antibiotic combination post surgery, co-careldopa and also ropinirole. The third drug was not named.

There were four incidents identified as errors within the Trust Datix system. Using the error tool by Dean et al (2000) however, these would have been coded as 'prescribing contrary to hospital treatment guidelines' and as such are classed in the document as 'situations that should be excluded as prescribing errors' (p235). In these incidents one pertained to a warfarin introduction regime being prescribed and administered wrongly, the second related to an unnamed drug being prescribed for a patient and administered at fifty percent greater than the recommended hospital guidelines, the third related to a patient being administered 'prescription only medicines', in this case amphotericin, to be taken at home without any instructions and the fourth related to an error in the prescription of palliative care treatment which led to a patient with existing renal failure being given a large dose of opiates that resulted in seizures.

Another three related to the 'prescription of a drug to which the patient has a documented clinical significant allergy' (Dean et al 2000). In this instance two of the prescriptions were for penicillin based antibiotics in patients who had a documented penicillin allergy. The third was for a patient who had a history of arrhythmias and the unnamed drug was contraindicated in this case, though was not detected until after the patient had consumed the medication.

A further three related to 'prescribing a drug that should be given at specific times in relation to meals without specifying this information on the prescription' (Dean et al 2000). Two of which were related to diabetic drugs not being administered with food and the third was not identified.

There were two related to 'writing a prescription for discharge medication that unintentionally deviates from the medication prescribed on the in-patient drug chart' (Dean et al 2000). One of these drugs was dalteparin and this was an overdose in the prescription and the other drug was not named but was identified as an under dose.

One related to the 'omission of a signature' (Dean et al 2000) and in this instance the drug had been administered by staff regardless. No drug was identified.

One related to 'continuing a prescription for longer than necessary' (Dean et al 2000) and in this case antibiotics were given for nine days longer than required in a paediatric case.

One related to 'writing milligrams when micrograms was intended' (Dean et al 2000). This involved the prescription of one hundred and fifty milligrams of clonidine instead of one hundred and fifty micrograms. According to the prescription chart the patient had been receiving this despite the tablets only being available in twenty-five microgram strength, necessitating that sixty tablets were given at each dose. It is apparent from this that the staff assumed that the prescription was micrograms and had been administering an accurate dose, thus the patient came to no harm.

In the error group the most common drugs to be involved were antibiotics, opiates, diabetic agents, steroids and anticoagulants. From these groups of drugs at least two of them have trust guidance to help in their prescription, but they continue to be implicated in errors.

3.2.5 Prescribing near misses

There were fifty-eight near misses within the traditional data collected. The majority, thirty-eight were detected by the nursing staff whilst fifteen were identified by pharmacy. Two were picked up by the patient themselves and one by the patient's family and a further two did not have enough information in them to determine who identified the near misses.
The largest group of near misses was the same as the largest group of errors and related to: 'prescribing a drug, dose or route that is not that intended' (Dean et al 2000). There were fourteen near misses of this nature and they related to prescribing the wrong dose, for example clonazepam five milligrams for a child when it should have been zero point two milligrams; prescribing medication to be given on the wrong days; prescribing the wrong drug e.g. actrapid when it should have been novorapid and insulatard; and prescribing something that had been discontinued the previous week. Drugs involved here included diabetic drugs, chemotherapy drugs, benzodiazepines, anticonvulsants, opiates, steroids, antidepressants, diuretics, calcium channel blockers and retinoids. Three did not have the medication listed. The rationales given for these near misses included transcription errors, ambiguous writing and times not being clearly identified on the drug chart.

Twelve near misses pertained to 'prescribing a drug in a dose above the maximum dose recommended in the BNF or data sheet' (Dean et al 2000). In one case an antibiotic was prescribed at ten times the recommended dose and in another thyroxine was prescribed at a hundred times higher than the recommended dose
Drugs involved here included antibiotics, thyroxine, chemotherapy drugs, opiates, respiratory stimulants, synthetic anti-androgen, vasodilatory drugs, non-steroidal anti-inflammatory drugs and low molecular weight heparin. In one case the drug was not clearly identified.

In ten of the cases the near miss related to 'writing an ambiguous medication order' (Dean et al 2000). Four related specifically to morphine whilst a fifth related to another controlled drug, though this was not specified. All five had issues relating to wrongly written hospital prescriptions based on the trust guidance around opiates. One incident was described as requiring four attempts by pharmacy and the prescriber in question till the prescription was accurate due to the prescriber's unfamiliarity with the hospital guidelines during that particular week; this was likely to be due to the handover of new junior medical staff.
Other ambiguities involved a lack of detail around the frequency of the drugs to be given, unclear detail on the drug itself or alterations made to the prescription rendering it indistinct.
Drugs included morphine, heparin, anti-epileptics, respiratory stimulants and calcium additives.

In four of the cases the issue was 'writing a prescription for discharge medication that unintentionally deviates from the medication prescribed on the in-patient drug chart' (Dean et al 2000).
Two of these were errors with the dose and the other two related to drugs that were missing on the prescription. Drugs in these prescriptions included ACE (angiotensin-converting) inhibitors, insulin, aspirin, anti-epileptics and hydroxocobalamine.

Four related to 'prescribing contrary to hospital or national guidelines' (Dean et al 2000) which is seen as a 'situation that should be excluded as a prescribing error' (p235). These four situations included two separate chemotherapy drugs being prescribed wrongly, vitamin K being prescribed via the intravenous route rather than the practice of intramuscular route and dispensing a prescription to a patient with the wrong addressograph. There are potential problems with all of these near misses.

Three further near misses related to 'prescribing two drugs for the same indication when only one of the drugs is necessary' (Dean et al 2000). Drugs included here were analgesics, asthma inhalers and a thiazide diuretic.
Two related to 'prescribing a dose that cannot be readily administered using the dosage forms available' (Dean et al 2000). One was for a strength of drug which is not manufactured and the other was for milligrams instead of units. Drugs involved here were opiates and insulin.

A further two related to 'prescribing a dose regime (dose/frequency) that is not that recommended for the formulation prescribed' (Dean et al 2000). Both were overdoses of the drugs involved and included a non-steroidal anti-inflammatory for a child and a non-opiod analgesic for an adult.

Two related to 'prescribing a drug that should be given at specific times in relation to meals without specifying this information on the prescription' (Dean et al 2000). Although not specified, it is likely that both of these near misses were related to diabetic drugs.

Another two pertained to 'unintentionally not prescribing a drug for a clinical condition for which medication is indicated' (Dean et al 2000). In one case the patient had only five of the fifteen required medications prescribed when they returned to hospital from outside and the other patient had them omitted when transferring from one hospital to another. No mention is made of the drugs involved.

One related to 'not taking into account a potentially significant drug interaction' (Dean et al 2000). This involved a patient being prescribed both aspirin and clopidogrel following a haemorrhage.

One pertained to the 'prescription of a drug to which the patient has a documented clinically significant allergy' (Dean et al 2000); which was the prescription for an antibiotic which the patient had an allergy to.

In the final near miss the prescriber's signature had been omitted.

In the near miss group there was a greater selection of drugs involved. However, diabetic drugs, heparin and opiates were again represented. These are drugs which feature highly in both categories and as such could be identified as the drugs which need to be included most frequently among any future staff training opportunities.

In several of the reports the drugs were not identified. In these cases it is not possible therefore to look at the overall incident and make some recommendations as to how this could be improved in the future to avoid this particular mistake from occurring again.
The majority of the incidents also did not outline if any harm came to the patient as a result. Many incidents will not lead to any obvious harm but in those that do, a clearly explained and contemporaneous incident report may help in the event of information required for the patient or the patient's family and also if a complaint ensues. From a risk management perspective the incident reports need to have a basic level of information included as standard and it may improve the quality of the incident reports in future if there were clear guidelines as to what information should be included. This could also be improved if these sections were also compulsory in nature thus not allowing the reporter to send the Datix form until these sections had been completed.

Table 3.3 below outlines the type of errors and near misses which occurred most frequently. It also outlines those which did not occur at all, or at least

which were not reported, according to the listings as per the Dean et al's (2000) error tool.

The tool provided a relatively consistent method of cataloguing errors and near misses in a formal way. There is no such tool utilised at present within the Trust and as a result this can cause confusion and ambiguity to the staff using the system.

3.2.6 Analysis of the error tool used

Whilst it was important to provide a consistent approach to defining errors and thus collecting them, there were shortcomings with the tool used (Dean et al 2000). The tool itself is divided into three sections, one of them ultimately allowing specific prescribing situations to be classed as 'situations which should be excluded as prescribing errors' (Dean et al 2000, p235). This includes such items as prescribing contrary to both hospital as well as national guidelines. In this particular study these have been coded as errors because they were reported as such. However, within the true definition of the tool, this would not be the case. In the Dean et al paper (2000), the error tool was created using a Delphi study which included a purposeful sample of thirty-four health care professionals with experience of clinical care of health related risk. Whilst they came to a consensus of in order to provide an operational definition of what should be classed as an error, they also created a tool which allows some user subjectivity. Therefore classification of errors can still be problematic and demands clear guidance from the organisation utilising it. This topic will be revisited in the discussion chapter.

Table 3.3: Spread of types of errors and near misses among traditional and non-traditional prescribers – utilising the table by Dean et al (2000)

Types of Errors	Number of errors (Traditional)	Number of errors (Non-traditional)	Number of near misses (Traditional)	Number of near misses (Non-traditional)	Total number
1. Prescription of a drug to which the patient has a documented clinically significant allergy.	3	0	1	0	**4**
2. Not taking into account a potentially significant drug interaction.	0	0	1	1	**2**
3. Prescribing two drugs for the same indication when only one of the drugs is necessary.	6	0	3	0	**9**
4. Prescribing a drug to be given by intravenous infusion in a diluent that is incompatible with the drug prescribed.	0	0	0	0	
5. Prescribing a drug to be infused via an intravenous peripheral line, in a concentration greater than that recommended for peripheral administration.	0	0	0	0	
6. Prescribing a drug, dose or route that is not that intended.	14	0	14	2	**30**
7. Writing illegibly.	0	0	0	0	
8. Writing a drugs name using abbreviations or other non-standard nomenclature.	0	0	0	0	
9. Writing an ambiguous medication order.	5	0	10	0	**15**
10. Prescribing 'one tablet' of a drug that is available in more than one strength of tablet.	0	0	0	0	
11. Omission of the route of administration for a drug that can be given by	0	0	0	0	

more than one route.					
12. Prescribing a drug to be given by intermittent intravenous infusion without specifying the duration over which it is to be infused.	0	0	0	0	
13. Omission of the prescribers signature.	1	0	1	0	**2**
14. Writing milligrams when micrograms was intended.	1	0	0	0	**1**
15. Writing a prescription for discharge medication that unintentionally deviates from the medication prescribed on the in-patient drug chart.	2	0	4	0	**6**
16. Prescribing a drug in a dose above the maximum dose recommended in the BNF or data sheet.	0	0	0	0	
17. Misspelling a drug name.	0	0	0	0	
18. Prescribing a dose that cannot be readily administered using the dosage forms available.	0	0	0	0	
19. Prescribing a dose regimen (dose/frequency) that is not that recommended for the formulation prescribed.	0	0	0	0	
20. Continuing a prescription for a longer duration than necessary.	1	0	0	0	**1**
21. Prescribing a drug that should be given at specific times in relation to meals without specifying this information on the prescription.	0	0	0	0	
Situations that may be considered prescribing errors depending on the individual clinical situation	**Number of Errors**		**Number of Near Misses**		**Total**
1. Prescribing a drug in a dose above the maximum dose recommended in the BNF or data sheet.	2	0	12	0	**14**
2. Misspelling a drug name.	0	0	0	0	
3. Prescribing a dose that cannot be readily administered using the	2	0	2	0	**4**

dosage forms available.					
4. Prescribing a dose regime (dose/frequency) that is not that recommended for the formulation prescribed.	1	0	2	0	**3**
5. Continuing a prescription for a longer duration than necessary.	0	0	0	0	
6. Prescribing a drug that should be given at specific times in relation to meals without specifying this information on the prescription.	3	0	2	0	**5**
7. Unintentionally not prescribing a drug for a clinical condition for which medication is indicated.	4	0	2	0	**6**
Situations that should be excluded as prescribing errors	**Number of Errors**		**Number of Near Misses**		**Total**
1. Prescribing by brand name (as opposed to generic name).	0	0	0	0	
2. Prescribing a drug without informing the patient of its uses and potential side effects.	0	0	0	0	
3. Prescribing a drug for which there is no evidence of efficacy, because the patient wishes it.	0	0	0	0	
4. Prescribing for a child a drug that has no product license for use in children.	0	0	0	0	
5. Prescribing a drug that is not in the hospital formulary.	0	0	0	0	
6. Prescribing contrary to hospital treatment guidelines.	4	0	3	0	**7**
7. Prescribing contrary to national treatment guidelines.	0	0	1	0	**1**
8. Prescribing for an indication that is not the drug's product license.	0	0	0	0	
	49	**0**	**58**	**3**	**110**

3.2.7. Location of the error or near miss

The incident reports catalogued occurred in seven divisions within the Trust, see table 3.4. In the non-traditional group there were three separate near miss incidents but in disparate divisions. In the traditional group however the division with the highest number of reported errors and near misses was acute medicine. This division is also the largest one in the institution with the most number of patients at any one time.

Table 3.4: Errors and near misses by division and by group

Specialist Area	Number of Errors Traditional Group	Number of Errors Non-Traditional Group	Number of Near Misses Traditional Group	Number of Near Misses Non-Traditional Group
Acute Medicine	13	0	17	1
Cardiothoracics	11	0	6	0
Neurosciences	9	0	8	1
Women & Children	5	0	9	0
Speciality Medicine	4	0	6	1
Surgery	4	0	4	0
Trauma	2	0	5	0
PCT	1	0	0	0
	49	0	55	3

3.3 Analysis of subunit two of the study - Interviews

Twenty interviews were undertaken, ten each with traditional and non-traditional prescribers. Tables 3.5 and 3.6 outline the demographic details of each.

Table 3.5: Demographics of the non-traditional sample

No	Specialist area (n=10)	Male/Female	Number of years prescribing
1	Ophthalmology	Female	5 years
2	Cardiothoracics	Female	1 year
3	Cardiothoracics	Female	3 years
4	Cardiothoracics	Female	4 years
5	Cardiology	Female	4 years
6	Infectious Diseases	Male	10 years
7	Wound care	Female	10 years
8	Diabetes	Female	2 years
9	Diabetes	Female	5 years
10	Urology	Female	2 years

Table 3.6: Demographics of the traditional sample

No	Specialist area (n=10)	Male/Female	Number of years prescribing
1	Infectious Diseases	Male	20 years
2	Infectious Diseases	Male	25 years
3	Cardiology	Male	20 years
4	Cardiology	Male	7 years
5	Cardiology	Male	29 years
6	Cardiology	Male	7 years
7	Diabetes & Endocrinology	Male	15 years
8	Diabetes & Endocrinology	Male	3 years
9	Diabetes & Endocrinology	Male	20 years
10	Cardiology	Male	7 years

3.3.1 Male versus female split of participants

Within the two sample groups there is clearly a split of males versus females. The non-traditional group were all nursing staff and within the sample of forty-one invited, only two were male.

The traditional group recruited however, were all male. Within the sample of thirty-eight who were initially invited to participate there were only three females. Subsequently none of them wished to take part in the study.

It is unclear if this split of males to females within the interview samples affected the results and this is examined more closely within the discussion chapter.

3.3.2 Timing of the interviews

The interviews themselves lasted for between twenty minutes and seventy-two minutes and those undertaken with the traditional group were almost all shorter than those with the non-traditional group, see table 3.7. With the average time of interview for traditional prescribers being just over twenty-nine minutes and the average time for non-traditional prescribers interviews being almost fifty minutes.

Table 3.7: Total interview times for all participants

Traditional	Length of interviews (mins)	Non-traditional	Length of Interviews (mins)
1	**23**	1	**41**
2	**33**	2	**42**
3	**30**	3	**53**
4	**33**	4	**43**
5	**21**	5	**49**
6	**55**	6	**52**
7	**34**	7	**32**
8	**20**	8	**43**
9	**22**	9	**72**
10	**23**	10	**69**

All were digitally recorded, transcribed and then analysed using Colaizzi's procedural Steps (1978). All were returned to the participants for comments on the thematic analysis, with only one participant asking for a very slight amendment to be made since the researcher had misunderstood exactly what had been said. This did not however make any alteration to the final themes.

3.3.3 Emergent themes

Seven themes emerged from the interviews using the coding previously described (see Appendix 10 for more in depth analysis):

I. Education to prescribe
II. Support during prescribing
III. Confidence to prescribe
IV. Errors and near misses in practice
V. Incident reporting
VI. Continued prescribing education and update to maintain safety
VII. Further safety issues

Comments attributed to participants are written in italics and coded according to their 'traditional' or 'non-traditional' group and by numbers 1 to 10, since there were ten in each group. The quote used is also coded with the page number on each transcription so that they are more easily audited.

3.3.4 Education to prescribe

Both groups identified that there were negative issues with the initial training that enabled them to prescribe.

The non-traditional prescribers outlined that the course was not particularly suitable for them, especially within their specialist areas.

'I thought it was dreadful and didn't really get very much out of it at all...
...Can I just say going to some of those sessions is a waste of time... I could probably have sat at home and read and probably got more out of it...' (Non-traditional 6, p1 and p3)

'...I'm obviously with a cardiac background so I had two hours in the whole of the six months on the key drugs for my speciality...' (Non-traditional 9, p1)

They also felt let down by the lack of content and because much of it was based within primary care rather than secondary or acute care.

'It was very much pitched at primary care and some of the things that I would have liked them to go into in more detail are things like pharmacokinetics and things like that and that was... just skirted across...' (Non-traditional 6, p6)

'So if there was a little weakness about it... it was that it didn't ... there was less emphasis on the secondary care side of it...' (Non-traditional 8, p1)

Due to the fact that many participants found the course was not particularly aimed at them within either secondary care or within their specialist area this was something that was pointed out as being a safety issue right from the start of their journey to become prescribers.

'...So I didn't feel that any of that training, any of the education that was given to us actually taught us how to be safe prescribers, there wasn't an actual safe prescribing element to it...' (Non-traditional 9, p1)

One participant outlined that it would be more suitable if the course was based around specialist modules in order that staff would not have to learn information that was not going to be beneficial in practice, but that they had

more targeted training to make them fit for purpose. This could be preceded by commonly used information which everyone would need.

> *'So you could, maybe do it generically how drugs are absorbed, taken, how they affect the body... but then branch off to your specific areas... if you're an ENT nurse and you want to prescribe in ENT, then you just study that area of the body so you become quite skilled at doing your assessment and prescribing in that area...'* (Non-traditional 10, p3)

There were only three participants from the non-traditional prescribing group who felt that the course was useful in its present form.

> *'...I thought it was...actually I thought it was quite good...I've heard other people saying they didn't but I thought it was quite good; but it wasn't what I expected...'* (Non-traditional 1, p1)

> *...'I got a lot out of the course and I was glad I did it and I've recommended it to other people that I work with...'* (Non-traditional 7, p1)

> *'...so it was about a four month course, and I thought it was a very good course actually...* (Non-traditional 8, p1)

This group also outlined that having a clinical skills qualification or the ability to undertake a history, examination and diagnosis on their patients prior to undertaking the prescribing course would result in making this process much safer for nurses. (This is now currently the case for nurses in this trust undertaking a prescribing course.)

> *'it would have been nicer if you'd have done some kind of clinical skills before...I hadn't done my clinical skills and the girls who have done clinical skills...they seemed to have a better... preparation for it....'*(Non-traditional 1, p1)

The traditional prescribers felt that their training was lacking but for different reasons to the non-traditional prescribers. In the past this was mainly due to lack of knowledge about actually writing prescriptions, since it was felt that a good grounding was given on other aspects of prescribing.

> [On how they were taught to prescribe 25 years ago] '*...they did a lot of very good pharmacology teaching... and clinical pharmacology... A lot of that would be on interactions of drugs and ...the basic science of it all. When it comes to prescribing I think in my day... you were taught on the floor by your senior... See it, do it, teach it... So I think today's way is better if it's directed teaching...*' (Traditional 7, p1)

> [Prescribing training was] '*...Pretty limited for us, there was no structured education as an undergraduate...You'd be taught pharmacology and you'd be told 'these drugs do this, these are the doses we give' but I can't remember any sessions at all as an undergraduate where they sat us down with drug charts and said 'here's a drug chart, this is how you fill one in...*' (Traditional 6, p1)

Whereas more recently, the traditional group mostly felt that some of the reasons for errors in prescribing was a lack of actual pharmacology knowledge as well as methods used to deliver education such as problem based learning.

> [Today's junior doctors] '*...They have no training whatsoever in terms of they know nothing about drugs when they come out of medical school... They may know about a group of agents that you prescribe for a condition but they do not know individual drugs, they do not know the doses or anything like that and they should... medical school is not just theory, its practice as well..*' (Traditional 3, p1)

> '*...You can pick up the top three errors in prescribing and drill them into students until they're fed up of it, in different ways, be it practical prescribing, workshops where they're actually prescribing, theoretical teaching, I think we need to focus on those common things. Because*

then if you spend ages spending some time teaching medical students those things, when in five years time when they graduate those things should be disappearing...' (Traditional 4, p12)

Also identified by the traditional prescribers was the fact that they had more access to senior staff that they relied on for assistance than occurred in previous years.

'...we were given a lot of autonomy in terms of autonomy in responsibility i.e. it was our job to get the dose right and to prescribe appropriately so we were more careful and looked up things and sort of found out more about prescribing... Juniors these days have got so much of a consultant and senior presence on the ward they are having a lot of those decisions made for them...' (Traditional 5, p1)

There were however some, especially the more junior prescribers who felt that the education that is given today is actually better than previous education and more targeted around problem areas.

'...I think now they have an exam and they have practised prescribing and things like that. I think that's a much better and much more rigorous way...' (Traditional 10, p1)

'...I think how they do it now is pretty good because they know that there's a problem with junior doctors prescribing... on the generic skills course there's a patient safety module and a lot of that is around prescribing errors...' (Traditional 6, p2)

3.3.5 Support during prescribing

Both the traditional and non-traditional prescribers outlined several support mechanisms which had and continued to be responsible for enabling their safe prescribing practice.

For the traditional group this included pharmacists, peers, medical representatives, the British National Formulary (BNF) and on-line resources; generally those specific to their specialist field.

> *'...I was also very aware that the best medical book I have is definitely the BNF by far... It's the book I've used most often throughout my career and it's a book, if I had one book only, it would be the BNF...'* (Traditional 7, p3)

> *'...Undoubtedly it would be a combination of the senior nursing staff on the ward and probably your medical registrar... I suppose consultants were slightly less hands-on than they were now...'* (Traditional 8, p1)

> *'...The pharmacists are on the wards all the time, you're constantly bumping into them so if there's any queries 'oh we're going to use something slightly unusual' we just speak to them and they say 'yeah we can do it, we'll sort it out' or 'we'll find out what dose it should be and we'll get back to you...'* (Traditional 6, p5)

> *'...there's a fantastic website... which is set up by Liverpool University... You just type any old drug and it will tell you, if there's a data on interaction, the data that's saying it's safe or it's dangerous or there's no data at all proceed with caution that will give you an answer almost immediately so that's a well used site...'* (Traditional 7, p3)

The non-traditional group were very similar and tended to also use pharmacists, their peer group, the BNF and medical representatives for support, but they also identified that they utilised the knowledge which came from the Trust non-medical prescribing group meetings, which proved popular with some of the participants.

> *'...obviously the drug reps, I am very conscious that they have a leaning toward their own drugs, but nevertheless they are still useful, I can always get things out of them...'* (Non-traditional 8, p5)

'...Pharmacy are brilliant support...' (Non-traditional 9, p6)

'...the consultant that I work for is very pro nurse specialists and development... so he's always been very supportive...' (Non-traditional 7, p4)

'...it is seeing how different people and different issues that other people have cause it... although its not the same issues as you have its worth thinking about... 'oh right, they approached this like this...and did that about that' so I do think its worth, worth having those meetings...' (Non-traditional 2, p5)

It was outlined however, by several participants from the non-traditional group that despite having support from a variety of people, it was more useful to have this from their own particular peer group.

'...You just need that little bit of support from someone who's been through what you've been through as well... it's really nice to have the consultants to ask, and they're extremely helpful, they would never look down on you, you don't feel embarrassed asking them, you don't feel silly at all, but it is really nice to get the perspective or the advice from somebody who knows what you do and understands it from your point of view..'. (Non-traditional 4, p5)

Another had developed a more unique method of assuring support for themselves as well as others within a particular specialist area, this included supervision as well as providing updates.

'...So what we've done now is, we've set up a (area wide) network and we meet every six weeks... we do nurse prescribing supervision... So we actually do give dedicated time to nurse prescribing supervision... We bring all our queries about drugs, if something's changed and we didn't know anything about it, if something should be prescribed differently... So it is a good group and it does bring a lot of issues up,

...We get a lot of support from that... I suppose it's a way of educating each other because we're learning new things...' (Non-traditional 10, p9)

There is evidence that the non-traditional prescribers use support from their peer group in a more cohesive manner than the traditional prescribers and that they are able to see where this could work well and thus arrange it for their own needs. Though this need for support may be due to the fact that prescribing is still relatively new within nursing and this may not be required once it is more widespread and there is a larger cadre of peers from which to get the same type of supervision. Alternatively, there was also verification that the non-traditional prescribers in this group used reflection more than the traditional prescribers and this may just have been something that is inherently different within the training and socialisation of both distinct groups. This was particularly evident when it came to discussing errors and near misses themselves which is looked at in more detail below.

3.3.6 Confidence to prescribe

When examining the confidence of the prescribers to practice following their initial training there were similarities in both groups. Both outlined that they had indeed been under confident at the beginning and that this had grown once they were exposed to continued prescribing practice.

'...I felt very under confident... because I felt like I had a theoretical background but not the practical background... I'm just trying to remember back and I think I used to check stuff up all the time...' (Traditional 4, p3)

'...Probably not to begin with, I would probably not have been confident but probably within the first one to two years at most I would have been confident...' (Traditional 3, p4)

'...yes, in what I prescribe... because I have this set group of drugs and it's the same things all the time... so I'm very familiar with the drugs and the side effects and that helps you when you're prescribing for somebody else so... yeah, I feel quite confident...' (Non-traditional 7, p3)

However, the confidence of the non-traditional group was also tempered with the anxiety surrounding getting it wrong, and this also made some individuals reluctant to consider themselves to be completely confident, or at least to be sure that they knew their own limitations.

'Probably not [confident*]... I always feel apprehensive about prescribing. ... I think sometimes it's a good thing isn't it to be ... but I always have to be really sure of what I'm prescribing, because you go on the wards as a nurse prescriber and people are like, 'Oh you're a prescriber, will you do this..?' ...I mean I'm fine, I'm quite happy to prescribe... things that I'm comfortable with, but I've always got to read the BNF from cover to cover before I really feel like I can prescribe it...* (Non-traditional 5, p3)

'...I'm a lot more confident than I was with my... with the drugs that I prescribe... so there's still the odd occasions where I still don't want to sign it...I just don't want to sign it cause you know, I'm not, I'm not au fait with all the other medications that they are on... I can't see anything in the BNF but I just don't feel comfortable to write them up or sign it...' (Non-traditional 3, p6)

The non-traditional group did outline that prescribing was something that should only be done by experienced clinicians and those who had spent several years in nursing in order to build up a bank of knowledge. It was seen as being too much for a newly qualified nurse to take on.

'...I don't think student [nurses] *would be ... I think you need that background of, you need to know how to nurse in the first place anyway... nursing is a three year course and you don't really learn that until you're in there as a staff nurse, and you're faced with challenges*

every day, and people asking questions... that's when your learning curve goes because you've been protected for them three years, most of the time. And then, to have to prescribe, and then somebody saying prescribing on top of that...' (Non-traditional 10, p10)

'...I worry in some respects that it becomes... well nurses prescribe now and in a couple of years it will be ...well you'll all go and just do some prescribing and if you dilute it too much, you do open up to more problems...its not as tightly controlled...its not specific roles, you're not quite sure what type of practice is going on...I think we need to be careful to allow it to do what its meant to be doing which is making medicines safer...' (Non-traditional 3, p5)

One participant made the point that nursing would become no better than medicine if everyone undertook prescribing in the same way as all medical staff do.

'...I don't agree with that [nurses taking on prescribing as part of pre-registration training] *because then you would have the same problems that we have with the multitude of House Officers, SHO's, Registrars because you would have so many people prescribing for a smaller group of people ... where a lot of medics they cover such wide areas... They've usually never met the patient before who they're prescribing for so I'm not surprised that there's more errors in that area but I think if nurses end up being put in that similar role they'll just do the same...'* (Non-traditional 9, p8)

Traditional prescribers were harder on themselves believing that prescribing is a fundamental skill which all doctors should have on qualifying.

'...as you go through your training you should be taught as part of a medical student what the dosage is and you should be examined on that before you leave medical school so that you know how to prescribe effectively... when I was taught you had to learn these things and you had to know them to get out of medical school and these days you don't...' (Traditional 3, p2)

One of the more junior traditional prescribers outlined that there was an expectation that they should be skilled in prescribing and that they felt obliged to carry on regardless.

> *'...I get on with it... Which it should be because I think when you're in training to be a consultant, you're half way through your training and in terms of prescribing, it's a skill that you should have been able to do. If you can't do it by now, you should be able to do it...'*
> (Traditional 9, p3)

One striking thing between the groups is that they both outlined that they were confident now in their own particular area where they used a small remit of drugs.

> *'...I think I'm confident in my own field and expertise. But I actually prescribe a relatively small number of drugs...'* (Traditional 8, p2)

> '...[I am confident] *in my field....in my very tiny list....99% yes...'* (Non-traditional 1, p4)

> *'...Yes, I think so... there's a bit of hesitancy there, isn't there? In terms of, on a day to day basis, on a ward round, you use the drugs that you're comfortable with and I'll only do cardiology as opposed to general medicine, so that really narrows what sort of... the drugs I use...'*
> (Traditional 9, p2)

One of the primary issues with the initiation of nurse prescribing was the concern that nurses would be able to prescribe from the whole of the BNF and therefore would use more drugs and make more mistakes (McCartney et al 1999, Duffin et al 2002, Bradley & Nolan 2004, Ryan 2004, While & Biggs 2004). What came very clearly from this study was that in the majority of cases within the non-traditional group, they were only using a relatively small number of drugs and the majority stated that they would feel

uncomfortable or would not choose to prescribe anything that was out with their area of expertise. This was despite being in situations where their colleagues, perhaps in ward situations would ask them to prescribe when they knew that they were able to do so.

> *'...Because of the nature of my work... I prescribe out of five families of drugs, so it's not a huge number anyway...'* (Non-traditional 8, p1)

> '...[if] *I was out and about and saw a patient that was taking a medication... so if he said, oh, I've got a problem, whatever, then I would obviously find that uncomfortable, if I wasn't happy in, with that area, I wouldn't prescribe it... So, it brings you really, very much down to a limited formula that you would use...'* (Non-traditional 10, p6)

> *'... I think it's like every extended role we've taken on; it's just now seen as common practice... And when we go out there, you just prescribe and if we write something in the notes and* [the ward staff] *asks the doctor* [to prescribe] *they say 'can't you do it?' It's viewed as alien if you can't do it... its just expected...'* (Non-traditional 2, p7)

3.3.7 Errors and near misses in practice

When asked if they had been involved either directly or indirectly in a prescribing or drug related error or near miss in their career, many participants said that this had never been the case. Some acknowledged that they may have been but that they either could not remember or perhaps they did not wish to share it. Participants also conceded that staff may not always be entirely honest about such things, perhaps since it may somehow show them in a poor light.

> *'...I'd be a bit dishonest if I said no, I can't think of anyone who's never...'* (Traditional 1, p2)

> *'...I'll do about 25, 30 prescriptions a week so I must make mistakes, it's impossible not to make mistakes...'* (Traditional 7, p8)

There were some participants who recalled errors or near misses with intense clarity. This seemed to depend on the outcome of the incident itself or whether it was them who was responsible for it. One thing was clear; the non-traditional prescribers, who had been involved in incidents, were very hard on themselves and it was obvious that the incident had resulted in self chastisement which in some cases affected their continued prescribing.

> *'...I saw this patient...* [and increased his medication - inadvertently by too much as the drug chart was unclear] *thought no more of it, wrote it in the notes... Then came back to work the following day, an incident report had gone in... If the patient had got it, he probably would have died and I would have killed somebody and that... I mean I must have cried for a week, two weeks... and the thought of that... in my prescriptions now I take a long time... I go back and read through the notes to see what's been written from the doctor's point of view and all the rest of it... But my colleagues at the time, when they got the incident report through... they were kinda trying to reassure me but it didn't, you know, its not their error, its my error... it was my error and I'll never ever forget that for as long as I live...'* (Non-traditional 2, p9)

> *'...if it happens to you you don't forget do you...? you don't because you're mortified, which I was, I was mortified...ehm, I prescribed a tablet...* [which was fairly new on the market] *and I wasn't quite sure of the dose, cause I don't use it... and read it up in the BNF... wrote it down in the notes, this is what I suggest, then went to prescribe it and got interrupted by one of the nurses asking me to look at somebody else... 'will you look at these* [results]*' and 'can you write...will you change this', so I was doing that in the middle of doing the other thing... So when I wrote it in the notes I wrote it correctly but when I wrote it on the actual drug chart, which I was half way through writing... I wrote it wrong... nothing happened because pharmacy rang and said 'this is the wrong dose' which was...thank God...thank*

God...but...oh I was mortified...absolutely mortified... it should have been a milligram and I'd wrote a gram, so it would have been a thousand times higher, the dose...and of course pharmacy said you know you'd have to give the patient a thousand tablets, that can't be right... but I was absolutely mortified...' (non-traditional 1, p7)

[On identifying that a patient who was allergic to penicillin had received the penicillin even though it was not prescribed by this non-traditional prescriber, they were merely responsible for the initial admission when this allergy was highlighted] *'...We were all involved from obviously day one, which was me, but I felt mortified because I kept thinking what else should have I done, but, looking back... when we reflected on it, I did what I was told to do and paid to do and I actually went overboard by saying to nurses put the wristband on, he's allergic to Penicillin, checked him on the ward and admission, don't give him anything, but you have to realise that once that patient's left your boundary it's not your responsibility and you're not accountable for what another prescriber then does, and that's hard to get your head round, and I don't know whether it's because I'm a nurse that I think like that, you're fully responsible... Where medics can switch of the minute they've left that patient...'* (non-traditional 9, p11)

The traditional prescribers on the other hand were more casual when discussing errors or near misses that they had been involved in and much more matter of fact about the consequences. This was possibly due to their length of experience or because they understood that there were other checks and balances in place which would help to safeguard their practice should a prescribing error occur.

'...The biggest error I have always been involved in is prescribing controlled drugs... It's been my bug bear for years... But I would always admit something that is wrong when prescribing a controlled drug... I would often just prescribe morphine and then wait for the call from the pharmacist in half an hour's time to say you've missed this out and you've done this wrong... I think I haven't actually had a call from a pharmacy about that for at least a year now, so I think maybe

that finally after fifteen years I've learned how to prescribe controlled drugs, maybe...' (Traditional 4, p5)

'...Whether I've been ... I suspect over the years I've probably had some involvement with a member of my team prescribing something wrong but I can't honestly recall something to be fair. I think that's a reflection on the fact that certainly in hospital the Pharmacists, no matter what people put on prescription forms, they tend to avert most of those things...' (Traditional 3, p5)

There was however, one traditional prescriber who had been vicariously involved in an error which had led to a patient death. Although he was not directly responsible for anything which happened, having been merely friends with the doctor who was directly involved, the event itself and its ramifications had left a lasting impression.

'...I guess it's not having a witch hunt, although these mistakes happen it's incredibly rare something like that is because of one person and it's the whole no blame culture isn't it? That there's a mistake, it's generally a series of system errors as opposed to deliberate, there's a difference between a mistake and being completely negligent or going out to deliberately harm someone... Yes suspend him but what they need to do is step back and say 'okay, a horrible mistake's happened, the patient's died, the people involved are going to feel horrible, they're going to be blaming themselves. We just need to take stock of this, they need counselling and support and we just need to start at the beginning and just unpick it and get all the facts and see what happens... As opposed to saying 'it's clearly your fault', the impression at the time was it was more that, it was the knee jerk reaction 'you must have done something wrong' without having all the facts. And when you look at it he was a small cog in what went wrong but just the important one...' (Traditional 6, p12)

There was also an issue around what should happen after an error or near miss occurs. One non-traditional participant clearly felt that something should happen to them following a near miss that they were involved in and

when nothing did, it made them consider the value of incident reporting at all.

> *'...I never heard...I never heard anything else... cause I was thinking...right, so what happens now, who's going to call me and make me account for this mistake that I've made and check that I'm not gonna make that mistake again and nothing ever, nothing...I was telling everybody who would listen to me cause I was so mortified... 'Oh you'll never guess what I've done...?' telling all the doctors...this is terrible...I did ...listen to what I've done...and absolutely anyone who would listen I told... my family hated it...but nobody came and said 'right we've had this, you know...we've had this form in about you' and you know 'can you explain how it happened?' but there was nothing there was no... so I thought, does that mean that all the forms I put in, nothing ever happens about them either..?* (Non-traditional 1, p8)

Alternatively when discussing the Trust decision tree around drug errors and near misses (this is a particular process used by the trust to identify what steps need to be taken after any medication incident) and the benefits of using disciplinary action, one non-traditional prescribing participant who had been involved in a near miss felt that in some cases this may only serve to ensure that the person involved ceased using their prescribing skills in the future.

> *'...as regards prescribing, yeah you.... see I would be disciplined wouldn't I? So, its interesting...would I be any better off if I'd been disciplined when I know that I'm never gonna forget this and its gonna always affect the way that I'm always going to be very cautious about how I write things? Will disciplining me make me just not want to do it? I suppose it depends on how discipline is done really...'* (Non-traditional 2, p13)

In the main the non-traditional prescribers tended to reflect on their incidents more than the traditional prescribers and this was obvious from the stories that were told and how they viewed themselves afterwards, with 'mortified'

being the most commonly used word to describe themselves following an incident. It may be that the traditional prescribers felt the same or even used similar techniques, but these were not shared during the process of the interviews.

3.3.8 Incident reporting

There was an overriding theme regarding the incident reporting system within the institution which was the main topic on which nearly everyone had something to say. This mainly centred around four specific issues. Firstly, the misgivings about using the system and how this may impact on anyone who was mentioned within an incident form. Secondly, the fact that there is little or no feedback from the system, thus making staff almost suspicious of its use. Thirdly, the length of time that it takes to complete the report as well as what should be included within it. And finally, how people decide what actually does and does not make it to an incident reporting form.

There were several participants who identified that the use of the incident reporting system was seen as quite threatening to the member of staff who was alluded to in the actual report and that many staff did not want to be directly associated with it.

> *'...I know Datix is non-blaming, non-criticising open system but people would not like their name to be put into the Datix form I'm sure... you'll still be hurt by it I suppose... So I think it's not quite as open as it maybe should be...'* (Traditional 7, p7)

> *'...I think the nurses are a bit more relaxed about them than medics to be honest... Our medical people get really upset if they think we've put a Datix form in about them, they take it very personally don't they? And it's not personal but yeah certainly from our experience here we've had a few where I've still heard that particular person talking about it about a year later, the fact that one of our team put a Datix form in about them...'* (Non-traditional 6, p12)

'...Datix [reporting] *is a good record of an error and the subsequent trail... The problem is it takes time and you have got to sit down and fill it in and to be honest in the real world a lot of people, unless if it is a very, very serious error, don't bother for two reasons... One it is more work and two it is often the perception that once you are logging it, it is becoming really serious and I think junior colleagues often feel intimidated by the fact that there is a Datix run incident form against them...'* (Traditional 5, p5)

'...for us we'll come back and think... I must fill in an incident form about that and we'll chat to each other and sometimes it does and sometimes it doesn't... [get completed], *I don't know if that's a 'nice' culture, that we don't want to offend people, but at the same time if you don't say that this is dangerous, nothing ever improves about it...'* (Non-traditional 2, p10)

One interesting finding from talking to the traditional prescribers was that many seem to believe that completing an incident form is not their direct responsibility, with several citing nurses or juniors as the correct personnel to undertake this. This seems to be related to the fact that either doctors won't admit to making errors or they believe the system to be long and overly complicated.

'...it's the ward staff, it's the nursing staff who report them... we don't quite have a culture of medical staff reporting their own drug errors... I have seen drug charts with the wrong, a wrong dose on it and it goes on for a couple of days...' (traditional 8, p5)

'...Sometimes, if it's an error in terms of administering the drug... that will always get reported and will go through ridiculously complicated and bureaucratic systems to be sorted out because that's what the nurses do, of course...' (Traditional 3, p7)

'...you're encouraged to push it in through Datix and I have to admit I haven't put one in myself ... personally no, I've usually told other

people to do it, a bit of passing the buck there I'm afraid...' (Traditional 1, p5)

'...You will not find, I suspect, doctors self reporting about when they've made an error... You may find the odd one who will do that but I suspect most of them won't and because they don't realise or because they'll never own up to it...' (Traditional 3, p7)

Contrary to this, the more junior the traditional prescriber was, the more likely they were to complete an incident form. They also seemed to have a comprehensive understanding of what it was meant to achieve.

'...I filled in one Datix form about something non-prescribing related... but I know in general there is someone that will be looking at the forms and then they will be sent to the appropriate line manager or division manager depending on the combination of severity and the likelihood of the error happening again...' (Traditional 10, p5)

'...I've completed an incident form when I administered, not prescribed, administered too high a dose [in an] *emergency situation, but not from a prescribing perspective. Although, I'm sure it should be done more than it is... We don't fill a lot of incident forms as a group* [of medical staff]...' (Traditional 9, p5)

Almost all participants reported that since they received no feedback on the reporting system and could not assess whether anyone had benefited from their time spent on completing the incident form; they would be less inclined to complete one in the future. So an element of feedback was seen as essential in order for the participants to feel that it was beneficial.

'...If you're not confident of the real value of putting them in, I expect we've all got very busy lives and it's one extra thing to do which you'd rather not do if you didn't have to...' (Traditional 1, p4)

'...if nothing does happen, if there is somebody in pharmacy who is just looking at that and then there isn't any feedback like you say, people think 'well, what's the point?' they fill their DATIX form in and then you

don't get any feedback, nobody ever comes back to you so, is it just a waste of time..?' (Non-traditional 7, p11)

'...When I do a Datix form, which I do not infrequently for these kinds of things, you never hear anything more about it... You fill the form out and that's it... You never hear a thing... All the ones I've done, you never hear any result of what happened. Datix has no method of feeding back the results of the enquiry, investigation to the person who filled the form out...' (Traditional 4, p7)

'...I can't say I've had much in the way of feedback from them... Because people probably will think nothing comes of that, I'll fill the form in and what comes of it, so why fill it in...?' (Non-traditional 5, p9 & p10)

'...I've never, of all the incident forms I've ever filled in I've never had any feedback from any of them...' (Traditional 10, p6)

One traditional prescriber outlined difficulty with feedback of a different fashion, that which was required to be given to junior medical staff following an incident report about something that they had done. The effort described here was most likely typical of others, since this situation occurs in many wards and departments every day.

'...when I come across a significant error... I contact the prescriber... But these days what you very commonly find is the prescriber's on nights or on days or happen to be on call, and you page them and there's no answer... You page them the next day and there's no answer and then by a week's time you've forgotten about it and you haven't got hold of them still, because they've been on leave because of the European Working Time Directive, hours reduced. So you've never actually ... the prescriber never actually learned of their error because they're on shift and... in the end it just gets passed by... So it gets hard to feed it back, directly about what people have done wrong sometimes... you have the best intentions to try and find this prescriber and say "Look you did this wrong ..." but it comes to three

or four days down the line and you haven't got hold of them and suddenly things kick off and you're really busy, then it just gets passed by and after that you lose the impetus that you had...' (Traditional 4, p8)

Several participants who had completed incident reporting forms discussed the time that it took to accomplish. This was seen as a major barrier in empowering staff to complete them as required by the Trust.

'...it's all on people's goodwill to do it and the minute you say 'Datix' it doesn't matter who you say it to, people's eyes roll up and they think 'oh no I don't do I, it's going to take me a while?' And then there's all the paperwork after it, so I think reporting still is woeful but I think the reporting is woeful in part because they just see it as 'this is more administration to do', not 'this is something that's important'... (Traditional 6, p15)

'...I think if the Trust was serious in wanting to capture all errors, then making error reporting as simple and straightforward and quick as possible would work...' (Traditional 4, p10)

'...It's just a long process you know, filling in the Datix form for every error you pick up in prescribing takes some time... So I think the result of that is that you only do them for what you class as the more serious errors, and the more minor ones you let slip because you just don't have the time to do it. We're all working many hours beyond what we're contracted to work and if you fill out Datix forms you'd be here late at night...' (Traditional 4, p7)

One significant finding related to the incident reporting system was how participants identify what actually needs to be reported or included on the form. They seem to almost bargain with themselves as to whether something is worthy of being reported or not. Participants felt that anything that they considered to be serious would perhaps be reported whilst others would be lost, regardless of whether they were important to the trust overall.

This ultimately means that what one practitioner feels is serious another may not and thus subjectivity enters the reporting system. This justification aids in the staff decision about completion of an incident report.

> '*...I think they would then put a Datix form in if it was a repeated error ... but not for individual errors...*' (Traditional 7, p8)

> '*...if it's been a simple error... I think you make a judgement on to how serious the error is, to go down the route ... because I think a few years ago, it was very much, not a learning experience, it was a telling off...*' (Non-traditional 10, p12)

> '*...if I noticed someone else's error, like a minor thing, I would just go ahead and change it, I wouldn't do anything unless it was significant...*' (Traditional 2, p5)

> '...[Prophylactic] *anticoagulant therapy, quite often they forget to... when they're coming back from theatre late at night and they haven't been prescribed their heparin and they haven't been prescribed their antibiotics and you* [the nursing staff] *catch all that... yeah... it's a big area that you would never dream of reporting that, I wouldn't even think about it...*' (Non-traditional 7, p11)

> '*...I wouldn't fill one in to say I'd prescribed the wrong dose but in terms of if something was given..., then you would think about it...*' (Traditional 9, p5)

> '*...When I fill out an error form I usually only do it if I genuinely feel that there is a system there that is likely to crop up again and I completely prefer to know when something's been done about it...*' (Traditional 10, p6)

One participant was also cognizant of the fact that there needs to be some structure around why we use and complete forms and that this may indeed improve things in the future.

'...I think it's... possibly about having some sort of structure as to what you actually use Datix forms for and having some other way to report back on things like that...' (Non-traditional 6, p14)

3.3.9 Continued prescribing education and update to maintain safety

Participants outlined that once they had trained to prescribe there was not much available to them to maintain that education and knowledge. They had several suggestions as to how this could be done. This included on-going training, which should be made mandatory like other aspects in the Trust, some kind of annual testing as well as using critical incidents as a means of learning.

'...it maybe that you could do with a refresher day... a refresher study day every year or every two years, like you do for your mandatory training... this is as essential as that is really... I think we need it cause although you're doing it day to day new things crop up all the time...' (Non-traditional 2, p19)

'...I think... maybe the link that's missing in this Trust as well is... how do we go about prescribing it properly because... I've not seen that link in the education here whereas in other Trusts I've worked in, pharmacy had regular input in divisional teaching ...' (Traditional 10, p7)

'...I think you do your prescribing and then that's it, then you're let loose and I think it should be a bit like your ALS [Advanced Life Support] *and every so often you then have to go back and do a refresher like an OSCE or something like that, I think that would be good... Because there are things... it's like everything isn't it there are things that you forget and I think knowing that every couple of years you're looking at going through that process again would be good...'* (Non-traditional 6, p10)

'...I think we can teach and teach and teach but only when you're examined you realise where the deficits are... And I think that's a reasonable thing to do, all prescribers will do an exam, you're not allowed to go and look up the answers, honestly answer it...You give a five minute on-line [exam] *and you've got five minutes from opening it to closing it this way you can't run off and look up the BNF. Or some way of doing it so you can tell what people are doing...'* (Traditional 7, p4)

'...I think the critical incident meetings that other trusts have would be really useful... I think that that's the kind of thing... you always want to be consciously competent... I think that's what you get from these near misses or critical incidents... because it keeps you alert... it keeps you thinking every time you're putting pen to paper...' (Non-traditional 2, p16)

There was also a belief by some that education would be more effective at reducing errors than such things as electronic prescribing.

'...I think it's just education, that's all it is, it's just reminding people ... it's teaching people in the first place and then reminding them afterwards so I think things like feedback from Pharmacists is a good thing... These are the common errors just to remind people, do it every month, these are the top five errors this month, things like that... It's just keeping it ticking over...' (Traditional 3, p9)

'...Education, education and more education I think... I feel you can learn a lot from anecdote when you know that some disaster has happened on a ward recently because of errors of wrong prescribing or something has been missed and people will automatically take notice if they say "that could have been me"... So I think we need a way of actually getting that information on errors in a non-threatening way to a wide audience...' (Traditional 5, p5)

One participant also outlined what could be done in practice when new doctors started a placement in order to ensure that their prescribing was safe initially and to ensure that they developed safe prescribing techniques.

> *'...so I think rather than all exam based and tutorial based, just put them to the wards for a week and make it compulsory for the first two weeks that all their prescriptions, they're not supposed to sign anything, write them up, get them counter signed by a senior... Two weeks of that and you can abolish the pharmacy prescribing exam... I think that's, that medical practice, it's more practical...'* (Traditional 2, p9)

3.3.10 Further safety issues

Several of the participants had interesting ideas as to how prescribing safety could be improved overall in the future.

The use of specific Trust personnel responsible for dealing with incidents was mentioned, then staff would know who to contact to chase up incidents and less time would be lost attempting to do it properly every time, especially as time was limited and many incidents go unreported.

> *'...I guess to make it as simple as possible and taking that workload off the person who picked the error up and putting it on to somebody else... I mean it's not going to happen as the Trust's not going to employ anybody but, if I could pick the phone up, and just say Peter, Error Manager person, and say, look this happened, this, this, this, this... They jot it all down, they write down who's concerned they contact the prescriber and say look you did this wrong, were you aware of that...? Then they were back from night shift a week later... They fill the Datix form in physically, they coordinate the response... So just shifting the workload off the busy clinician who's picked that error up onto someone who's doing this as their fulltime job; would probably make it a lot easier...'* (Traditional 4, p10)

The use of consistent personnel responsible for prescribing in each specialist area was another topic, which was identified as a means of reducing errors in the future. Thus the quality of prescribing was less likely to go down as these staff would be familiar with the drugs used in their particular area and there would be less peaks and troughs in their ability. Nurse prescribers provided much of the prescribing in these areas, though the traditional as well as the non-traditional prescribers in this study commented on it.

> *'...I think we are getting better, certainly much more safer because I think nurses have taken on an extended role and nurses are, because they have got a finite knowledge about the limited drugs they know a lot about those drugs and can often be very, very valuable in getting junior medical staff who often have got a lot more drugs to think of, a lot more theory to deal with, I think working in partnership definitely is the way forward...'* (Traditional 5, p7)

> *'...There's quite a few non-medical prescribers... They of course have only a pretty small number of drugs that they prescribe... I think they're carefully overseen, I think they are less likely to make drug prescription errors than medical juniors... And of course they also stay in the department longer so you've actually got time to ... educate and feedback... I think there is something to be said about having a smaller number of core people prescribing a smaller number of drugs... I think that would reduce error...'* (Traditional 8, p6)

> *'...I do think it's nice to have been in the same department for ten years to know the staff, to know how it works, to know who to contact if you've got a problem... And obviously that means more input for us, because we've been here for so long, because we're sensible... And they wanted to teach us properly so that we did it properly from day one and carried on...'* (Non-traditional 4, p15)

It was also felt that since some errors result from poor prescription writing, improving documentation would results in fewer mistakes. Also related to documentation, participants revealed that fewer errors were possible if tight

protocols were used. Therefore, the introduction of clear protocols in each area was felt to be justified.

> *'...Documentation... It's my biggest bug-bear.... People don't feel it's important to put the correct patient's details on, their allergies on, they don't feel it's important to re-write a drug which is ... the most common that I see across the Trust wherever I go where they'll say, oh, we'll increase that drug, they stick a line through it and then write it in the corner instead of re-writing that line of drug... I don't know why it continues...'* (Non-traditional 9, p17)

> *'...I saw a number of times where drugs were misinterpreted due to bad handwriting... I've seen on two occasions where insulin was given as millilitres rather than as units which is incredible...'* (Traditional 10, p4)

> *'...we also have a lot of protocols as well which is very good... So instead of having to write up heparin we just write up heparin as per protocol ...'* (Traditional 10, p4)

> *'...I would still have to revert to the local protocols for infusions which BNF doesn't tell you how to actually prepare and how to actually prescribe it to be given that specific way, so those types of infusions and stuff I find local protocols more helpful than the BNF...'* (Traditional 2, p2)

Electronic prescribing was seen to have advantages and disadvantages in terms of reducing errors. Some felt that this was indeed the way forward and was likely to improve safety, whilst others felt that the potential would be there for different types of errors to be made instead. Participants also indicated that robust IT systems would be required in order for this to work effectively.

> *'...I think the major advance that we can make as a Trust is electronic prescribing... I think it's bound to happen sometime but the sooner it happens the better, and it just will cut out I think, the systems you put into it will cut out a lot of the errors...'* (Traditional 1, p5)

'...E-prescribing would help, I'm sure... But I think the system has to be easy to use and simple... I think that would be an excellent way of minimising prescribing errors...' (Traditional 9, p7)

'...I think e-prescribing would definitely minimise errors considerably but doesn't negate it completely... *The human element has to be there...'* (Traditional 5, p6)

'...I'm not sure to be honest [if electronic prescribing would improve errors] *but I would rather stick to the hand written ones really... because if you want to change medication... looking after medical patients, unlike surgical patients, on medical patients we make a lot of medication change... so I'm just thinking if it was all electronic, how much time it would consume, logging on to a system, changing, reprinting so that it's by the bed side...'* (Traditional 2, p8)

'...I'm not sure what I think about electronic prescribing because of course drop-down boxes then it's actually quite easy to generate a drug error...' (Traditional 8, p5)

Finally, there appears to be an issue related to the trainee medical staff within the organisation. Since much Trust communication is undertaken on-line and most junior staff do not have a Trust email address, participants felt that they were sometimes missing out on vital communiqué's relating to errors and near misses. Some were worried that when this was passed to senior staff, it was not being disseminated effectively in some cases to the people who needed to know about it the most. If a clear system of communication were in use, trainee medical staff would benefit from being included in any lessons learnt from incident reporting.

'...It's all about communication... its difficult isn't it...? Because I think you've got that problem with high and, the fast turnover of medical staff because you're in a four month job now... I've been here over a year and we don't get a trust email address and that kind of communication with the medical staff, if you're talking about

traditional prescribing, it's difficult... And I don't know how that's going to be resolved but that's the main issue...' (Traditional 9, p7)

'...If there was a Trust wide problem that needs to be fed back to us, not only to the Consultants... we're prescribing them day in day out, much, many more times than the Consultants are... if there's a trend emerging, okay fine this has happened, this has happened, or it's something that's happening quite frequently then yes definitely all of us, and juniors who are below like F1, F2, SHO's, we need to be fed back because we are prescribing, we are the prescribing factories really...' (Traditional 2, p9).

3.4 Analysis of subunit three of the study - Prescriptions

Prescriptions were collected from both groups which had been written for their out-patient population and compared to the error tool.

During 2009 – 2011 a total of eighty-three prescriptions were collected for review. This included fifty-three written by non-traditional prescribers and thirty written by traditional prescribers.

From those analysed, there were none which had any errors on the actual written form. Neither had any of them been altered, following a phone call from pharmacy as a result of a near miss.

There were relatively few out-patient prescriptions to be analysed during this phase of the research study. This may have been due to two reasons. Firstly the Trust as a whole had recently been actively reducing the number of out-patient prescriptions that had been written, using 'recommendation' forms instead; thus there were fewer to be collected. And secondly, that the pharmacy department had been unable to collect all of those which had been written to include them in the study.

Using the prescriptions available, there were no untoward prescribing issues to analyse. The prescriptions in this subunit were also out-patient prescriptions as opposed to the first arm of the study when the majority of

the Datix incidents relating to in-patient prescriptions; with only two out of one hundred and ten being an out-patient departments prescription error. Thus it is difficult to make any comparisons. What is interesting about the number of prescriptions in this arm is that the majority of them were written by non-traditional prescribers, perhaps as a result of being deployed in clinics in areas which are nurse-led, where they undertake all of the prescribing. The other assumption which could be made about this data is that most of the out-patient prescriptions in the traditional group were written by juniors rather than the consultants themselves and indeed during interview some seniors did actually state that they wrote very few out-patient prescriptions.

The drugs prescribed within this group were mainly for patients who were on continuous treatment for chest problems such as tuberculosis, infectious diseases such as hepatitis and cancer treatment such as prostate cancer; thus were mainly continuing care treatments. These drugs were different from those identified in the first arm of the study which was involved in errors and near misses.

Overall there were many interesting themes to come from the three subunits of data analysed. There were also some excellent suggestions as to how the safety and accuracy of prescribing could be improved.

In order to assess all of this knowledge together and undertake a more thorough breakdown of the case study data, secondary analysis was performed using some pre-set propositions.

This secondary analysis is detailed below.

3.5 Secondary Analysis

Secondary analysis is usually the term given to analysis of data which has been collected previously and usually by another researcher (Gray 2009, Seale 2011). It can also mean performing a different type of analysis on pre-existing data (Robson 2002). In this particular context secondary

analysis describes the process taken when looking at the case itself and performing a within subunit and between subunit analysis. Utilising the Brunswikian Lens model and the predetermined propositions described in the methodology chapter a further analysis of all of the data of the case was undertaken.

This involved initially deconstructing the research question and the aims of the research into assumptions or propositions which were written into the research protocol. These were then used to interrogate the data. Yin (2009) describes this process as 'pattern matching' (p136) however, there is also one further element included which was also outlined by Yin (2009) that of elucidation or enlightenment. That is, the case is re-synthesised into a more cohesive account.

There were seven propositions in total and below the data is further analysed using each one in turn thus allowing a re-contextualisation to occur.

3.5.1 There is a pattern in the type of prescribing errors made within this trust:

Patterns were seen in the errors and near misses examined in the study from the archival records. Recurrent patterns were seen both in the type of errors found as well as in the drugs involved.

Patterns were also discovered during the interviews as there were similar issues recounted by participants relating to prescribing errors.

In this case the majority of both errors and near misses occurred within the same category of 'prescribing a drug, dose or route that is not that intended' (Dean et al 2000). In fact this was the most common type of error as well as near miss in both the traditional and non-traditional group based on the error tool.

There were also repetitions in the errors and near misses which occurred with the same drugs. The drugs most commonly involved included diabetic

agents, opiates, antibiotics, steroids and anticoagulants. Two or more of these having specific Trust guidance as well as national guidance surrounding them which should in theory make their prescription safe. Furthermore, during the interviews, mention was made by the participants that they see similar errors occurring, they also point out that whatever is happening in individual wards and departments should be shared out across the whole organisation as a means of emphasising and maintaining safety. Recurrent errors need to be highlighted across the organisation and emphasis put on them in future so that these could form the basis of any future educational or mandatory teaching programme. This could then be altered in the future based on what error themes were being demonstrated by Datix forms at the time.

3.5.2 There is no difference in the type and amount of prescribing errors among traditional versus non-traditional prescribers:

Based on the data investigated, there are similarities in the type of errors and near misses made since they are mainly centred around 'prescribing a drug, dose or route that is not that intended' (Dean et al 2000); thus the category is the same. The same cannot be said of the number of errors and near misses. Based on the archival data used within this study and on the error tool used to analyse them, the non-traditional prescribers had no errors recorded and only three near misses. The traditional prescribers had forty-nine errors and fifty-eight near misses recorded. Therefore there is a difference between the two groups in amounts. This could be due to the fact that the traditional prescribers still write the majority of prescriptions in the hospital (certainly in out-patient prescription terms this is ninety-six percent versus four percent) and thus there is greater opportunity for error to occur. Or alternatively, that the non-traditional prescribers are more careful about how they write prescriptions. Regardless of this and based on numbers alone, the traditional group make most prescription mistakes.

3.5.3 Self-awareness related to prescribing problems is different between traditional and non-traditional prescribers:

There is a difference between both groups relating to prescribing problems with the traditional group being much more matter of fact about errors than the non-traditional group. This was relayed within the interviews.

The traditional group already have an assumption that sometimes errors will occur and that fact that this can be caused merely by human error was one thing that was mentioned several times. They also seem more relaxed about the possibility of problems being picked up by others since they appear to rely on other safety mechanisms such as pharmacy prior to the dispensing of drugs and nurses prior to the administration of drugs, almost outlining a 'safety chain' which occurs before the medication gets anywhere near a patient.

The non-traditional group however, outline their prescriptions with much more responsibility and appear to take on the role of all of the 'safety chain' when they outline problems. Also once errors were made, the non-traditional group, when discussing them, described themselves as being 'mortified' that they had been involved. This particular word was used by several of the non-traditional participants and it outlines not only that they were upset by what had happened to the patient but also perhaps what they felt that meant to them as professionals since this word denotes some sort of embarrassment, humiliation or shame.

The traditional prescribers did not use any such derogatory word or phrase that outlined their prescribing in the same way, thus self awareness is different in these terms.

What is interesting however with the traditional group is that there were several participants who mentioned that the non-traditional prescribers were fastidious about prescribing and that they were safe when they were restricted to prescribing in specialist areas. So much so that they suggested that their use would increase the safety of prescribing. They also suggested that non-medical prescribers should be used in the future to teach and

support junior medical staff in training. This demonstrates that they have an awareness that the non-traditional prescribers are valuable in this area since they are better at reducing prescribing problems and are perhaps better able to demonstrate this to rotating medical juniors.

3.5.4 There are commonalities among traditional and non-traditional prescribers in their experience of prescribing education:

There were commonalities related to the education of both groups and this was primarily aimed at the lack of education or at least of appropriate education. This was again outlined during the interviews.

The majority of all participants felt that the education which taught them to become prescribers could have been improved from one perspective or another. There were some differences in this but the topic that presented itself most often was related to the actual practicalities of prescribing. It was felt that more time needed to be spent on this and in making sure that there were protocols to support this so that this was more robust in the future.

The non-traditional prescribers also believed that on the whole, nurses who undertake the course should have some core experience in the first instance and that this would also be improved if they had previously undertaken a clinical skills course.

However one further issue related to education, corresponded to the prescribers once they were actually practising. There was a mutual desire that current issues in the Trust related to the errors and near misses in prescriptions should be highlighted more often and that these should be used as the basis for feedback and education for all prescribers in the organisation; it was felt that this is not currently the case and as such they were missing out on valuable safety information.

3.5.5 Non-traditional prescribers have more insight into near misses than traditional prescribers:

Again as outlined during the interviews, this was not the case. The non-traditional prescribers in this study who had been involved in a near miss continued to outline this as an error. They had difficulty seeing the difference between something that was intercepted before it reached a patient and something that actually reached the patient and caused harm. In their eyes they were guilty of a cardinal sin if they had written something wrongly even if this was intercepted by a nurse or pharmacist. Miss-writing a prescription alone gave them cause to justify themselves as prescribers and caused them to reflect on their practice at great length. Whereas as outlined above, the traditional prescribers were more versed in using the 'safety chain' and actively used this in everyday work as they knew that pharmacy in particular would be monitoring their prescribing practice.

3.5.6 All prescribers within the Trust outline similar issues which they feel affect how drug errors occur:

There was some similarity from the participants during interview when it came to education and the lack of appropriately targeted education to teach someone how to prescribe. This in turn will affect how drug errors occur. Similarly, there were issues surrounding the update of this education and how this could affect the participants' ability to prescribe especially when new drugs came on the market.

One overwhelming issue which all participants outlined related to how drug errors occur, or at least may continue to occur. This is that in this particular organisation there is a lack of feedback from the incident reporting system. During the interviews all twenty of the participants highlighted that this is an important issue which needs to be addressed. Therefore when drug errors are made and an incident form completed, the information from this is not reported back to the very personnel that require it the most. Thus some

prescribing errors will continue to occur unless they are better highlighted and shared across the trust. This is seen as vitally important in the reduction of errors in the future.

3.5.7 Drug errors and near misses are not affected by sex or number of years' experience:

Based on the data found in this study it was not possible to determine if this was the case across the organisation. What was clear was that among the personnel who identified that they had been involved in an incident, there was a difference in sex as well as years of experience. This would however, vary across different organisations and is only peculiar to the one studied.

Using the data from all subunits of the study and subjecting them to some further analysis through the Brunswikian Lens, comparing class events and also analysing within class events, some new insights or themes can be seen in the case study. This is explained further in a schematic of the analysis for all of the data in appendix ten.
The main outcomes of the analysis and the topics which form the main conception of the case study include the collapsed themes of:

I. Education – both prior to prescribing and following training
II. Errors and near misses themselves – dealing with them, highlighting them and learning from them to maintain a safety culture

These themes help to provide some structure as to how patient safety can be improved in relation to prescribing medications but will also have relevance to overall safety and will be discussed in detail in the following chapter.

Chapter 4 – Discussion

4.1 Introduction

A number of themes were highlighted in the previous analysis section when looking at all three subunits of the study separately and then by undertaking a secondary analysis. These themes will now be discussed individually and then will be described within the framework of the original question and research objectives found on page twenty-seven.

There is also an analysis of the use of the Brunswikian Lens Model and the associated propositions utilised as part of the Case Study at the end of this chapter.

Themes:

I. Education – both prior to prescribing and following training
II. Errors and near misses themselves – dealing with them, highlighting them and learning from them to maintain a safety culture.

4.2 Theme 1 - Education - both prior to prescribing and following training

Both traditional and non-traditional prescribers had some issues around the training and education that led to them being able to prescribe, this occurred as a pre-registrant, as a junior medical trainee, prior to prescribing and also once actively prescribing.

Some participants felt that their initial prescribing training had been good or at least adequate, the majority felt that it had been lacking, it was not fit for purpose and could be improved. Thus there are areas where staff have identified potential weaknesses which, if not resolved, could potentially lead to error when prescribing in practice, thus reduce safety to patients.

This perceived lack of education corresponds positively with the literature from both non-traditional as well as traditional groups.

4.2.1 Pharmacology education during pre-registration nurse training

The concern regarding the educational focus of non-traditional prescribers was highlighted even before they were given the authority to actually fully prescribe. This in part came from dissenting voices who felt that nurses should not be given prescribing rights at all (McCartney et al 1999, Duffin et al 2002, Horton 2002, Bradley & Nolan 2004, Ryan 2004, While & Biggs 2004). However, since a working knowledge of pharmacology is required for many reasons, not least being able to administer medications appropriately as well as being capable of providing good information to patients, several studies concentrated on the level of education and training on the biological sciences in pre-registration courses. Courtenay (1991) was probably one of the first to actually highlight that there were deficiencies in this preparation with pharmacology education in particular, being placed quite low on the list of important biological science topics by the students and lecturers studied.

Later in 2000, Latter and colleagues investigated the educational preparation of nurses and identified their readiness to undertake a medication role within their practice. They also identified that pharmacology education was on the whole weak, was not always provided by the best placed personnel and was not directly linked with clinical practice (Latter et al 2000). This is further echoed in the work of Leathard (2001a and 2001b) where the need for knowledge of pharmacology for future advancement as well as a greater input of chemistry within nursing courses is advocated. As well as the work of King (2004), who concluded that having a stronger focus on pharmacology within nurse education would better prepare nurses for their medication responsibilities, once qualified, as well as make them more confident to move into prescribing roles in the future. Sadly, despite these

studies, in 2008, there continued to be deficiencies identified in training, with Lymn et al outlining that nurses were still ill-prepared for nurse prescribing from as early as their initial pre-registration training. In a study examining how pharmacology learning could be improved they identified that almost half of the one thousand nurses studied had only ever undertaken a biological science subject at GCSE (General Certificate in Secondary Education) level. They believe that this, coupled with nurse education moving away from a biomedical science towards a social science, has resulted in a detrimental focus shift (Lymn et al 2008).

This is also conceded by Morrison-Griffiths et al (2002) who postulated that nursing has changed dramatically in the last forty years with nurse education moving into higher educational institutions and the focus of nursing itself developing in line with 21st century advancement. As a result practice has moved on slightly more quickly than education. Concluding that nurses do not have a knowledge base that is sufficient for the roles they now find themselves in and suggesting that pharmacology becomes a vital core subject within every pre-registration curriculum (Morrison-Griffiths 2002).

However, with the advent of pre-registration education changes in 2012 ensuring that all nurses in the future will be educated to degree level, there is a presumption that their academic prowess will increase. This in turn may result in nurses who are more able to understand and assimilate the often-difficult challenges of pharmacology education, though this clearly does have to be a feature of their future curriculum.

Moving away from the biological sciences While and Rees (1993) studied the knowledge base of health visitors and district nurses in relation to the medicines which were going to be included in the proposed nursing formulary. They found that despite the fact that the majority of the participants included had expressed a desire to undertake the prescribing course when it became available, their knowledge was found to be limited

and was considered to be a weak foundation on which to base a course in prescribing. As a result there was some concern about the prescribing course being able to furnish these staff with all the requisite knowledge and skills that they would require into the future (While & Rees 1993).

Clearly there are issues related to the underlying education and training given to pre-registration students as well as to the level of education which they bring with them when they become students of nursing. Improving knowledge may help to better prepare nurses to advance their role in the future, and if they train to be prescribers they will already be armed with essential underlying information.

4.2.2 Pharmacology education and nurses' ability to prescribe

The non-traditional prescribers within this study identified that their prescribing education had not been particularly effective. There were three main reasons given as to why this was the case; this included a lack of pharmacology education, a lack of information within their specialist areas and also a lack of clinical skills necessary for the assessment and diagnosis of patients.

The choice of which candidates to send on a prescribing course is a topic which has been scrutinised in the literature and at least three of the issues are consistent with those found in the study. A percentage of prescribing students are not prepared to study at degree level beforehand, do not have enough understanding of basic pharmacology and its terminology, lack skills of assessment and diagnosis and also have not undertaken any preparatory work before they start (Banning 2004, Travers 2005, Bradley et al 2006); therefore it is recognised that a proportion of candidates struggle. In other countries, such as America and Australia, where prescribing is becoming more common among nurses, their initial academic standard is set at

degree level which is currently higher than that in the UK (Lymn et al 2008). This may also be a contributory factor to the confidence or lack thereof, found among nurse prescribers in this country.

Sodha et al (2002) investigated the knowledge of both nurses with and without a prescribing qualification and examined this using some hypothetical scenarios. Despite the fact that those who were qualified prescribers rated themselves as having high confidence levels related to medication knowledge, this was not displayed within the results. In this particular study the nurses who had not been exposed to extra training did better than those who had. Sodha et al (2002) concluded that the pharmacology knowledge base of nurses before as well as during a course on non-traditional prescribing should be strengthened.
This lack of pharmacology knowledge was also identified in 2004 by Lewis-Evans and Jester. They found that whilst nurses were keen to undertake nurse prescribing and could see the benefits; they displayed a lack of knowledge as a barrier to this, believing that their information had mostly come from practice rather than as a direct result of further education. Later in 2005, a further small scale study by Travers also identified that the lack of education both as pre-registered nurses as well as that given to students on a prescribing course left nurses unprepared to perform a skill that they wanted to be confident about.

By 2005, larger studies were beginning to appear related to how a course of prescribing education had prepared nurse prescribers to practice. Latter and colleagues performed an evaluation of extended formulary independent nurse prescribing which included a self assessment of their education and training (2005, 2007a). This study found that the majority of those examined felt that the prescribing course had either fully or partly met their needs in relation to the practicalities of becoming a prescriber. However, it also found that twenty-nine percent of those studied were either uncertain

about its effectiveness or felt that it did not entirely meet their needs, thus around one third of the two hundred and forty-six participants still had some unresolved educational issues (Latter et al 2005, 2007a). Pharmacology knowledge was identified as a topic that participants did not feel was covered fully within their course as well as highlighted as one common area studied persistently during participants' personal revision time. Subsequently Courtenay and Gordon (2009) also found that three quarters of the prescribers they studied (four hundred and ten) continued to cite that the pharmacology of medicines remained the one subject that participants wanted more knowledge of.

Bradley et al (2007) however, outlined from one small study that whilst the course had not fully prepared these nurse prescribers for practice, it was viewed as providing some building blocks from which to progress. Thus perhaps practitioners may be expecting too much from a course of education alone and this gap should be addressed within their clinical practice areas when working with their mentor. This very topic was outlined by Ahuja (2009) who demonstrated that learners were satisfied with the learning that they had in practice. This was increased however, if it involved a formally organised learning contract with someone they had worked with previously as well as the ability to spend a minimum of thirty percent practice time being supervised by them.

In 2010 a further evaluation was undertaken which also alluded to the quality of the prescribing course of education, this time in relation to nurse and pharmacist independent prescribing (Latter et al 2010). This found that whilst the majority of both nurses and pharmacists felt that their educational preparation had either completely or largely met their needs (eighty-seven percent and seventy-eight percent respectively), the remainder felt it was only met to a limited extent. Rather than pharmacology education it was the acquirement of physical examination and assessment skills which was

highlighted as lacking within the educational preparation in this particular study (Latter et al 2010).

There is another perspective on difficulties with the training and education of non-traditional prescribers; that of the higher educational institutions. As Campbell (2004) outlines, academics also struggled with the fast pace of the development of nurse prescribers and many of them were designated to deliver courses for which they had no direct clinical experience. Change has happened rapidly in non-medical prescribing training, educators have been expected to teach generalists and specialists together, student selection has not always been good, preparation of mentors has been difficult, assessment also varies and students sent on the course often have unrealistic expectations (Campbell 2004).

In a recent national survey aimed at those nurse prescribers who were registered on the Association for Nurse Prescribing database, Courtenay and Gordon (2009) identified twenty separate therapy or speciality areas where nurses prescribe, thus highlighting the diverse scope of the initial prescribing preparation. This is due to the fact that nurses who train to prescribe are essentially experienced, senior staff who work within specialist areas; this makes educating them in preparation for their own specific areas, extremely problematic.

There is also a great variation in the teaching of pharmacology in the higher educational institutes in England as well as who provides this instruction (Campbell 2004), with the most likely teachers unable to be involved due to either politics within educational institutions or lack of financial resources (Morrison-Griffiths et al 2002).

The theme of prescribing education not being specific enough is one that is consistent with the literature, although this is already changing perhaps as academic institutions become more familiar with the course content and also as the pace of change slows down, now that nurses are able to

prescribe from all of the BNF. Trusts, including the one studied, have already put in place minimal access requirements which include the ability to work at degree level, exposure to regular prescription writing opportunities and also being equipped with the skills of history taking, examination and diagnosis. One thing that may also help with this in the future is the opportunity for trusts to work more closely with the universities who facilitate training so that the provision may change based on current course evaluation and on research such as this.

One non-traditional respondent in this study suggested that generic training could be done together and then staff could branch off into their own areas of speciality and have more specific education. This is important since as Lymn et al (2008) suggests, it enables education to be purposeful and thus new knowledge is more likely to be integrated into clinical care scenarios. Universities are unlikely to favour the introduction of speciality specific courses due to small numbers within each speciality area. However, if prescribers could also access this as a means of continuing professional development, this may prove to be a valid method of delivery for all prescribing staff in the future.

4.2.3 Pharmacology education during medical student and junior doctor training

The traditional group of participants in the study outlined that there were gaps in the current education of junior medical staff and cited that their knowledge of pharmacology as well as their ability to actually prescribe appropriately in practice, were lacking. These two elements are commensurate with the literature.

The quality of the education for traditional prescribers essentially came under the microscope when the focus of health care became more directed towards safety to the patient and with the recognition that medication errors

were one of the most common avoidable type of errors. At the same time, the shift of medical education moved towards a more problem based learning approach which incorporated errors and mistakes, especially around prescribing (Dean et al 2000, DH 2000, Audit Commission 2001, DH 2001, Dean et al 2002a, Dean et al 2002b, Horton 2002, Whiting et al 2002, Dean et al 2003, General Medical Council 2003, Rawlins 2003, Maxwell & Walley 2003, DH 2004, Aronson 2006). As a result of this impetus, the literature is awash today with articles written about medical students and junior medical staff and what can be done to improve their training to prescribe more safely (Maxwell & Walley 2003, Han & Maxwell 2006, Coombes et al 2007, Medical Schools Council 2007, Tobaiqy et al 2007, Heaton et al 2008, Ross et al 2008, Dornan et al 2009).

In 2003 Maxwell and Walley identified that improved prescribing training was required in order to better prepare medical staff for the challenges of medication management in the future. They outlined a course that was developed to help to breach some of the gaps in training including a student formulary. Three years later Han and Maxwell (2006) reported on a study of first year foundation doctors (FY1's) who had received this training in Edinburgh and despite the fact that this was based on the identified weaknesses of previous curriculums, FY1's continued to outline that they felt ill-prepared for this skill with only thirty-two percent feeling adequately equipped and most of them having only practiced writing prescriptions on five or fewer occasions.

Similarly Tobaiqy and colleagues (2007), using self reported questionnaires also looked at FY1's and attempted to identify if their training on clinical pharmacology and therapeutics in Aberdeen enabled them to prescribe rationally and safely. Again there was a lack of knowledge and preparedness identified with only eight percent describing themselves as having good knowledge. Participants outlined that they felt that they needed more intensive education and training on adverse drug reactions as

well as drug-drug interactions in order to make them safe and to help them reduce errors (Tobaiqy et al 2007).

In 2008 a follow up study by Heaton et al looked more widely at the rest of the UK and sought the views of medical students and recent graduates about their training in prescribing and how prepared they felt to practice. The majority of the two thousand, four hundred and thirteen personnel studied (seventy-four percent) believed that they had too little teaching and that their training opportunities were limited. This was not something that was specific to one area of the UK alone.

Similarly Dornan et al (2009) outlined parallel traits among first year foundation trainees (FY1's) during a study looking at the causes of prescribing errors. They also identified that their training had been lacking in specific skill acquisition to ensure that they were safe practitioners when they took up medical positions. This lack of knowledge was also further exacerbated during their initial placements since they were often left unsupported, especially during ward rounds and when on-call (Dornan et al 2009).

If this remains the case, then the initial education to prepare junior medical staff is falling short of what is required when initially in practice. This may result in students 'catching up' on the skills and knowledge they require whilst on their initial placements. This resultant lack of fitness for purpose may lead to the potential for errors to be made whilst in the clinical arena.

There are no comparable research studies enabling non-traditional and traditional prescribing training to be looked at together and this is perhaps an area that should be researched in the future.

According to Ellis (2002), a fourth year medical student, much less exposure was given to pharmacology teaching during her training than the time allocated to nurse prescribing training. She believes therefore, that there is more importance placed on training staff that already have many skills as compared to that given to the most junior partners in health care.

Historically there is a belief that these two factions require very different training, possibly due both to historical and social perceptions about their roles. However, with nurses becoming an all graduate profession in the near future, they will be training to the same academic level as medical students and there should be more inter-professional learning opportunities. This will also afford a better opportunity to combine prescribing training and also related issues such as safety in practice.

4.2.4 Continued in-service education

Almost universally the participants in this study talked about having more prescribing education once they were qualified and were functioning as active prescribers. This learning was outlined in a variety of ways including that similar to current mandatory training as well as, more uniquely, being tested in their knowledge via on-line examinations, which would demonstrate any gaps in their knowledge. What was clear was that they all felt that there was prescribing elements that they could be continuing to learn about and many participants felt that this must include learning from other people's mistakes. Even simply not repeating them would be useful. This is also echoed in the literature with Gray et al (2007) identifying that prescribers must have on-going training of some sort and also that audit of individual prescribing habits should be included in this teaching.
When relating this to safety in practice, Bradley et al (2007) also concluded in their study that non-traditional prescribers required on-going training and that this should take many forms including support from their teams as well as opportunities to discuss medication decisions with experts in their field. Similarly Latter et al (2007) identified that the majority of non-traditional prescribers in their study wanted to have some kind of continuing professional development once they were prescribing. Courtenay and Gordon (2009) in addition identified that the top two topics which were key

for nurse prescribers' further education included information on prescribing for patients with respiratory conditions and those with pain.

There are some who believe that the NHS should be responsible for providing further education to staff once they are qualified, particularly around the field of medicines management and that they have a responsibility to ensure that this is cascaded throughout the service (Horton 2009).

Following work undertaken looking at drug errors, Likic and Maxwell (2009) outlined how focussed pharmacology for safe and effective prescribing could be taught both in medical schools to students as well as qualified doctors who were actively prescribing. The student list of objectives for both traditional and non-traditional prescribers could vary but the objectives suggested by Likic and Maxwell (2009) for those who are qualified could be used in any organisation serious about the effectiveness of their prescribers and for any group of prescribers. These are outlined in Table 4.1.

Table 4.1: Likic and Maxwell 2009 – Suggested topics to keep prescribers updated

No	Postgraduate (once qualified as a prescriber)
1	Prescribers should have protected time to update and reflect on their prescribing practices; dedicated training events should be provided at least once a year.
2	Prescribers should get feedback in the form of quality markers of prescribing relevant to their area of clinical practice.
3	Prescribers should, in the first year after graduation, receive genuine supervision that allows them to discuss problems and seek advice in a non-judgemental way.
4	Prescribers should not be pressurized into prescribing medicines of which they have little experience or understanding.
5	Whenever possible, errors that are identified should be drawn to the attention of the individuals concerned to afford a blame-free learning opportunity; all clinical units, including junior and senior doctors should review and discuss prescribing incidents at regular intervals.
6	eLearning resources should be made available to support continuing professional development for prescribers at all levels.
7	Prescribing champions should be present in all large healthcare organizations to oversee the processes outlined above.

In 2003 Basford undertook a small scale questionnaire looking at the issue of maintaining competence in nurse prescribing following initial preparation. The nurse prescribers who took part in this study outlined that there was a number of things that helped to support them to maintain competence. Interestingly these are very similar to those cited by Likic and Maxwell (2009) and suggest that these two groups essentially require the same things in order to maintain their prescribing practice, thus joint education could be used within organisations. Basford's (2003) list is in table 4.2.

Table 4.2: Basford 2003 – Requirements to maintain competence in prescribing

No	Supportive mechanisms
1	Workplace mentoring and support
2	Locality seminars and meetings
3	Access to the internet and wider literature
4	The NHS national Prescribing Centre
5	Continuing professional development e.g. lifelong learning schemes and work-based learning programmes
6	Staff appraisal/individual performance review which encouraged the use of personal development plans
7	A dedicated trust prescribing advisor
8	Regular use of their knowledge and skill

Both papers include several of the issues mentioned within this study in relation to prescribing and how prescribers can continue to be taught and involve learning from errors and near misses, having resources to use and also having regular updates.

Courtenay & Gordon (2009) identified in their study of non-traditional prescribers that the most popular method of maintaining continuing professional development was via e-learning. This has also been discussed in the literature by Lymn et al (2008) who outlined that the use of reusable learning objects or RLO's was a particularly useful tool for learning for both students and active prescribers. RLO's are electronic resources with one single learning objective which use audio and graphics to help students engage with the content in order to learn (Lymn et al 2008). The authors found that when reviewing a sample of participants at one year following completion of the prescribing programme, the RLO's were still being accessed and were found to be responsible for an increased confidence in

prescribing, though safety was not one of the main features in this study (Lymn et al 2008).

Gray et al (2007) pointed out from their study looking at prescription errors in an acute medical assessment unit that the mere posting of these errors anonymously on a notice board served to act as an educational tool for prescribers. This is something that can easily be done by any trust who wishes to highlight the current error and near miss themes that they find in their establishment.

Clearly there are educational needs in both groups, particularly when prescribers are preparing to prescribe, but there are those who outline that education alone is not the answer to all of the issues related to making prescribing errors (Aronson 2006, Gray et al 2007, Likic & Maxwell 2009, Downer & Shepherd 2010, Sandilands et al 2010).
Sandilands et al (2010) studied a group of final year medical students who had been exposed to a focussed doctor and pharmacist led practical prescribing course and compared them to a control group who had not. They identified that despite the extra training, only minimal improvements were seen in the number of errors and a thirty percent incidence still occurred. They believe that whilst education is important, there are many other factors involved in making a prescribing error and that a concentrated effort is required to minimise the overall risk including reviews of the overall systems links related to the act of prescribing (Sandilands et al 2010).
Downer and Shepherd (2010) also found that district nurses required continuing education in order to maintain their confidence in prescribing. Support from managers and peers were also identified as being equally important for the role to be successful.

As Aronson (2006) states, 'prescribing is difficult' (p490), the skills required are complicated, especially today since the number of drugs is ever

increasing, their complexity is also becoming more difficult, patients are living longer and many have polypharmacy needs and expectations of the public are ever higher. The skills of prescribing are not something that can be learnt once and then not returned to; these skills demand regular update and review and indeed life long learning. In the words of Chantler (1999), '*Medicine used to be simple, ineffective and relatively safe. Now it is complex, effective and potentially dangerous*' (p1181); therefore today's healthcare training needs to reflect this and ensure that practitioners are prepared in the best way possible to make them fit for purpose.
Today's complex health care services have related systems, which we all need to work within in order to make the delivery of health care safe (Chantler 1999, Moss 2004, Bradley et al 2007, Gray et al 2007). Therefore organisations should ensure that the most appropriate systems for them are in place, that initial training is fit for purpose and that there are continual opportunities for staff that prescribe to update and continue to learn on the job, including learning from errors and near misses.

Whilst there is some guidance around what is good prescribing practice such as that suggested by the General Medical Council (2008, 2011), the National Prescribing Centre (2001) and the Nursing and Midwifery Council (2006), there appears to be no unified agreement on what every prescriber should be doing. Therefore there are also no clear guidelines as to what these prescribers should be undertaking in terms of educational update. This can then cause confusion since so many other non-traditional prescribing roles are now being developed and their skills are all different. What is clear at the moment is that there are many people being encouraged to undertake prescribing and there are also those for whom prescribing is an inherent part of their role. Current evidence suggests that they all require some element of update in order to keep abreast of changes and also to maintain future safety; therefore ways of delivering these updates effectively in practice need to be further considered.

4.3 Theme two - Errors and near misses themselves – dealing with them, highlighting them and learning from them to maintain a safety culture.

4.3.1 Medication errors and the error tool

It is useful to start with the definition of a medication error. This particular study set out to utilise the error tool developed by Dean et al (2000) in order to provide some clarity as to what should be classed as an error within the data collected. This was in part due to the fact that the organisation where the study was performed does not currently have a working criterion and those incidents which are classified as errors or indeed near misses are decided upon by the staff member completing a Datix form.

What became clear from the study was that staff classified seven types of incidents as errors which are conversely outlined by Dean et al (2000) as situations where the individual clinical scenario must be taken into consideration when deciding if it was indeed an error. Thus there are some differences in opinions of what constitutes an error. This includes prescribing a dose higher than that indicated in the British National Formulary or continuing a prescription for longer than necessary. This introduces ambiguity about what is right and what is wrong and can lead to confusion and disagreement among staff, particularly if they report it as an incident.

Dean et al (2000) highlight one further collection of eight situations which they believe should be excluded as prescribing errors and again staff within this study highlighted them as errors in incidences when they had reported them. This includes such topics as prescribing a drug that is contrary to hospital protocol or contrary to national guidance. It may be prudent to use this as an error situation every time as it is giving mixed messages to prescribers about what they can choose to prescribe. This phrase in itself

could cause prescribers to deviate from guidance which is normally put in place to protect patients and as such prescribers may think that they are free to prescribe as they please. A better way of excluding prescribing instances which were deviations from guidance would be to ensure that the prescription had a documented rationale as to why the dosage may be different to that which was advocated, thus excluding it from being an error since it could be clinically indicated.

When this tool was developed by Dean et al (2000) a variety of practitioners were utilised in its construction. What is perhaps clear in this tool is that those responsible for its creation wished to build in the ability of prescribers to prescribe innovatively in order to care for patients who may not present with classical clinical problems As such the tool supports the use of regimes which are not indicated nationally. However, in terms of patient safety this could paradoxically lead to either a means to maintain patient safety as well as an opportunity to jeopardise it, since both scrupulous as well as unscrupulous clinicians could use it.

Whilst this tool provides some guidance, if used in the future within the trust it should be used with caution or altered so that prudence is utilised in all prescribing situations as well as clarity given in the definition of what is and what is not an error. It is currently too vague in terms of maintaining consistent standards and would benefit from having no ambiguity.

4.3.2 Location and number of error or near miss

The data demonstrated that the hospital location with the most number of medication incidents was the department of acute medicine. It is impossible to determine whether this department had the most actual number of errors and near misses or if there were more recorded because they are the largest specialist area. Another explanation may be simply due to the fact that they have the largest number of patients, many of whom have polypharmacy requirements and consequently they have the largest number

of prescriptions going through the system and thus margin for error. Alternatively, the staff working in this area may be more likely to complete an incident form than staff working in any of the other areas, since they may be more diligent at identifying as well as reporting errors or near misses. Within the split site organisation, one hospital site recorded far more errors and near misses than the other site of the trust, but the one with the most number of recorded incidents is also the largest area with the most patients; so again no firm conclusions can be made from this data.

Whilst one hundred and seventeen incidents were initially scrutinised, this in itself is not a large number over one year. The literature points to the fact that untoward incidents are markedly underreported and that it is likely that somewhere in the region of fifty to ninety-six percent never make it to an incident report (Barach & Small 2000, Lawton & Parker 2002, Kingston et al 2004, Martowirono 2010).
If this were the case within prescribing incidents in this particular organisation then for one year the overall total could be postulated to be more likely to reach one hundred and seventy-six to two hundred and twenty-nine separate incidents. It is likely that there are others and that for whatever the reason they do not get reported. Learning opportunities from these are therefore lots to the organisation.

4.3.3 Errors once in a qualified prescribing role – the traditional staff

The blame for the majority of medication errors is generally put on junior medical staff, perhaps unfairly so. Ross and colleagues in 2008 undertook a systematic review in order to identify the reported scale of errors among this group. They found that the error rates reported were extremely inconsistent and ranged between just over four percent to eighty-two percent, but that in many cases the person who had made the error was not

identifiable and so due to methodological weaknesses it was impossible to provide accurate data on who was responsible. Therefore further work is required.

In this study the traditional participants were more senior and included middle grade staff (Specialist Trainee's (ST)) as well as consultant staff. There is little in the literature which actually outlines how well these groups of staff prescribe in practice, thus it is difficult to ascertain whether these reported shortcomings in initial education continue into future practice however; information has appeared in some papers either as a primary or secondary feature.

Hart et al (2008) discuss the inclusion of a drug test as part of a selection process for paediatric specialist trainees in Sheffield. Here the trainees ranging from ST1 – ST4 were given a clinical scenario to reflect their stage of training and asked to document the drug involved on a drug chart. Two hundred and thirty trainees were included and from this only one of them managed to complete the drug chart completely accurately, with prescribing skills described as 'generally poor'(Hart et al 2008, p636). Also Dornan et al (2009) who were looking specifically at what caused foundation doctors to make mistakes in prescribing also compared their level of prescribing errors to other groups. They found that the rate of errors among the FY1 group surveyed during a review of one hundred and twenty-four thousand prescriptions was just over eight percent, but that for FY2's it was just over ten percent, for FTSTA (fixed term speciality training contract of up to one years duration in the early years of speciality training) it was just over eight percent, for NCCGS (non-consultant career grade staff, including staff grade doctors and senior associate specialists) it was almost seven percent, for consultant medical staff it was almost six percent, for nurses it was just over six percent and for pharmacists it was zero. Therefore, despite the fact that junior medical staff undertake more prescribing than any of the other groups and make mistakes, they are not the only group to do so. Others who have

had more experience than them also continue to make errors during prescription writing (Dornan et al 2009).

There is also some concern that juniors make more mistakes since they are not exposed to as much clinical practice due to the implementation of the European working time directive and the reduction in weekly working hours to a maximum of forty-eight. However, specific guidance exists around this particularly in relation to training and competencies and as such no doctor in training should be disadvantaged (EWTD Reference group 2009).

4.3.4.Errors once in a qualified prescribing role – the non-traditional staff

There is a dearth of information in the literature devoted to the prescribing safety of non-traditional prescribers. What is mainly available is self reported (Bradley et al 2007). Few studies have attempted to use different forms of assessment (Offredy 2007).

Offredy et al (2007) utilised patient scenarios as well as cognitive continuum theory to establish the extent of nurse prescribers knowledge of pharmacology and to better understand how they undertake patient related decisions utilising that knowledge. They identified among the group studied that nurses lacked the requisite knowledge and as a result also had a lack of confidence when prescribing within the controlled situations of the scenarios (Offredy et al 2007). This lack of knowledge and confidence is disappointing however, during the test the participants were not allowed access to any of the normal resources which would be available in real life situations such as the BNF and the Internet. Therefore it could be postulated that they were indeed disadvantaged when compared with what would happen within their daily working lives (Offredy et al 2007). The group were also criticised for only being knowledgeable within the small area of practise where they may work and not outside of that (Offredy et al 2007). One could argue that this is a positive finding rather than a negative

one since most nurse prescribers' work within discreet, specialised areas and will not necessarily be required to provide prescriptions for other patients in similar ways to their medical colleagues. Indeed, this was one of the main tenets outlined by protagonists as to why nurses should not be given prescribing rights in the first place (Horton 2002, Duffin & Yu 2002) and therefore prescribing from a regular list of drugs which are well understood will help to improve safety.

Conversely Latter et al (2007) when investigating a small group of nurse prescribers found the opposite. When studying audio recordings of nurse prescriber consultations and rating them against a Medication Appropriateness Index (MAI) using an expert panel, they identified that nurses were generally making appropriate decisions about prescribing. More work is required to look at these aspects in the future now that there are more nurse prescribers qualified and practising.

Within the interviews in this study however, the traditional staff did allude to the fact that nurses with a prescribing qualification were safer and that in areas where static nursing staff undertook regular prescribing, the quality of that prescribing went up. However one non-traditional prescriber also pointed out that if all nurses undertook prescribing training, perhaps as part of their pre-registration programme, that in the future, nursing would be no better at prescribing than the junior medical staff and that the mistakes we see now would continue.

4.3.5 Discussing errors in practice

Few people in my study owned up to being directly involved in any errors though it was alluded to by several participants that despite the fact they preferred not to talk about them, that it would be dishonest of them to say that it had never happened to them. One traditional participant had some

experience of an incident that had occurred with a colleague and three of the non-traditional participants did outline incidents that they had been involved in personally; though two of these had been near misses and the third was a patient error which did cause harm, though did not involve the participant's prescription directly. The non-traditional participants took longer to discuss these and reflected more upon them than the traditional participant. The non-traditional participants were also very critical of themselves as a result and outlined how these incidents had altered their prescribing practice in some way.

Vincent (2003) outlines that discussing errors is important for several reasons, initially to see the people involved in an error to obtain a comprehensive account of what happened, which may very well be different to that within any written account. As well as using examples of errors within an educational event from which all staff can learn (Vincent 2003).
It has been acknowledged that healthcare professionals and in particular, doctors, are cautious of discussing any errors that they make especially with their senior colleagues believing that this may jeopardise their future career (Lawton & Parker 2002). Conversely it has also been noted that some physicians are in favour of sharing error information with others and are also willing to share this with their institution, though often the methods available for doing so are not thought to be appropriate. This includes such methods as sharing the information during informal sessions with colleagues and at medical meetings (Garbutt et al 2008). Kaldjian et al (2008) found that the participants in their study did discuss errors with their colleagues however, their prime motivation for doing so was to discover if they would have made the same clinical judgement, with learning about the error itself being seen as slightly less important.
It has been postulated that medical staff are willing to discuss errors that they have been involved in if the environment is a non-threatening one (Dean et al 2002a). However, it has also been identified by some medical

staff that the availability of supportive listeners among their medical peers may be sadly lacking (Kaldjian et al 2008), thus reducing the likelihood of this happening. The literature also points to perceived learning events such as morbidity and mortality meetings and outlines that the actual sharing that takes place during these events is also limited due to concerns about blame and humiliation in public (Kaldijain et al 2008). If this is the case among medical groups, then perhaps it is unsurprising that some personnel may not wish to share their errors with anyone and this therefore has a resultant detrimental effect on their decision to report them at all.

Within other groups Espin and colleagues (2010) examined nursing staff in an intensive care setting and found that a high proportion of participants would report errors with many stating that they would also discuss them beforehand with the parties involved, with interdisciplinary communication being seen as vital and non-hierarchical in this particular study. However, this may also occur naturally due to the fact that there is an expectation that since nurses and midwives are at the shop front, they are best placed to intercept errors, particularly those involving medication and are perhaps, indoctrinated into discussing them (Mayo & Duncan 2004).

There was a difference in the discussion between the traditional and non-traditional participants in my study with the non-traditional participants appearing to be more open with their answers and more willing to talk about perceived errors. This may however have been purely due to the fact that the interviewer is also part of the nursing fraternity. Discussion may have been more stilted with the traditional participants as the interviewer was not seen as part of their group. Despite the fact that they did allude to errors that they may have been involved in, as with the literature, they were not willing to engage in much discussion regarding them.
The language itself which was used when discussing their involvement in incidents varied between the two groups with the traditional group being

more matter of fact about incidents that may have happened with some describing them as inevitable since they involved humans. The non-traditional participants however, were more personally involved describing themselves as being 'mortified' that they could possibly have been implicated in such a thing. They were also more self critical of what they had done and talked about never being able to forget it. This may be due to the fact that they are very experienced nurses although new to prescribing, with the consequences of making a mistake during something which is seen as a real advancement, being viewed as letting others down. On a more practical level it may have been due to the fact that nurses are encouraged to use reflection more often as part of their continuous professional development and as such are more able to vocalise what they are thinking. Or it may be purely due to the fact that the majority of the participants from the non-traditional group were female, and as such view things slightly differently.

Interestingly it has also been identified that the female medical staff are more likely to discuss errors and are also their own biggest critics (Kaldjian et al 2008). So female nurses and medical staff may just be more reflective in nature rather than anything else.

4.3.6 Possible effects of gender on the data collection

The sample of ten non-traditional staff interviewed included one male and nine females. Indeed in the original group invited there were only two males in total from a group of forty-one. This non-traditional sample was exclusively nurses and therefore having one male in a group of ten may be somewhat representative of the natural split of sexes in the nursing profession. With one author suggesting that there has never been any more than ten percent of males in the nursing profession in the UK (Whittock & Leonard 2003).

The sample of traditional prescribers however, was all male. In the original traditional group invited to participate, only three from a total of thirty-eight were women. Whilst it is true that more recently women are outnumbering men in their admission to medical training (Dacre 2008, Royal College of Physicians 2009, Dacre & Shepherd 2010), this was not the case several years previously. With McKinstry (2008) suggesting that medical staff currently above the age of forty-five years old are predominantly male. One further paper produced by the Royal College of Physicians (RCP) found that from the overall number of consultants based on figures from 2007, only forty percent were female (2009).

Since the majority of the medical staff in this study were consultant staff who had in the main, fifteen years or more experience, it is to be expected that the majority would be male.

One further issue with the split of sexes within medicine is due to the speciality within which they work with females less likely to be working in areas such as surgery and more likely to be working in those areas which can give more flexibility in their working pattern such as psychiatry and primary care (McKinstry 2008, RCP 2009). There are more men than females working within the specialist areas utilised within this study and as such more men were eligible for inclusion.

Whilst this may be reflective of the male versus female split of medical staff within these specialist areas within this organisation, this may have had a gender specific effect on the information which was volunteered within the interviews.

Evidence suggests that female medical staff communicate more than their male counterparts when their consultations with patients are monitored and resultantly their interactions last longer (Meeuwesen et al 1991, Hall & Roter 2002, Roter, Hall & Aoki 2002, Roter & Hall 2004, Sandhu et al 2009). Females in comparison to males display more social communication, listen more to their patients and are more empathetic (Meeuwesen et al 1991, Hall & Roter 2002, Roter & Hall 2004, Sandhu et al 2009). Whereas male

medical staff tend to be more domineering, interrupt more and also stick more to the task in hand, thus are less likely to stray from the required therapeutic conversation (Sandhu et al 2009).

Conversely, there is information to demonstrate that the sex of the patient also has some influence on the overall consultation with female patients asking more questions and as a result more communication often takes place (Hall & Roter 2002).

The sex of the interviewer within the research study therefore may also have had some impact on the result. Since the researcher was female and thus interviewed the medical staff who were all male there could be seen to be some element of inequality there. The researcher was also a nurse and therefore the power gradient seen between medical and nursing staff, whether real or imagined, could also have played some role in the interaction.

Myers and Newman (2007) outline that there are many potential problems with interviews which can affect data collection. These include the contrived nature of the interview situation, the rank of the interviewer and also the effects that the interviewer has on the participants; likening the whole thing to a drama complete with a stage, props, actors and a script (Myers & Newman 2007). Whilst DiCicco Bloom and Crabtree (2006) discuss power within qualitative interviews and identify that despite attempting to make allowances for differences in societal roles, it may be impossible to be objective. Alternatively, Nunkoosing (2005) merely suggests that there is a power relationship between the interviewer and the interviewee and there is no equality between the two, since interviewers are also responsible for the analysis of the data and the extrication of meaning.

Finally, Schwalbe and Wolkomir (2001) profile how men and their expressions of masculinity can be problematic within interviews claiming that many will continue to try to exert some sort of power on the process. 'Minimizing' (p94) or providing brief answers to questions is suggested as just one method whereby this is attempted (Schwalbe & Wolkomir 2001).

It is perhaps inevitable that if the traditional participant group had contained more female members the interviews may very well have been longer and the content may have looked a little different. However, this may not have been specifically caused by the fact that they were medical staff but merely since they were different sexes. Therefore whilst this sample may be representative of the male female split in medicine, the extent to which having an exclusively male team of medical staff contributing and whether or not this may have affected the results of this study is unknown. It is impossible to know if the overall conclusions would have been any different if the mix were altered, or indeed if the information disclosed about errors would be diverse.

There is much work to be done to ensure that the culture of discussing errors is made more acceptable to groups of health care personnel. However, since it is evident that nurses and midwives are more able to talk about errors than the medical staff perhaps one key to improving this is to have joint education, meetings and conferences about errors and near misses in the future, rather than having them in discreet groups, thus over time the environment should become a more open one for everyone. Reducing errors and improving safety is not a topic which lends itself to be discussed in isolation rather it should be included in multidisciplinary meetings.

4.3.7 Reporting errors

When it came to reporting errors rather than just discussing them, there was a difference identified between the attitudes of the traditional versus the non-traditional participants in this study. When asked who should be responsible for reporting errors and near misses, the participants' overwhelmingly suggested that this should be the person who identifies the incident. However, only a fraction of them acknowledged that they had

actually used the reporting system in practice. Many of the non-traditional prescribers were familiar with the reporting system but in comparison the traditional participants were not, though the more junior they were, the more aware they were of reporting and how to undertake it. Some of the more experienced traditional participants however, had clearly never engaged with it at all. Therefore there is a paradox which reflects that the participants intend to report incidents believing that this is the correct thing to do, but in reality they do not necessarily exhibit this behaviour.

Historically, nurses and midwives have been better than medical staff at reporting incidents (Vincent et al 1999, Waring 2005, Evans et al 2006, Armitage et al 2007, House of Commons 2009, Hutchinson et al 2009), but there are many barriers highlighted as to why this is not universally done by all staff. These include not knowing what to report (House of Commons 2009, Mahajan 2010), being unfamiliar with the reporting system (Vincent et al 1999, House of Commons 2009, Mahajan 2010), not recognising that an incident has occurred (Evans et al 2006), the reporting formats being too long (Kingston et al 2004, Evans et al 2006, House of Commons 2009, Mahajan 2010, Martowirono et al 2010), not having enough time (Vincent 1999, Evans et al 2006, Mahajan 2010, Martowirono et al 2010), lack of useful feedback (Kingston et al 2004, Evans et al 2006, Mahajan 2010, Martowirono et al 2010), not being sure if anything useful comes about as a result of the reporting (Martowirono et al 2010), concerns about personal reputation (Tamuz et al 2004, House of Commons 2009, Martowirono et al 2010), fear of being disloyal (Martowirono et al 2010) and fear of punitive action (Vincent et al 1999, Mahajan 2010, Martowirono et al 2010).

Many of these were alluded to within the study as well as two further issues, that of being cautious about how reporting incidents will be viewed by other staff, thus relationships may be tarnished as a result and also only using the system to report those incidents that are considered to be serious; thus others will go unreported.

It has been theorized that medical staff are resistant to any quality improvement programmes due to the fact that they do not agree with what measures are being used. They view them as a vehicle to blame individuals for mistakes that are made without any evidence to support an improvement in care and they are seen as an addition to their already overburdened job plans (Shekelle 2002).

Lawton and Parker (2002) gave scenarios to three hundred and fifteen staff within three trusts in England and asked them to identify which ones they would be likely to report to a senior member of staff. They found that medical staff were more unwilling to report incidents to senior members of staff than nurses or midwives.

Evans et al (2006) also demonstrated that consultant medical staff were more likely to fail to use a reporting system; with some forty percent in their study never having completed a form. They also found that the more experienced they were as a consultant, the less likely they were to complete an incident form. They contemplated that this could be due to the fact that they delegate this task to more junior staff or that they are still under the belief that it is only bad doctors who make mistakes (Reinertsen 2000, Evans et al 2006). Similarly Martowirono et al (2010) found that the residents in their study got around the barriers of time and loyalty to their peers by asking a nurse to complete an incident form on their behalf.

More recently Travaglia et al (2009) undertook a study looking at the responses of staff in relation to a newly implemented electronic incident management system. In this study the medical staff identified that despite being interested in improving patient safety, they were the group more likely to provide negative comments on the system, they were least likely to have had any training on it and also they were the group least likely to engage with it, preferring instead to delegate another member of the team to do it on their behalf (Travaglia et al 2009).

Interestingly, this does not only include prescribing incidents in practice, in 1999, Eland et al also identified that medical staff seriously underreported

adverse drug reactions stating similar reasons for not doing so, despite this system having been in place for some thirty years.
The findings in my study are comparable to the literature with traditional staff being the less likely of the two groups to report anything via an incident reporting system.

Nurses and midwives, on the other hand, are more likely to report an incident when they believe it to be an error against a protocol or written standard (Firth-Cozens 2002a, Lawton & Parker 2002, Kingston et al 2004, Espin et al 2010). This may be one reason that nurses report more often than medical staff as medical staff may be less inclined to follow rigid protocols unlike nurses. Or, alternatively, as Lawton and Parker (1999) suggest, may be used more by nurses in an attempt to challenge medical practice.
However, in work undertaken by Currie and Richens (2009) it was identified that in some situations student midwives were being actively discouraged from completing incident reports by their supervisors and others felt that they would be branded as troublemakers if they did so and would be less likely to be employed within the institution once they became registered.

The difference in the reporting rates between medical staff and nursing staff can be quite stark. One American study by Rowin and colleagues (2008) found that when two hundred and sixty-six thousand incident reports were analysed medical staff were only responsible for the reporting of some one percent whereas nursing staff were responsible for reporting forty-five percent of the total number. The remainder being picked up by other hospital staff. There was a similar difference seen between the reporting rates of doctors and nurses in a UK based surgical study by Kreckler et al (2009) with rates of fifteen percent versus sixty-five percent, with nurses additionally more likely to know where to find a reporting form as well as what to do with it.

There is also the issue of culture and socialisation which affects reporting. It has been suggested that within this there are subcultures to which nurses, midwives and doctors all belong and as such, their loyalties are split (Currie & Richens 2009). Lawton and Parker (2002) identified that doctors, nurses and midwives all use different principles when making judgements about the actions of their colleagues and so as such this will affect whether they positively or negatively engage with the reporting system.
Other literature also indicates that medical staff are brought up in an environment where reporting is considered bad practice among their peer group (Kingston et al 2004, Lilleyman 2005), thus inevitably this will affect their ability to report.
Ultimately there are many reasons why participants within my study may have taken a decision to report or may have had that decision affected by another process, which may have had little to do with the actual incident itself or indeed its seriousness. As a result some incidents are likely to go unreported, uninvestigated and are lost as learning opportunities.

Within the study it was also identified that some departments report more incidents than others, with acute medicine being the highest reporter. This may be for a variety of reasons. It could be that this division has a greater safety and improvement culture, thus staff are better at identifying and reporting incidents believing that this will lead to enhanced levels of care (Mahajan 2010). Or it may be that they have more incidents as they are the largest division in the Trust and have the greatest population of patients who may be on multiple medications. The medical speciality also featured highly in a study by Shaw et al (2005) when they investigated the feasibility of developing a national reporting system. Though in comparison Waring (2004) discovered that enthusiasm for reporting in acute medicine was generally low, whereas in obstetrics and anaesthetics support was regarded as the highest; albeit this particular speciality is one of the highest litigated against specialities. These studies however include all types of incident

reports and not just those in prescribing and as such may be influenced by external issues such as legal action.

During the interviews, some participants alluded to the fact that there was an inherent view surrounding the reporting system that it was connected to blame and discussed how this had been seen in the past. Others felt that this attitude had changed and that there was more of a culture of openness, certainly surrounding safety. However, the idea that one's name may appear in an incident form and that this was somehow going to highlight individuals as being bad practitioners, was also outlined in the interview process, with some participants still being uncomfortable about it.
There is an age old, perceived notion that one who makes an error has been distracted, is idle or is inept and that if they had shown due diligence, the error would have been avoided (Reinertsen 2000). This notion seems to continue among some personnel ultimately affecting their ability to be open, honest and to share their errors with anyone else in their institution.
The issue of blame is one which is central to many publications regarding patient safety and incident reporting (Vincent et al 1999, Mahajan 2010, Martowirono et al 2010), with many studies establishing that health care professionals would like incident reporting to be completely anonymous resulting in no blame.
Many others have also reported feeling anxious that they will own up to an error which may result in little benefit to others whilst placing the spotlight on themselves (Leape 2000, Firth-Cozens 2002b, Waring 2005, Rowin et al 2008). Or indeed, concern that the information in the incident report will be used to litigate against them rather than afford them some protection (Kingston et al 2004). Leape (2000) and Waring (2005) describe this anxiety as being allied to shame, with medical and nursing personnel being socialised into a fraternity where perfection is demanded and anything less is not well tolerated either by the public or indeed within other professional circles.

Fear is another issue which is well represented in the literature with this being seen as multidimensional such as fear of being embarrassed, fear of being in line for punishment both personally as well as by others and fear of being involved in resulting litigation (Leape 2000).
Trust is one thing that is fundamental to patient safety in order that staff can be sure that if they report an error that it is treated justly, openly and will be used to improve future care to patients (Firth-Cozens 2004). Institutions then, should ensure that this is built into their reporting systems and that they are seen to follow this approach.

Within the Datix reports in this study forty-nine of them were errors. Included in this forty-nine there were twenty-one where it was not possible to tell who had identified the error itself. This may be in part due to the fact that the reporting system is meant to be anonymous, except for the name of the person who completed the form as well as the names of anyone who may be harmed as a result. However, the design of the forms allow those completing them to make them so vague as to render it virtually impossible for anyone to identify who may have made the initial mistake. Whilst this may make the system more attractive for staff to engage with, it does make it more impracticable for the Trust to identify if there are similarities with faults either in systems or among personnel in order to make redesign or re-training possible.
It is true that the main point of any incident reporting system should be to monitor errors and near misses thus establishing recurrent themes which can be improved to make care safer for patients (Lilleyman 2005). This also has to incorporate an element of monitoring which enables institutions to benchmark or establish how well they are doing in relation to others. If these institutions have higher than average errors, then they also need to be able to identify why this is and take the appropriate action. This may be due to systems errors, but may also be due to specific personnel; thus fair blame may be a more responsive and appropriate way to manage error systems.

As Runciman et al (2003) suggests, failure to actually allocate blame is equally damaging and can result in a loss of trust in health care professionals.
It may be true, as Lilleyman (2005) suggests, that the National Health Service has in the past had a tradition of denying, covering up or blaming individuals for serious errors however, this is definitely changing in today's safety climate. Reporting systems must be purposeful and this includes making them transparent with a balanced approach to accountability (Kaplan & Barach 2002).
The Department of Health (2009) has itself published a set of standards in relation to error in health care and how this should be communicated to patients, carers and their families, thus providing guidance on being open about the sharing of this information.

Attitudes to errors and how they are dealt with, particularly within medical circles may be changing and this could be due to the continuing and increasing emphasis placed upon its importance within a safety culture. As an example, Leape (1999) castigated the inception of the safety culture into the United States of America since he believed its intentions to be strictly non-honourable and developed in response to the increasing malpractice litigation rates. Yet three years later he has changed his attitude in favour of using voluntary reporting systems which, he believes, when properly analysed will improve patient wellbeing (Leape 2002).

In the UK, there have been various improvements in the last few years which have come about as a direct result of using a national reporting and learning system (NRLS). This system is one of the arms of the National Patient Safety Agency (NPSA) which is the part of the Department of Health and was specifically established in 2001 to identify patient safety issues and find appropriate solutions for them. Examples of their benefits include guidance on the safer use of intravenous gentamicin for neonates following

the detection of five hundred and seven gentamicin related medication incidents between 2008-2009 (NPSA 2010). The provision of improved guidance surrounding the use of opiod medications following four thousand, two hundred dose related errors and five deaths reported to the NRLS from 2001 to 2008 (NPSA 2008b). And the advent of a never events strategy which includes guidance surrounding mostly preventable, disastrous procedures such as wrong site surgery, wrong route administration of chemotherapy and inadvertently retaining instruments following surgery (NPSA 2009).

Berwick (2001) suggests that when humans are involved there will always be an element of error and that 'exhortation, censure, outrage and shame' (p247) will not be the methods to reduce this; but changing systems will be. Therefore organisations should monitor their errors as well as their approach to dealing with these to ensure that systems as a whole are reviewed and that the attitude and approach to their management is commensurate with the incident itself. Thus the accurate reporting of incidents may increase in the future.

4.3.8 What to report?

The majority of incidents reported within this study (sixty-one versus forty-nine) were near misses rather than actual errors which may suggest that staff feel more confident reporting these since there was no patient harm involved.

Armitage and colleagues (2007) when studying incident reports of drug errors in one hospital in England also found that there was a higher than average number of near misses reported. Despite the fact that near misses do not contribute any harm to a patient it is important that they are analysed since much can be learnt from this information and root causes can be established which will ultimately lead to the reduction of potentially harmful errors (Barach & Small 2000, Firth-Cozens 2002a, Kaplan & Barach 2002,

Leape 2002, Kingston et al 2004, Evans et al 2006, Armitage et al 2007, Jeffs et al 2008, Rowin et al 2008, House of Commons 2009, Kessels-Habraken et al 2010, Mahajan 2010). However, if health care professionals are able to report near misses in such a manner, it may mean that the more harmful mistakes are not being reported as a result since they may feel less confident in reporting anything that caused actual bodily harm.
In this study staff were careful to point out that there were several issues surrounding what they would and would not report. These included the perceived seriousness of the incident as well as whether or not it would take a long time to actually complete the ensuing paperwork. Other things were alluded to such as whether or not the incident was actually felt to be an error in their particular area, since sometimes some things become custom and practice and whether or not the incident report would alter the dynamics of the relationship with the person who reported the incident.

There was a theme within the prescribing errors reported since most of the errors as well as near misses fell into the category 'prescribing a drug, dose or route that is not that intended' (Dean et al 2000); thus there are similarities as to when reports are made. There were also consistent themes in relation to what medications were reported including recurrent errors with diabetic agents, opiates, antibiotics, steroids and heparin. It appears that there are some drug errors that staff report more than others. This may be due to the fact that more errors occur with these drugs or simply because these drugs have trust guidance surrounding them and as such, when a violation of the guidance occurs, nurses are more likely to report them.
There is some correlation between the drugs identified within this research as being problematic and with the drugs identified in Dornan et al's study (2009) of FY1's; with analgesics and antibiotics being the two groups of drugs with the most number of mistakes. Corticosteroids, anticoagulants and drugs used in diabetes were also relatively high on their list (Dornan et

al 2009). Therefore it is likely that these should form the basis of on-going prescribing teaching and regular update.

Being unsure what to report is also a feature in the literature with Stanhope et al (1999) identifying a difference between the number of incidents formally reported in two hospitals in London, versus incidents identified from a retrospective hand search of the notes of the same patients. Similarly, in a later study Capuzzo et al (2005) outlined that the reported events only picked up half of incidents when they were compared to concurrent observation of the same events. Thus it is likely that the same thing occurs in other institutions.

There are also differences in who reports what. This may be something that is influenced by the reporting strategy within the organisation (Tamuz et al 2004, Sari et al 2006), or it may be the ability of the person responsible locally to analyze the data which affects the staffs ability to report them (Vincent 2004, Tighe 2006). Whatever the issue, this leads to a variation in reporting.

Evans et al (2006) found that many doctors reported an incident when it involved the patient getting the wrong treatment but many did not report when a patient did not receive their treatment; consequently acts of omission were not seen as equally important. Whilst Kreckler et al (2009) found that many surgical care errors were not reported by the medical staff as they may be construed instead as surgical complications.

Nurses are seen as more likely to report such things as falls, rather than drug errors (Hutchinson et al 2009), since it is one of the national standards set for reduction, thus is on their clinical radar. However, they have also been described by medical colleagues as being more likely to complete an incident form in some attempt to extricate themselves when things goes wrong (Waring 2005).

Whilst medical staff are also less likely to report any violation to a protocol even when the outcome for the patient is bad (Lawton & Parker 2002).
One further issue likely to affect what is reported is that of habit with Waring (2005) suggesting that even poor standards may become embedded with staff in any particular environment accepting that as normal. In these cases these topics are less likely to be reported as they have become accepted and silently agreed by local staff.
This compared well with the personnel in this study who outlined similar methods of justification as to when they would feel compelled to complete an incident report.
The literature also includes this element of justification in deciding what is and is not worthy of an incident report (Vincent et al 1999, Mayo & Duncan 2004, Mahajan 2010) with some staff believing that if they have satisfactorily dealt with it themselves, then a report is not required. If staff disagree about whether or not it is in fact a topic for reporting they may think twice about doing it and also those issues for which there may be no one single cause identified.
It is also true that medical staff may be more likely to engage with any incident reporting system if they have a degree of control over it and can determine what its reports are used for (Waring 2004). Staff can easily abdicate any responsibility for ensuring that a report is made.

One of the specific issues identified with incident reporting in this particular trust is that there is no accepted way of reporting. Due to this lack of standardisation, staff have their own individualised method of deciding what is important or serious enough for them to generate an incident report. Therefore it is no surprise that each individual will have a different perspective. One participant said that they would only consider using it if an error had occurred which was potentially harmful, whilst others agreed that reporting would be improved if the form was shorter and simpler to complete. One participant even suggested that it would be much more

efficient if someone was employed to coordinate all of the incident reports for staff, then a simple phone call could be made to delegate the overall responsibility for reporting to them.

Others identified that if appropriate methods for handling the incident were available within their department, then a report was not deemed necessary. Therefore any learning possible from these particular situations would be then lost to other wards and departments.

The participants were however, not blind to the benefits of having a more robust system with several of them outlining that reporting would be strengthened if there were clear guidelines as to what to report as well as how to report them. Some participants felt that the use of the incident reporting system should be made compulsory and others felt that they should be used more seriously as an academic tool from which lessons should be learnt for the future. This is also echoed in the literature with the emphasis placed on clearer definitions as well as simplified methods of communicating them to risk departments (Vincent et al 1999, Kingston et al 2004, Mayo & Duncan 2004). Other, more unique interventions include the use of personal digital assistants and call centres that collect incident information (Evans et al 2006).

Bent et al (2002) and Freestone et al (2006) outline work which was undertaken in Australia using small hand held computers or personal digital assistants for anaesthetic trainees. This identified that the use of this system was relatively quick and well completed and provided more accurate information on incidents than the usual electronic reporting system; with the overall reporting rate given as just over ninety-nine percent (Freestone et al 2006). Reporting via this system was therefore better completed and could in future be useful in other areas where their reporting rates are low.

Clearly subjectivity plays a large role in the justification to report an error and perhaps it is time for reporting systems to become clearer and more objective.

The issue of reporting an incident is, in effect, a social business and despite the fact that the main intention of reporting is to increase safety, some personnel still seem to place greater importance on what other staff may feel and think about them above the actual future safety of other patients. There is also a distinct variation in what is reported, thus subjectivity also plays a role in the decision to highlight incidents.
Undoubtedly, the culture of reporting, despite its recent alterations and emphasis on patient safety, still has some way to go before the practice is truly accepted and embraced among hospital personnel.

4.3.9 Learning from errors

All twenty participants in this study said that they had had no feedback from the incident reporting system provided by the trust; this is therefore a crucial factor in the organisations ability to learn. They also felt that as a result of this they would consider every case in the future when an incident form should be completed and make a decision as to whether or not it was required. This was due to their lack of faith in the system and its resultant ability to increase safety to others. This is also consistent with much of the literature on incident reporting (Kingston et al 2004, Tamuz et al 2004, Rowin et al 2008, Basu 2009, Benn et al 2009, Marhajan 2010, Martowirono et al 2010) with Evans et al (2006) identifying from their study that it was by far the largest stated problem. Doing nothing with the data collected has been reported to cause mistrust of the system and thus will lead to personnel being turned off of all patient safety systems in the future (Leape 2000). The key then, to engaging staff in improving safety via a reporting and learning system is to ensure that staff know implicitly that any reports submitted will ultimately be analysed properly as well as being fed into patient safety improvement programmes which are rolled out to other areas (Mahajan 2010).

Feedback may be dependent on the information available at the time or indeed on the speciality area. As an example Basu et al (2009) undertook a survey to establish how many trainee doctors within the speciality area of obstetrics and gynaecology, who had been involved in completing incident forms in relation to an adverse clinical incident, received any feedback. Basu et al (2009) identified that whilst some ninety percent of the sample group had submitted an incident form only fifty-one percent had received any kind of feedback, with this more likely if you were a senior rather than a junior trainee. They did however, work within obstetrics and gynaecology and as the most litigious speciality; it may be that the trainees have been indoctrinated into strict clinical governance methods. However, this does provide some hope that it is indeed possible to encourage and educate the medical personnel to be more involved in incident reporting, but it may be more relevant to them if this is linked with risk management in terms of potential future litigation.

The extent of feedback however, is reliant on the usefulness of the information contained within the incident reports.
The data found in this study was frequently of poor quality and very little information was contained within either the incident report or the investigation which had occurred initially at ward level when it was identified. This is consistent with work undertaken by Tighe et al (2006) where they also found that poorly completed incident reports led to an under-utilisation of information in order to improve patient safety. The Department of Health (2006) in their feedback on incidents that had been reported via the National Reporting and Learning System (NRLS) also found that it was difficult to accurately identify what harm had been caused to patients within their data and their ability to look at national trends was impaired as a result. This is not a new phenomenon and was also found by Shaw et al (2005) and Armitage et al (2007) with the result that insufficient information was included on incident reports in order to identify sufficient detail on causation.

The Department of Health (2006) has outlined that not as many lessons in patient safety have been learnt as expected as a result of the analysis of incident reports across England and Wales. This has also been found in independent studies where using various other methods of data collection such as hand searches and observation, more incidents have been uncovered than those contained within a voluntary reporting system (Stanhope et al 1999, Capuzzo et al 2005, Sari et al 2006).
The same could be said about the analysis of incident reports from this study together with the qualitative comments from the study participants. One valid reason for this and one which was found within this study is the fact that not enough useful information was included in the reports to enable a logical and constructive analysis to take place. Reports were vague at times with little information included as to what had happened to the patients and if indeed any harm had occurred as a result of the error. Hence the actual quality of incident reports must improve so that better and more effective links can be made and more effective feedback could be guaranteed. One method of ensuring this would be to make sure all areas of the form provided clear instructions and their fields would be mandatory to complete before the form could be electronically submitted. This may help in the provision of more explicit information which would then form part of the feedback.

There are a number of ways suggested as to how this feedback could take place including the production of publications such as bulletins and manuals, the inclusion of feedback at conferences, during educational events, during training and also during leadership walk rounds (Mahajan 2010). As well as optimizing the operational definition and categorization of incidents to ensure maximum learning (Tamuz et al 2004). With Benn et al (2009) advocating that a variety of different methods are utilised to feedback using a common framework and that some of these are repeated.

What is clear is that doing nothing with the data, especially not feeding back to the staff responsible for collecting it, has repercussions which most organisations would not find useful. If the provision of feedback is one of the factors which influences whether or not health care personnel would report via another incident form in the future, then this needs to be one of the most important inhibiting factors to change.

The following section returns to the four initial study objectives and reviews the study conclusions in relation to each one.

4.4 Objective one:

To assess the number and type of prescribing errors and near misses made by traditional as well as non-traditional prescribers in one trust in the north of England.

The number of prescribing errors and near misses made by traditional versus non-traditional staff within this study was striking, with the non-traditional prescribers making no mistakes and having only three near misses; versus the traditional prescribers having forty-nine errors and fifty-eight near misses. The non-traditional prescribers therefore make fewer mistakes. However, this does need to be looked at carefully in context since the non-traditional prescribers currently prescribe much less than the traditional prescribers (in out-patient prescribing alone four percent versus ninety-six percent).

There was a recurrent theme in the type of prescribing errors made with the most common type of error to occur related to prescribing the wrong drug, route or dose, this occurred in twenty-seven percent of all prescriptions examined. The drugs most commonly involved included diabetic agents, opiates, antibiotics, steroids and anticoagulants.

4.5 Objective two:

To understand how prescribing errors and near misses are experienced by the prescribers themselves.

There are different perspectives regarding errors and near misses from the traditional and non-traditional prescribers with the former being less likely to talk about them despite alluding to the fact that they occur. Non-traditional prescribers were willing to talk at length and also chastised themselves if they happened to be involved in any.

4.6 Objective three:

To apply a known tool which is capable of categorizing errors in prescription charts.

The tool used within this research study was capable of categorizing errors in prescription charts but within the confines of the categories it contained. There was some latitude when defining what was and what was not an error and this was left up to the prescriber to be decided. As such, subjectivity was introduced which could easily aid in the perpetration of a medication error. Whilst the tool could be used, it may be preferable within organisations if they used something that excluded ambiguity so that all staff are in no doubt as to what is and what is not specifically classed as an error.

4.7 Objective four:

To identify any recurrent issues which may affect prescribing within this trust among all of those who prescribe.

The issues of continuing education as well as feedback from errors and near misses reported to the Trust were the major issues within this objective. Attending to them in the future in the manner outlined by the

participants within this study would greatly affect confidence in prescribing in the future.

4.8 Use of the Brunswikian Lens Model and Propositions

As a junior researcher, the Brunswikian Lens Model (Scholz & Tietje 2002) provided a framework that helped to keep me focussed. Initially when it was evident that a large amount of data would be gained by undertaking case study analysis, I was unsure how I would be able to handle it all and how I would make sense of it. When I was introduced to the Brunswikian Lens Model and having read around its origins, I suddenly had clarity about how the research question should be developed and also analysed.

The ability to be able to clarify the case and put some boundaries around it in terms of what would be discussed and thought about during the data collection as well as the analyses of the data using the model, helped to simplify things and provided what was almost like a map to be followed. Case studies to the novice can seem long and difficult and some may find the ability to construct them within some form of structure, more easy to manage.

Having propositions to aid in the study also helped provide structure. Propositions are created by inquisitive researchers (Price 2008); this means that they are generally created in response to questions that the investigator has about the case being studied. In this case I had many questions about the case since prescribing was something that I had been interested in for some time and in particular, nurse prescribing was something that I had been researching for several years. The case itself began with a series of questions about what was being looked at and also how this fitted together. The development of a series of propositions that resulted from these questions enabled me to think in a more logical fashion when undertaking the case study. As a novice researcher the propositions helped to ensure that I stayed on track and that the focus remained clear. The propositions

also ensured that important points were not forgotten about amidst the copious data and that the case was explored using a series of predetermined points for consideration. This helped me to not only explore the data but also to ensure that the case was encapsulated and I felt less likely to stray from the main reason for the research.

The case study was inductive research, since it was exploratory in nature and as such the propositions within this study helped me to be very specific about what was initially being looked at.
The propositions were not designed to be used as hypotheses which could be tested, rather they were used to interrogate the data and to aid in the formation of conclusions. Hypotheses can be used within case studies but they are more likely to be used when a deductive design is being adopted and a topic is being confirmed rather than explored (Yin 2003). The researcher therefore has to be clear about the nature of the research being undertaken and what evidence will be gained as a result. It was important that the propositions in this case remained as questions and that they were used both in the data collection and in the analysis in order that broad theories could emerge.

The use of a framework such as the Brunswikian Lens model and associated propositions helped to keep the research on track, particularly since there was copious data. I would use this again in the future as part of case study research and would also recommend this as a tool for junior researchers who may be anxious about undertaking long, complex case studies.

4.9 Limitations of the study

Initially in-patient prescriptions were identified as the best way to view errors and near misses among both prescribing groups. It was felt however, when the study was being reviewed by the County Durham and Tees Valley 2 research Ethics Committee (reference number: 08/H0905/90), that if this was to be the case then every prescription included would require the individual approval of each prescriber; this approach therefore became impossible. The method taken was then changed to look at out-patient prescriptions, since they were easier to access than individual notes and it was also more acceptable to use the sample group to get consent to use their prescriptions as part of the study. This way the researcher only saw prescriptions which were individually written and were not on the usual in-patient prescription chart where many prescribers would have contributed. This caused problems on two counts. Firstly, non-traditional prescribers do not all practice in out-patient departments, thus this reduced the pool of staff which could be included in the study. Secondly, since the research was approved there has been a drive to cut costs and a campaign on the reduction of out-patient prescribing has meant that there were fewer prescriptions being generated in the out-patient departments from which to analyse errors and near misses, so the number available was smaller than anticipated.

This small number could not be analysed statistically, particularly for the number of non-traditional errors and near misses. A larger, multicentred study would be more likely to provide sufficient power in the future to enable this to be more appropriately undertaken.

The subunits looking at prescriptions were not the same, one subunit was looking at primarily in-patient incident forms and the other, whilst looking at examples of prescribing, was based in out-patient prescribing. This meant that they could not be directly compared. (Though any error with medications should be flagged up via the same system).

The prescribing error tool was used as it was the only one available however, some of the definitions within the tool were subjective and those currently classed as errors may not be seen by others as errors and likewise those which were classed as non-errors, could also have been seen as an error.

The participants were 'self selected' consequently only those who were interested in taking part would have agreed to be included. This precludes anyone in the group who may have particular issues around prescribing or anyone who has made an error or mistake that they did not wish to disclose. The fact that only those prescribers who were prescribing outpatient medications were included was another issue; thorough investigation of in-patient prescriptions was not possible and this may have given rise to different results.

The literature on nurse prescribing has been written in a historical fashion which studied prescribing in various guises from its initial development in the 1980's. This has included supplementary prescribing through to independent prescribing. All of this has been used collectively despite the fact that some pertain specifically to those initial prescribers who could prescribe very little and some pertain to those who now currently prescribe independently. Also all specialities are included collectively which means that papers on primary care and secondary care are mixed.

This study could only include incidents which had been formally reported. There may have been many other incidents which occurred during the study period but could not be included since there was no formal information on the electronic incident reporting system available to the researcher.

The group of traditional prescribers included in this study were exclusively male. There is no way of knowing exactly how the data would have been influenced by having more traditional female prescribers included within the study, though it is possible that they may have given more in-depth accounts of their experiences.

Chapter 5 - Conclusions and Recommendations

The experience of both traditional and non-traditional prescribers provides insight into how prescribing could be undertaken and monitored more safely in order that patient care is improved through concentrating on three specific topics; namely education, incident reporting and feedback. The following conclusions and recommendations outline exactly where these improvements could be made.

Traditional and non-traditional prescribing groups felt that the initial education to prepare prescribers for practice is lacking in useful content in order to make them fit for purpose. More specifically, they believed that the theoretical content of courses could improve and that there should be more emphasis on learning to actually prescribe in practice. Traditional prescribers need more knowledge of drugs and practical skills of undertaking written prescriptions. Non-traditional prescribers need improved pharmacological knowledge and also more in-depth knowledge of drugs used in their specialist areas. This information should be shared with institutions of higher education in order that courses are more responsive to the needs of clinical practice.

Continuing prescribing education was recommended by both groups as being essential to maintain safe practice, since it was felt that after qualification there was very little in the way of monitoring this. There are similarities on what these groups think this should consist of which includes mandatory type training, study days, update on errors within the institution as well as regular examination. This should be included in safety training within the institution as another safety check on clinicians practice.

The non-traditional prescribers have been shown in this study to make fewer errors than traditional prescribers. They are very conscientious about keeping their practice safe, choosing to mainly prescribe drugs that they are familiar with and those they prescribe regularly and they also undertake several checks during the prescribing process. Non-traditional prescribers are therefore safe to utilise in specialist areas where they have particular expertise.

The non-traditional prescribers do however make more near misses than traditional prescribers based on the Datix reports in this study. This could be due to the fact that they are more likely to report these than the traditional prescribers. This may occur in relation to their conscientiousness, which was clearly evident within the interview data. Reporting near misses should mean that others will learn from this and not go on to make a similar error.

The results indicate that both groups had similar issues with confidence to prescribe once they started to undertake this in practice, but the traditional group were more exposed to prescribing in their roles and as such perhaps became indoctrinated into it more quickly.
Traditional and non-traditional prescribers view errors differently, with non-traditional prescribers thinking about error all the time when they prescribe and traditional prescribers being more relaxed whilst relying more on different interceptors such as nurses and pharmacists to avoid an error before it reaches a patient. Knowing how prescribers feel about prescribing and their attitude to writing a prescription is something that should also be taught during prescribing courses, thus complacency can be examined and highlighted.

Both groups use various support people to help keep their practice safe and this includes pharmacists, though the non-traditional prescribers reported

that they are more likely to use their peer group than the traditional prescribers. This can again be utilised in prescribing teaching with practitioners being assured that there are others available to provide support.

There are recurrent themes with drug errors in this particular institution; both in the type of error made as well as in the drugs involved. The most common type of error to occur related to prescribing the wrong drug, route or dose with the drugs most commonly involved including diabetic agents, opiates, antibiotics, steroids and anticoagulants. This highlights that despite there being national guidance related to the prescribing of some of these drugs and despite having Trust protocols in place; there is a problem with ensuring that prescribers comply. This outcome is useful to the organisation in relation to future targeted training and may also be useful to other, similar organisations.

The non-traditional prescribers recall any errors or near misses that they have been involved in with crystal clear clarity and continue to berate themselves about it whilst the traditional prescribers do not want to talk about the mistakes or do not remember any. It is clear that reflection on practice is something that is perhaps peculiar to non-traditional prescribers or that traditional prescribers do not wish to share such information in the same manner. Facilitating sessions where practitioners all share in their prescribing experiences could be a powerful method of increasing safety.

There are deficiencies within the incident reporting system which need urgent attention in order that this can be better used as a method of highlighting and improving errors. This includes giving better instruction as to how it is to be used and also making sure that the information gained as a result is disseminated to all staff in the organisation in a more thorough

manner. Formal feedback from this system is essential to help improve safety throughout the organisation.

This study highlights that when examining new practices in detail within a case study analysis and using the personnel involved; many issues can be uncovered which, if attended to, would improve the future safety of patients. These are generally minor issues; the solutions to which could create large benefits for future health care personnel and the public they serve.

Other areas are identified which would be worthy of future research and these include:

1. Future, multicentred studies are required in order to include sufficient numbers of errors and near misses to provide a comprehensive statistical analysis of the safety of prescribing within traditional as well as non-traditional prescribing staff.

2. Further research on prescribing courses which could include developing a single access course for all prescribers which then branched off into speciality education; this could also include the elements which have been identified within this study as being lacking from the courses.

3. Developing a strategy for the dissemination of safety related information within an organisation, since the current one identified within this specific institution does not work as well as it could. This would impact upon clinical practice and ultimately patient safety.

4. Developing an on-going update and training strategy for continuing prescribing education for institutions, which includes targeted training, mandatory study and also regular testing of all prescribing

staff, to determine if this reduces error and increases safety to patients. This again would enhance clinical prescribing.

Case study analysis in this instance has enabled the topic of errors and near misses and how they are experienced by both traditional and non-traditional prescribers to be illuminated and topics to increase patient safety to be highlighted. It is hoped that this together with the topics for future research will increase awareness within this organisation as well as emphasize them for others.

References

Ahuja, J. (2009) Evaluating the learning experience of non medical prescribing students with their designated medical practitioners in their period of learning in practice. *Nurse Education Today*, 29: 879-85.

Anaf, S., Drummond, C. and Sheppard, L.A. (2007) Combining case study research and systems theory as a heuristic model. *Qualitative Health Research*, 17(10): 1309-15.

Anderson, D.J. and Webster, C.S. (2001) A systems approach to the reduction of medication error on the hospital ward. *Journal of Advanced Nursing*, 35(1): 34-41.

Anderson, R.A., Crabtree, B.F., Steele, D.J. and McDaniel, R.R. (2005) Case study research: the view from complexity science. *Qualitative Health Research,* 15(5): 669-85.

Anthony, S. and Jack, S. (2009) Qualitative case study methodology in nursing research: an integrative review. *Journal of Advanced Nursing*, 65(6): 1171-81.

Armitage, G. (2005) Drug errors, qualitative research and some reflections on ethics. *Journal of Clinical Nursing*, 14: 869-75.

Armitage, G. et al (2007) reporting drug errors in a British acute hospital trust. *Clinical Governance: An International journal*, 12(2): 102-114.

Aronson, J. (1994) A pragmatic view of thematic analysis. *Qualitative Report*, 2(1).

Appleton, J.V. & King, L. (2002) Journeying form the philosophical contemplation of constructivism to the methodological pragmatics of health services research. *Journal of Advanced Nursing*, 40(6): 641-48.

Armitage, G. & Chapman, E.J. (2006) Incident reporting: a curate's egg? *Journal of Integrated Care Pathways*, 10: 92-6.
Aronson, J.K. (2006) A prescription for better prescribing. *BMJ,* 333: 459-60.

Attride-Stirling, J. (2001) Thematic networks: an analytical tool for qualitative research. *Qualitative Research*, 1(3): 385-405.

Aubrey, W.R. & Yoxall, C.W. (2001) Evaluation of the role of the neonatal nurse practitioner in resuscitation of preterm infants at birth. *Archives of Disease in Childhood – Fetal Neonatal Edition,* 85: 96-99.

Audit Commission (2001) A *Spoonful of Sugar. Medicines Management in NHS Hospitals.* London. Audit Commission.

Bailey, C.G. et al (2008) Medication errors in relation to education and medication errors in relation to years of nursing experience. In: *Dr Maranah Sauter's Nursing Research Course.* USA. Volume 3: 1-8.

Banning, M. (2004) Nurse prescribing, nurse education and related research in the United Kingdom: a review of the literature. *Nurse Education Today*, 24: 420-27.

Banning, M. (2005) Medication errors: considerations for nurse prescribers. *Nurse Prescribing*, 3(2): 68-72.

Basford, L. (2003) Maintaining nurse prescribing competence: experience and challenges. *Nurse Prescribing*, 1(1): 40-45.

Basu, A. et al (2009) Feedback in incident reporting – more needed. *Clinical Governance: An International Journal*, 14(1): 38-41.

Barach, P. and Small, S.D. (2000) Reporting and preventing medical mishaps: lessons from non-medical near miss reporting systems. *British Medical Journal*, 320 (7237): 759-63.

Barber, N. (2009) Extended prescribing rights – the UK experience. *Australian Prescriber*, 32: 118-9.

Barber, N, Rawlins, N. & Dean Franklin, B. (2003) Reducing prescribing error: competence, control and culture. *Quality & Safety in Healthcare*, 12(suppl 1): i29-i32.

Bates, D.W. (2000) Using information technology to reduce rates of medication errors. *BMJ*, 320: 788-91.

BBC (2001) Victim's parents blast drug guidelines. BBC Internet News. Available from: http://www.news.bbc.co.uk/1/hi/health/1640800.stm (accessed August 25th 2007)

BBC (2003) Doctor admits drug blunder killing. BBC Internet News. Available from: http://www.news.bbc.co.uk/i/hi/health/3129668.stm (accessed August 25th 2007).

Becker, D.J. (2007) Do hospitals provide lower quality care at weekends? *Health Research & Educational Trust*, 42(4): 1589-1612.

Bell, C.M. and Redelmeier, D.A. (2001) Mortality among patients admitted to hospitals on weekends as compared with weekdays. *New England Journal of Medicine*, 345: 663-6.

Bent, P.D. et al (2002) Professional monitoring and critical incident reporting using personal digital assistants. *MJA*, 177: 496-99.

Benn, J. et al (2009) Feedback from incident reporting: information and action to improve patient safety. *Quality and Safety in Health Care*, 18: 11-21.

Bergen, A. & While, A. (2000) A case for case studies: exploring the use of case study research in community nursing research. *Journal of Advanced Nursing*, 31(4): 926-934.

Berwick, D.M. (2001) Preventing errors lies in redesign – not exhortation. *British Medical Journal*, 322: 247-8.

Blaikie, N.W.H. (1991) A critique of the use of triangulation in social research. *Quality & Quantity*, 25: 115-36.

Boyatzis, R.E. (1998) Transforming *Qualitative Information. Thematic Analysis and Code Development.* London. Sage Publications.

Bradley, E. & Nolan, P. (2004) The progress of nurse prescribing: a commentary. *Nurse Prescribing*, 2(4): 148-151.

Bradley, E., Campbell, P. and Nolan, P. (2005) Nurse prescribers: who are they and how do they perceive their role? *Journal of Advanced Nursing*, 51(5): 439-48.

Bradley, E., Blackshaw, C. and Nolan, P. (2006) Nurse lecturers' observations on aspects of nurse prescribing training. *Nurse Education Today*, 26: 538-44.

Bradley, E. and Nolan, P. (2007) Impact of nurse prescribing: a qualitative study. *Journal of Advanced Nursing*, 59(2): 120-58.

Bradley, E., Hynam, B. and Nolan, P. (2007) Nurse prescribing: reflections on safety in practice. *Social Sciences & Medicine*, 65: 599-609.

Bradshaw, A. and Merriman, C. (2008) Nursing competence 10 years on: Fit for practice and purpose yet? *Journal of Clinical Nursing*, 17(10): 1263-69.

Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative research in Psychology*, 3: 77-101.

Brooks, N. et al (2001a) The patient's view: the benefits and limitations of nurse prescribing. *British Journal of Community Nursing,* 6(7): 342-348.

Brooks, N. et al (2001b) Nurse Prescribing: what do patients' think? *Nursing Standard*, 15(17): 33-8.

Bryman, A. (2006) Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 6(1): 97-113.

Bryman, A. (2008) Social *Research Methods*. 3rd Edition. Oxford. Oxford University Press.

Buckely, P. et al (2006) Inter and intra professional perspectives on non-medical prescribing in an NHS trust. *The Pharmaceutical Journal*, 277: 394-98.

Burns, N. & Grove, S.K. (1999) *Understanding Nursing Research*. 2nd Edition. Philadelphia. Saunders.

Campbell, P. (2004) Nurse prescribing: the higher education institutions' perspective. *Nurse Prescribing*, 2(5): 194-6.

Cao, G. (2007) The pattern-matching role of systems thinking in improving research trustworthiness. *Syst Pract Act Res*, 20: 441-53.

Capuzzo, M. et al (2005) Reporting of unintended events in an intensive care unit: comparison between staff and observer. *BMC Emergency Medicine*, 5(3): 1-7.

Carey, N., Courtenay, M. and Burke, J. (2007) Supplementary nurse prescribing for patients with skin conditions: a national questionnaire survey. *Journal of Clinical Nursing*, 16: 1230-1237.

Chantler, C. (1999) The role and education of doctors in the delivery of health care. *The Lancet*, 353: 1178-81.

Child, D. (2001) Hospital nurses perceptions of pharmacist prescribing. *British Journal of Nursing*, 10(1): 48-54.

Colaizzi, P. (1978) Psychological research as the phenomenologist views it. In: Valle, R.S. & King, M. (eds). *Existential–Phenomenological Alternatives for Psychology*. New York. Oxford University Press. p. 48–71.

Coombes, I. et al (2007) Safe medication practice tutorials: a practical approach to preparing prescribers. *The Clinical Teacher*, 4: 128-34.

Courtenay, M. (1991) A study of the teaching and learning of the biological sciences in nurse education. *Journal of Advanced Nursing*, 16: 1110-16.

Courtenay, M., Carey, N. and Burke, J. (2006) Independent extended supplementary nurse prescribers, their prescribing practice and confidence to educate and assess prescribing students. *Nurse Education Today*, 27: 739-47.

Courtenay, M. et al (2006) preparing nurses to prescribe medicines for patients with dermatological conditions. *Journal of Advanced Nursing*, 55(6): 698-707.

Courtenay, M. and Berry, D. (2007) Comparing nurses' and doctors' views of nurse prescribing: a questionnaire survey. *Nurse Prescribing*, 5(5): 205-10.

Courtenay, M. and Carey, N. (2007) Nurse independent prescribing and nurse supplementary prescribing practice: national survey. *Journal of Advanced Nursing*, 61(3): 291-99.

Courtenay, M. et al (2007a) Independent extended nurse prescribing for patients with skins conditions: a national questionnaire survey. *Journal of Clinical Nursing*, 16: 1247-55.

Courtenay, M. et al (2007b) An evaluation of a specialist nurse prescriber on diabetes in-patient service delivery. *Pract Diab Int*, 24(2): 1-6.

Courtenay, M. and Carey, N. (2008) Nurse independent prescribing and nurse supplementary prescribing practice: national survey. *Journal of Advanced Nursing*, 61(3): 291-299.

Courtenay, M., Stenner, K. and Carey, N. (2009) Nurses' and doctors' views about the prescribing programme. *Nurse Prescribing*, 7(9): 412-17.

Courtenay, M. and Gordon, J. (2009) A survey of therapy areas in which nurses prescribe and CPD needs. *Nurse Prescribing*, 7(6): 255-62.

Courtenay, M., Carey, N. and Stenner, K. (2011) Non medical prescribing leads views on their role and the implementation of non-medical prescribing from a multi-organisational perspective. *BMC Health Services Research*, 11: 142 Available from: http://www.biomedcentral.com/1472-6963/11/142 (accessed 19th October 2011)

Cousins, D.H. et al (2005) Medication errors in intravenous drug preparation and administration in the UK, Germany & France. *Quality & Safety in Healthcare*, 14: 190-95.

Cooper, R. et al (2008a) Non-medical prescribing in the United Kingdom. *Journal of Ambulatory Care Management*, 31(3): 244-252.

Cooper, R.J. et al (2008b) Nurse and pharmacist supplementary prescribing in the UK – a thematic review of the literature. *Health Policy*, 85: 277-92.

Coyler, H.M. (2004) The construction and development of health professions: where will it end? *Journal of Advanced Nursing*, 48(4): 406-412.

Creedon, R. et al (2009) An evaluation of nurse prescribing. Part 1: a literature review. *British Journal of Nursing*, 18(21): 1322-27.

Crotty, M. (1998) *The Foundations of Social Research – meaning and perspective in the research process.* London. Sage Publications.

Currie, L. and Richens, Y. (2009) Exploring the perceptions of midwifery staff about safety culture. *British Journal of Midwifery*, 17(12): 783-90.

Dacre, J. (2008) Are there too many female medical graduates? No. *BMJ.* 336: 749.

Dacre, J. and Shepherd, S. (2010) Women and Medicine. *Clinical Medicine*, 10(6): 544-7.

Darke, P., Shanks, G. and Broadbent, M. (1998) Successfully completing case study research: combining rigour, relevance and pragmatism. *Info Systems J*, 8: 273-89.

Davies, J. (2005) Health Visitors' perceptions of nurse prescribing: a qualitative field work study. *Nurse Prescribing*, 3(4): 168-172.

Dean, B. et al (2000) What is a prescribing error? *Quality in Health Care*, 9: 232-37.

Dean, B. et al (2002a) Prescribing errors in hospital in-patients: their incidence and clinical significance. *Quality & Safety in Healthcare*, 11: 340-44.

Dean, B. et al (2002b) Causes of prescribing errors in hospital inpatients: a prospective study. *The Lancet,* 359: 1373-1378.

Dean, B. et al (2003) Reducing prescribing error: competence, control and culture. *Quality and Safety in Health Care*, 12(Suppl 1): i29-32.

Dean Franklin, B. et al (2005) The incidence of prescribing errors in hospital inpatients: an overview of research methods. *Drug Safety*, 28(10): 891-900.

Department of Health (1986) *Neighborhood Nursing – a focus of care. Report of the Community Nursing Review.* (Cumberledge Report). London. DH.

Department of Health (1989) *Report of the Advisory Group on Nurse Prescribing.* (Crown Report 1). London. DH.

Department of Health (1991) *Nurse Prescribing Final Report. A Cost Benefit Study.* London. Touche Ross.

Department of Health (1999) *Making a Difference - Strengthening the contribution of Nursing, Midwifery & Health Visiting to health and health care.* London. DH.

Department of Health (1999) *Review of Prescribing, Supply and Administration of Medicine.* (Crown Report 2) Final Report. London. DH.

Department of Health (2000a) *The NHS Plan – A Plan for Investment, a Plan for Reform.* London. DH.

Department of Health (2000b) *A Health Service of all the Talents – Developing the NHS Workforce.* London. DH.

Department of Health (2000c) *An Organization with a Memory. . Report of an expert group on learning from adverse events in the NHS.* London. DH.

Department of Health (2001) *Building a Safer NHS for Patients, Implementing an Organisation with a Memory.* London. DH.

Department of Health (2003) *Building a Safer NHS for Patients. Improving Medication Safety.* London. DH.

Department of Health (2005) *Supplementary Prescribing by Nurses, Pharmacists, Chiropodists, Podiatrists, Physiotherapists & Radiographers within the NHS in England – A Guide for Implementation.* London. DH.

Department of Health (2006) *Improving Patients' Access to Medicines. A guide to Implementing Nurse and Pharmacist Independent Prescribing within the NHS in England.* London. DH.

Department of Health (2006) *Safety First. A Report for Patients, Clinicians and Health Care Managers.* London. DH.

Department of Health (2009) *Allied Health Professions Prescribing and Medicines Supply Mechanisms Scoping Project Report.* London. DH.

DeSantis, L. & Ugarizza, D.N. (2000) The concept of theme as used in qualitative nursing research. *Western Journal of Nursing Research*, 22(3): 351-372.

DiCicco-Bloom, B. and Crabtree, B.J. (2006) The qualitative research interview. *Medical Education*, 40: 314-21.

Dooley, L.M. (2002) Case study research and building theory. *Advances in Developing Human Resources*, 4(3): 335-354.

Dornan, T. et al (2009) *An in-depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education. EQUIP Study.* Manchester.

Downer, F. and Shepherd, C.K. (2010) District nurses prescribing as nurse independent prescribers. *British Journal of Community Nursing*, 15(7): 348-52.

Doyle, L., Brady, A., & Byrne, G. (2009) An overview of mixed methods research. *Journal of Research in Nursing*, 14(2): 175-85.

Drennan et al (2009) *National Independent Evaluation of the Nurse and Midwife Prescribing Initiative.* University College Dublin. Dublin.

Duffin, C. & Yu, R. (2002) Doctors dissent. *Nursing Standard*, 16(22): 12-3.

Eisenhardt, K.M. (1989) Building theories form case study research. *Academy of Management Review*, 14(4): 532-50.

Eland, I.A. et al (1999) Attitudinal survey of voluntary reporting of adverse drug reactions. *British Journal of Clinical Pharmacology*, 48: 623-27.

Ellis, A. (2002) Prescribing rights: are medical students properly prepared for them? *BMJ*, 324: 1591.

Espin, S. et al (2010) To report or not to report: A descriptive study exploring ICU nurses' perceptions of error and error reporting. *Intensive and Critical care Nursing*, 26: 1-9.

Evans, S.M. et al (2006) Attitudes and barriers to incident reporting: a collaborative hospital study. *Quality & Safety in Healthcare*, 15: 39-43.

EWTD Reference Group (2009) *A Guide to the Implications of the European Working Time Directive.* London. EWTD Reference Group.

Fereday, J. & Muir-Cochrane, E. (2006) Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1): 80-92.

Firth-Cozens, J. (2002a) Barriers to incident reporting. *Quality & Safety in Health Care*, 11: 7.

Firth-Cozens, J. (2002b) Anxiety as a barrier to risk management. *Quality & Safety in Health Care*, 11: 115.

Firth-Cozens, J. (2004) Organisational trust: the keystone to patient safety. *Quality & Safety in Health Care*, 13: 56-61.

Fisher, R. (2004) Relationships in nurse prescribing in district nursing practice in England: A preliminary investigation. *International Journal of Nursing Practice*, 11: 102-07.

Foss, C. and Ellefsen, B. (2002) The value of combining qualitative and quantitative approaches in nursing research by means of method triangulation. *Journal of Advanced Nursing*, 40(2): 242-48.

Freestone, L. et al (2006) Voluntary incident reporting by anaesthetic trainees in an Australian hospital. *International Journal for Quality in Health care*, 18(6): 452-57.

Freshwater, D. (2006) Integrating mixed-methods research into healthcare. *Journal of Research in Nursing*, 11(3): 179-81.

Frost, N. et al (2010) Pluralism in qualitative research: the impact of different researchers and qualitative approaches on the analysis of qualitative data. *Qualitative Research*, 10(4): 441-60.

Gangeness, J., and Yurkovich, E. (2006) Revisiting case study as a nursing research design. *Nurse Researcher*, 13(4): 7-18.

Garbutt, J. et al (2008) Lost opportunities: How physicians communicate about medical errors. *Health Affairs*, 27(1): 246-55.

General Medical Council (2003) Tomorrow's Doctors. London. GMC.

General Medical Council (2008) Good Practice in Prescribing Medicines. London. GMC.

General Medical Council (2011) Good Practice in Prescribing and Managing Medicines and Devices. Draft for consultation. London. GMC.

George, J. et al (2006) Independent prescribing by pharmacists: a study of awareness, views and attitudes of Scottish community pharmacists. *Pharm World Sci*, 28: 45-53.

George, J. et al (2007a) Benefits and challenges of prescribing training and implementation: perceptions and early experience of RPSGB prescribers. *International Journal of Pharmacy Practice*, 15(1): 23-30.

George et al (2007b) Experiential learning as part of pharmacist supplementary prescribing training: feedback from trainees and their mentors. *The Annals of Pharmacotherapy*, 41: 11-18.

George, J. et al (2008) Views of pharmacists and mentors on experiential learning for pharmacist supplementary prescribing trainees. *Pharm World Sci*, 30: 256-71.

Ghaleb, M.A. et al (2005) What constitutes a prescribing errors in paediatrics? *Quality & Safety in Healthcare*, 14: 352-57.

Gilbert, T. (2006) Mixed methods and mixed methodologies: the practical, the technical and the political. *Journal of Research in Nursing*, 11(3): 205-17.

Gilgun, J.F. (1994) A case for case studies in social work research. *Social Work*, 39(4): 371-80.

Gomm, R. et al (2002) *Case Study Method*. London. Sage Publications.

Goswell, N. and Siefers, R. (2009) Experiences of ward-based nurse prescribers in an acute ward setting. *British Journal of Nursing*, 18(1): 34-37.

Graneheim, U.H. & Lundman, B. (2003) Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24: 105-12.

Gray, E. et al (2007) Prescription errors in patients on an acute medical assessment unit. *J R Coll Physicians Edinb*, 37: 305-08.

Gray, D.E. (2009) *Doing Research in the Real World*. 2nd Edition. Los Angeles. Sage.

Green, J.C. & Caracelli, V.J. (2003) Making paradigmatic sense of mixed methods practice. In: Tashakkori, A. & Teddlie, C. (eds) *Mixed methods in Social & Behavioural Research*. California. Sage Publications. p91-110.

Guillaume, L. et al (2008) Supplementary prescribing by community and primary care pharmacists: an analysis of PACT data, 2004-2006. *Journal of Clinical Pharmacology and Therapeutics'*, 33: 11-16.

Hall, J.A. and Rota, D.L. (2002) Do patients talk differently to male and female physicians? A meta-analytic review. *Patient Education and Counselling*, 48: 217-24.

Hall, J. et al (2003) The information sources used by community nurse prescribers. *British Journal of Nursing*, 12(13); 810-18.

Hall, J. et al (2006) Why don't trained community nurse prescribers prescribe? *Journal of Clinical Nursing*, 15: 403-12.

Hammersley, M. (2010) Reproducing or constructing? Some questions bout transcription in social research. *Qualitative Research*, 10(5): 553-69.

Han, W.H. and Maxwell, S.R.J. 92006) Are medical students adequately trained to prescribe at the point of their graduation. Views of first year foundation doctors. *Scottish Medical Journal*, 51(4): 27-32.

Harrison, A. (2003) Mental health services users' views of nurse prescribing. *Nurse Prescribing*, 1(2): 78-85.

Hart, A.R. et al (2008) Can junior doctors prescribe? *Archives of Disease in Childhood*, 93(7): 636-7.

Heaton, A. (2008) Undergraduate preparation for prescribing: the views of 2413 UK medical students and recent graduates. *British Journal of Clinical Pharmacology*, 66(1): 128-34.

Hobson, R.J. & Sewell, G.J. (2006) Risks and concerns about supplementary prescribing: survey of primary and secondary pharmacists. *Pharm World Sci*, 28: 76-90.

Horsburgh, D. (2003) Evaluation of qualitative research. *Journal of Clinical Nursing*, 12: 307-12.

Horton, R. (2002) Nurse prescribing in the UK: right but also wrong. *Lancet*, 359: 1875-6.

Horton, R. (2009) The UK's NHS Pharma: from schism to symbiosis. *Lancet*, 373: 435-6.

House of Commons (2009) *House of Commons Health Committee – Patient Safety.* 6th report of Session 2008-09. Volume 1. London. House of Commons.

Howe, K.R. (1988) Against the quantitative-qualitative incompatibility thesis or dogmas die hard. *Educational Researcher*, 17: 10-16.

Hutchinson, A. et al (2009) Trends in healthcare incident reporting and relationship to safety and quality data in acute hospitals: results from the national reporting and Learning System. *Quality & Safety in Health Care*, 18: 5-10.

Innes, M.A., Greenfield, S.M and Hunton, M. (2000) using case studies for prescribing reearch – an example from homeopathic prescribing. *Journal of Clinical Pharmacy and Therapeutics*, 25: 399-409.

Jeffs, L., Affonson, D.D., and MacMillan, K. (2008) Near misses: paradoxical realities in everyday clinical practice. *International Journal of Nursing Practice*, 14: 486-94.

Johnstone, P.L. (2004) Mixed methods, mixed methodology health services research in practice. *Qualitative Health Research*, 14(2): 259-71.

Jones, M. (1999) Nurse Prescribing: Politics to Practice. Bailliere Tindall. London. RCN.

Jones, C. and Lyons, C. (2004) Case study design? Method? Or comprehensive strategy? *Nurse Researcher*, 11(3): 70-76.

Jones, M. et al. (2007) Mental health nurse supplementary prescribing: experiences of mental health nurses, psychiatrists and patients. *Journal of Advanced Nursing*, 59(5): 488-496.

Jones, K. et al (2011) Nurse prescribing roles in acute care: an evaluative case study. *Journal of Advanced Nursing*, 67(1): 117-26.

Kaldjian, L.C. et al (2008) Do faculty and resident physicians discuss their medical errors? *Journal of Medical Ethics*, 34: 717-22.

Kaplan, H. and Barach, P. (2002) Incident reporting: science or protoscience? Ten years later. *Quality and Safety in Health Care*, 11: 144-5.

Keighley, B. (2006) Should nurses prescribe? *British Journal of General Practice*, 56: 68.

Kessels-Habraken, M. et al (2010) Defining near misses: Towards a sharpened definition based on empirical data about error handling processes. *Social Science & Medicine*, 70: 1301-08.

Kimmer, E. and Christian, A. (2005) A review of the usefulness and efficacy of independent nurse prescribing. *Nurse Prescribing*, 3(1): 39-42.

Kingston, M.J., et al (2004) Attitudes of doctors and nurses towards incident reporting: a qualitative analysis. *MJA*, 181(1): 36-39.

King, R.L. (2004) Nurses' perceptions of their pharmacology educational needs. *Journal of Advanced Nursing*, 45(4): 392-400.

Kingston, M.J. et al (2004) Attitudes of doctors and nurses towards incident reporting: a qualitative analysis. *MJA*, 181(1): 36-9.

Kirkham, S.R. and Anderson, J.M. (2002) Postcolonial nursing scholarship: from epistemology to method. *Advanced Nursing Science*, 25(1): 1-17.

Knudsen, P. et al (2007) Preventing medication errors in community pharmacy: root cause analysis of transcription errors. *Qual Saf Health Care*, 16: 285-90.

Kreckler, S. et al (2009) Factors influencing incident reporting in surgical care. *Quality and Safety in Health Care*, 18: 116-20.

Kroezen, M. et al (2011) Nurse prescribing of medicines in Western European and Anglo-Saxon countries: a systematic review of the literature. *BMC Health Services Research*, 11: 127. Available from: http://www.biomedcentral.com/1472-6963/11/127 [Accessed 22nd October 2011]

Lagerlov, P. et al (2000) Improving doctors' prescribing behaviour through reflection on guidelines and prescription feedback: a randomised controlled trial. *Quality in Health Care*, 9: 159-65.

Larson, D. (2004) Issues affecting the growth of independent prescribing. *Nursing Standard*, 19(2): 33-39.

Latter, S. et al (2000) Evaluating educational preparation for a health education role in practice: the case of medication education. *Journal of Advanced Nursing*, 32(5): 1282-90.

Latter, S, and Courtenay, M. (2004) Effectiveness of nurse prescribing: a review of the literature. *Journal of Clinical Nursing*, 13: 26-32.

Latter, S. et al (2007a) Evaluating nurse prescribers' education and continuing professional development for independent prescribing practice: Findings from a national survey in England. *Nurse Education Today, 27: 685-696.*

Latter, S. et al (2007b) Perceptions and practice of concordance in nurses' prescribing consultations: Findings from a national questionnaire survey and case studies of practice in England. *International Journal of Nursing Studies*, 44: 9-18.

Latter, S. et al (2007c) Evaluating the clinical appropriateness of nurses' prescribing practice: method development and findings from an expert panel analysis. *Quality & Safety in Healthcare*, 16: 415-21.

Latter, S. et al (2010) Evaluation of nurse and pharmacist independent prescribing. Department of Health Policy Research Programme project 0160108. University of Southampton / Keele University.

Laupland, K.B. et al (2008) Hospital mortality among adults admitted to and discharged from intensive care on weekends and evenings. *Journal of Critical Care*, 23: 317-24.

Lawton, R. and Parker, D. (1999) Procedures and the professional: the case of the British NHS. *Social Science & Medicine*, 48: 353-61.

Lawton, R. & Parker, D. (2002) Barriers to incident reporting in a healthcare system. *Quality & Safety in Healthcare*, 11: 15-18.

Lazar, D. (2004) Selected issues in the philosophy of social science. In: Seale, C. (eds) *Researching Society & Culture*. 2nd Edition. London. Sage.

Leape, L. (1999) Why should we report adverse incidents? *Journal of Evaluation in Clinical Practice*, 5(1): 1-4.

Leape, L. (2000) Reporting of medical errors: time for a reality check. *Quality and Safety in Healthcare*, 9(3): 144-45.
Leape, L. (2002) Reporting of adverse events. *New England journal of Medicine*, 347(20): 1633-38.

Leathard, H.L. (2001a) Understanding medicines: conceptual analysis of nurses' needs for knowledge and understanding of pharmacology (Part1). *Nurse Education Today*, 21: 266-71.

Leathard, H.L. (2001b) Understanding medicines: extending pharmacology education for dependent and independent prescribing (Part 2). *Nurse Education Today*, 21: 272-77.

Lee, T.W.R. et al (2001) Routine neonatal examination: effectiveness of trainee paediatrician compared with advanced neonatal nurse practitioner. *Archive of Disease in Childhood – Fetal & Neonatal Edition*, 85: F100-04.

Leslie, A. & Stephenson, T. (2003) Neonatal transfers by advanced neonatal nurse practitioners and paediatric registrars. *Archive of Disease in Childhood – Fetal & Neonatal Edition*, 88: F509-12.

Lewis, J. (1975) *Max Weber & Value Free Sociology. A Marxist Critique*. London. Lawrence and Wishart.

Lewis-Evans, A. & Jester, R. (2004) Nurse prescribers' experiences of prescribing. *Journal of Clinical Nursing*, 13: 796-805.

Likic, R. and Maxwell, R.J. (2009) Prevention of medication errors: teaching and training. *British Journal of Clinical Pharmacology*, 67(6): 656-61.

Lilleyman, J. (2005) A blame free culture in the NHS: quixotic notion of achievable ambition? *Perfusion*, 20: 233.

Lipscomb, M. (2008) Mixed method nursing studies: a critical realist critique. *Nursing Philosophy*, 9: 32-45.

Lisby, M. et al (2010) How are medication errors defined? A systematic literature review of definitions and characteristics. *International Journal for Quality in Health Care*, 22(6): 507-518.

Lloyd, F. & Hughes, C.M. (2007) Pharmacists and mentors views on the introduction of pharmacist supplementary prescribing: a qualitative evaluation of views and context. *International Journal of Pharmacy Practice*, 15(1): 31-7.

Luker, K.A. et al (1997) Nurses' and GPs' views of the nurse prescribers' formulary. *Nursing Standard*. 11(22): 33-38.

Luker, K.A. et al (1998a) Nurse-patient relationships: the context of nurse prescribing. *Journal of Advanced Nursing*, 28(2): 235.

Luker, K.A. et al (1998b) Decision making: the context of nurse prescribing. *Journal of Advanced Nursing*, 27: 657-65.

Lymn, J. et al (2008) Pharmacology education for nurse prescribing students – a lesson in reusable learning objects. *BMC Nursing*, 7(2): doi:10.1186/1472-6955-7-2.

McCartney, W. et al (1999) Nurse prescribing radicalism or tokenism? *Journal of Advanced Nursing*, 29(2): 348-54.

McDonnell, A., Lloyd Jones, M. and Read, S. (2000) Practical considerations in case study research: the relationship between methodology and process. *Journal of Advanced Nursing*, 32(2): 383-90.

McInstry, B. (2008) Are there too many female medical graduates? Yes. *BMJ*. 336: 748.

McLay, J. & Ross, S. (2008) Medication errors caused by junior doctors. *BMJ*, 336: 456.

Mahajan, R.P. (2010) Critical incident reporting and learning. *British Journal of Anaesthesia*, 105 (1): 69-75.

Marck, P.B. et al (2006) Building safer systems by ecological design: using restoration science to develop a medication safety intervention. *Qual Saf Health Care*, 15: 92-7.

Martowirono, K. et al (2010) Possible solutions for barriers in incident reporting by residents. *Journal of Evaluation in Clinical Practice*, 10: 1-6.

Mason, J. (2006) Mixing methods in a qualitatively driven way. *Qualitative Research*, 6(1): 9-25.

Maxcy, S.J. (2003) Pragmatic threads in mixed methods research in the social sciences: the search for multiple modes of inquiry and the end of the philosophy of formalism. In: Tashakkori, A. & Teddlie, C. (eds) *Mixed methods in Social & Behavioural Research*. California. Sage Publications. p51-89.

Maxwell, S. and Walley, T. (2003) Teaching safe and effective prescribing in UK medical schools: a core curriculum for tomorrow's doctors. *British Journal of Clinical Pharmacology*, 55: 496-503.

Mayo, A.M. and Duncan, D. (2004) Nurse perceptions of medication errors, what we need to know for patient safety. *Journal of Nursing Care Quality*, 19(3): 209-17.

Medical Schools Council (2007) *Outcomes of the Medical Schools Council Safe Prescribing Working Group.* London. Medical Schools Council.

Medicines & Healthcare Products Regulatory Agency (2006) *Consultation on proposals to introduce Independent Prescribing by Optometrists.* London. MHRA.

Meeuwesen, L et al (1991) Verbal analysis of doctor-patient communication. *Soc Sci Med*, 32(10): 1143-50.

Meyer, C.B. (2001) A case in case study methodology. *Field methods*, 13(4): 329-52.

Miles, K. et al (2003) Sexual health clinics for woman led by specialist nurses or senior house officers in a central London GUM service: a randomised controlled trial. *Sexually Transmitted Infections*, 78(2): 93-7.

Miller, M.R. et al (2007) Medication errors in paediatric care: a systematic review of epidemiology and an evaluation of evidence supporting reduction strategy recommendations. Qual Saf Health Care, 16: 116-26.

Mores, J.M. & Niehaus, L. (2009) *Mixed Method Design: Principles and Procedures.* California. Left Coast Press Inc.

Morrison-Griffiths, S. et al (2002) Pre-registration nurse education in pharmacology: is it adequate for the roles that nurses are expected to fill? *Nurse Education Today*, 22: 447-56.

Moss, F. (2004) The clinician, the patient and the organisation: a crucial three sided relationship. *Quality and Safety in Health Care*, 13: 406-7.

Myers, M.D. and Newman, M. (2007) The qualitative interview in IS research: Examining the craft. *Information and Organization*, 17: 2-26.

National Patient Safety Agency (NPSA) (2007a) *Safety in Doses: Medication Safety Incidents in the NHS. The 4th report from the Patient Safety Observatory.* London. NPSA.

National Patient Safety Agency (NPSA) (2007b) *Safety in doses: Improving the use of medicines in the NHS.* London. NPSA.

National Patient Safety Agency (2008a) *Foresight Training Resource Pack: Introduction to Foresight and Foresight Training.* London. NPSA.

National Patient Safety Agency (NPSA) (2008b) Reducing dosing errors with opioid medicines. *Rapid Response Report.* London. NPSA.

National Patient Safety Agency (NPSA) (2009) *Never Events Framework 2009/10.* London. NPSA.

National Patient Safety Agency (NPSA) (2010) Safer use of intravenous gentamicin for neonates. *Patient Safety Alert.* London. NPSA.

National Prescribing Centre (2001) Maintaining Competency in Prescribing. An outline framework to help nurse prescribers. London. DH.

Nebeker, J.R. et al (2002) Developing a taxonomy for research in adverse drug events: potholes and signposts. J Am Med Inform Assoc, (Nov/Dec Supplement): S80-S85.

Nolan, P. et al (2001) mental health nurses' perceptions of nurse prescribing. *Journal of Advanced Nursing*, 36(4): 527-34.

Nunkoosing, K. (2005) The problems with interviews. *Qual Health Research*, 15: 698-706.

Nursing and Midwifery Council (2006) Standards of Proficiency for Nurse and midwife Prescribers. London. NMC.

Oakley, A. (1999) Paradigm wars: some thoughts on a personal and public trajectory. *International Journal of Social Research Methodology*, 2(3): 247-254.

O'Connell, E. et al (2009) An evaluation of nurse prescribing. Part 2: a literature review. *British Journal of Nursing*, 18(22): 1398-1402.

Offredy, M. et al (2008) The use of cognitive continuum theory and patient scenarios to explore nurse prescribers' pharmacological knowledge and decision-making. *International Journal of Nursing Studies*, 45: 855-68.

O'Shea, E. (1999) Factors contributing to medication errors: a literature review. *Journal of Clinical Nursing*, 8: 496-504.

Otway, C. (2002) The development needs of nurse prescribers. *Nursing Standard*, 16(18): 33-38.

Paterson, L. (2004) *International Nurse Prescribing – How can this impact on neonatal/paediatric specific nurse prescribing?* London. Florence Nightingale Foundation Report.

Paterson, L. (2005) Nurse Prescribing within Neonatal Care. *Inspire*, 2(2): 6-7.

Patton, M.Q. (2002) *Qualitative Research & Evaluation Methods.* California. Sage Publications.

Payne, S. et al (2007) Case study research methods in end-of-life care: reflections on three studies. *Journal of Advanced Nursing*, 58(3): 236-45.

Poland, B. (1995) Transcription quality as an aspect of rigor in qualitative research. *Qualitative Inquiry*, 1: 290-310.

Pontin, D. and Jones, S. (2007) Children's nurses and nurse prescribing: a case study identifying issues for developing training programmes in the UK. *Journal of Clinical Nursing*, 16: 540-48.

Price, B. (2008) Case study research with children and their families. *Paediatric Nursing*, 20(6): 39-45.

Rana, T. et al (2009) Survey of psychiatrists' views of nurse prescribing. *Journal of Psychiatric and Mental Health*, 16: 257-62.

Rappert, B. (2010) Revealing and concealing secrets in research: the potential for the absent. *Qualitative Research*, 10(50): 571-87.

Rawlins, M.D. (2003) making tomorrow's doctors better prescribers. *British Journal of Clinical Pharmacology*, 55: 495.

Reason, J. (1990) *Human Error.* Cambridge. Cambridge university Press.

Reason, J. (2000) Human error: models and management. *BMJ*, 320: 768-70.

Reason, J. (2001) Understanding adverse events: The human factor. In: Vincent, C. (eds) *Clinical Risk Management. Enhancing Patient Safety.* 2nd Edition. London. BMJ. p9-30.

Reason, J. (2004) Beyond the organisational accident: the need for 'error wisdom' on the front line. *Quality and Safety in Health Care*, 13, Supplement II: ii22-ii33.

Reinertsen, J.L. (2000) Let's talk about error. *Western Journal of Medicine*, 172: 356-7.

Ridge, K.W. et al (1995) Medication error during hospital drug rounds. *Quality in Health Care*, 4: 240-43.

Robinson, G. (2004) *I'll Show Them Who's Boss! The Six Secrets of Highly Successful Management.* London. BBC Books.

Robson, C. (2002) *Real World Research.* 2nd Edition. USA. Blackwell Publishing.

Rodden, C. (2001) Nurse prescribing: views on autonomy and independence. *British Journal of Community Nursing*, 6(7): 350-55.

Rolfe, G. (1994) Towards a new model of nursing research. *Journal of Advanced Nursing,* 19: 969-75.

Rolfe, G. (2006a) Judgements without rules: towards a postmodern ironist concept of research validity. *Nursing Inquiry*, 13(1): 7-15.

Rolfe, G. (2006b) Validity, trustworthiness and rigour: quality and the idea of qualitative research. *Journal of Advanced Nursing*, 53(3): 304-10.

Rosenbery, J.P. & Yates, P.M. (2007) Schematic representation of case study research designs. *Journal of Advanced Nursing*, 60(4): 447-52.

Ross, S. et al (2008) What is the scale of prescribing errors committed by junior doctors? A systematic review. *British Journal of Clinical Pharmacology*, 67(6): 629-40.

Roter, D.L., Hall, J.A. and Aoki, Y. (2002) Physician gender effects in medical communication. *JAMA*, 288(6): 756-64.

Roter, D.L. and Hall, J.A. (2004) Physician gender and patient centred communication: a critical review of empirical research. *Annu Rev Public Health*, 25: 497-519.

Rowin, E.J. et al (2008) Does error and adverse event reporting by physicians and nurses differ? *The Joint Commission Journal on Quality and Patient Safety*, 34(9): 537-45.

Royal College of Physicians (2009) *Women and Medicine: The Future*. London. RCP.

Runciman, W.B. et al (2003) Error, blame and the law in health care: An Antipodean perspective. *Annals of Internal Medicine*, 138(12): 997-8.

Ryan, C. (2004) Is the profession prepared for nurse prescribing in hospital? *Nursing Times*, 100(39): 26-8.

Sandhu, H. et al (2009) The impact of gender dyads on doctor-patient communication: a systematic review. *Patient Education & Counselling*, 76: 348-55.

Sakr, M. et al (1999) Care of minor injuries by emergency nurse practitioners or junior doctors: a randomised controlled trial. *The Lancet*, 354: 1321-326.

Sale, J.E.M., Lohfield, L.H. and Brazil, K. (2002) Revisiting the quantitative-qualitative debate: implications for mixed methods research. *Quality & Quantity*, 36: 43-43.

Sandelowski, M. & Barroso, J. (2002) Finding the findings in qualitative studies. *Journal of Nursing Scholarship*, 34(3): 213-19.

Sandilands, E. et al (2010) Impact of a focussed teaching programme on practical prescribing skills among final year medical students. *British Journal of Clinical Pharmacology*, 71(1): 29-33.

Sari, A.B. et al (2006) Sensitivity of routine system for reporting patient safety incidents in an NHS hospital: a retrospective patient case note review. *British Medical Journal*, doi:10.1136/bmj.39031.507153.AE (published 15 December 2006).

Schelbred, A.B. and Nord, R. (2004) Nurses experiences of drug administration errors. *Journal of Advanced Nursing*, 60(3): 317-24.

Scholz, R.W. & Tietje, O. (2002) *Embedded case Study methods – Integrating Quantitative and Qualitative Knowledge.* London. Sage Publications.

Schwalbe, M. and Wolkomir, M. (2001) The masculine self and problem and resource in interview studies of men. *Men and Masculinities*, 4(1): 90-103.

Seale, C. (2011) Secondary analysis of qualitative data. In: Silverman, D. (eds) *Qualitative Research.* London. Sage. p347-64.

Sharp, K. (1998) The case for case studies in nursing research: the problem of generalization. *Journal of Advanced Nursing*, 27: 785-89.

Shaw, R. et al (2005) Adverse events and near miss reporting in the NHS. *Quality and Safety in Health Care*, 14: 279-83.

Shenton, A.K. (2004) Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22: 63-75.

Shekelle, P.G. (2004) Why don't physicians enthusiastically support quality improvement programmes? *Quality & Safety in Health Care*, 11: 6.

Silverman, D. (2011) *Interpreting Qualitative Data.* 4th Edition. London. Sage.

Simons, H. (2009) *Case Study Research in Practice.* London. Sage Publications.

Siriwardena, A.N. (2006) The rise and rise of non-medical prescribing. *Quality in Primary Care*, 14: 1-3.

Skingsley, D. et al (2006) Neuropharmacology and mental health nurse prescribers. *Journal of Clinical Nursing*, 15: 989-997.

Sodha, M. et al (2002) Nurses' confidence and pharmacological knowledge : a study. *British Journal of Community Nursing*, 7(6): 309-15.

South Tees NHS Hospitals Foundation Trust (2011) *Annual Report & Accounts. April 2010 – March 2011.* South Tees NHS Hospitals Foundation Trust.

Stake, R.E. (1995) *The Art of Case Study Research.* London. Sage Publications.

Stanhope, N. et al (1999) An evaluation of adverse incident reporting. *Journal of Evaluation in Clinical Practice*, 5(1): 5-12.

Stenner, K. and Courtenay, M. (2008) The role of inter-professional relationships and support for nurse prescribing in acute and chronic pain. *Journal of Advanced Nursing*, 63(3): 276-83.

Stenner, K., Courtenay, M. and Carey, N. (2010) Consultations between nurse prescribers and patients with diabetes in primary care: a qualitative study of patient views. *International Journal of Nursing Studies*, 48: 37-46.

Stenner, K., Carey, N. and Courtenay, M. (2010a) Implementing nurse prescribing: a case study in diabetes. *Journal of Advanced Nursing*, 66(3): 522-31.

Stenner, K., Courtenay, M. and Carey, N. (2010b) How nurse prescribing influences the role of nursing. *Nurse Prescribing*, 8(1): 29-34.

Stewart, D.C. et al (2008) Exploring patient's perspectives on pharmacist supplementary prescribing in Scotland. *Pharm World Sci*, 30: 892-97.

Stewart, D.C. et al (2009a) Views of pharmacist prescribers, doctors and patients on pharmacist prescribing implementation. *International Journal of Pharmacy Practice*, 17: 89-94.

Stewart, D.C. et al (2009b) Cross sectional survey of the Scottish general public's awareness of, views on and attitudes toward non-medical prescribing. *The Annals of Pharmacotherapy*, 43: 1115-21.

Stewart, D.C. et al (2010) Developing and validation a tool for assessment of pharmacist prescriber's consultations. *Family Practice*, June: 1-7.

Stewart, D.C. et al (2011) Pharmacist prescribing: update on policy, practice and research. *Nurse Prescribing*, 9(9): 458-461.

Tamuz, M., Thomas, E.J. and Franchois, K.E. (2004) Defining and classifying medical error: lessons for patient safety reporting systems. *Quality and Safety in Healthcare*, 13: 13-20.

Tighe, C.M. et al (2006) Incident reporting in one UK accident and emergency department. *Accident and Emergency Nursing*, 14: 27-37.

Tobaiqy, M., McLay, J. & Ross, S. (2007) Foundation year 1 doctors and clinical pharmacology and therapeutics teaching. A retrospective view in light of experience. *British Journal of Pharmacology,* 64 (3): 363-372.

Tonna, A.P. et al (2007) Pharmacist prescribing in the UK – a literature review of current practice and research. *Journal of Clinical Pharmacology & Therapeutics*, 32: 545-56.

Travaglia, J.F. et al (2009) Implementation of a patient safety incident management system as viewed by doctors, nurses and allied health professionals. *Health: an Interdisciplinary Journal for the Social Study of Health, Illness and Medicine*, 13(3): 277-96.

Travers, J. (2005) Professional issues for the future of nurse prescribing: a qualitative study. *Nurse Prescribing*, 3(4): 164-67.

Tully et al (2009) The causes of and factors associated with prescribing errors in hospital in-patients. *Drug Safety*, 32(10): 819-36.

Venning, P. et al (2000) Randomised controlled trial comparing cost effectiveness of general practitioners and nurse practitioners in primary care. *BMJ*, 320: 1048-053.

Vincent, C. et al (1999) Reasons for not reporting adverse incidents: an empirical study. *Journal of Evaluation in Clinical Practice*, 5(1): 13-21.

Vincent, C. (2003) Understanding and responding to adverse events. *The New England Journal of Medicine*, 348(11): 1051-6.

Walshe, C.E. et al (2004) Case studies: a research strategy appropriate for palliative care? *Palliative Medicine*, 18: 677-84.

Waring, J.J. (2005) Beyond blame: cultural barriers to medical incident reporting. *Social Science & Medicine*, 60: 1927-35.

Wass, V. (2005) Ensuring medical students are 'fit for purpose'. *BMJ*, 331: 791-2.

While, A.E. & Biggs, K.S.M. (2004) Benefits and challenges of nurse prescribing. *Journal of Advanced Nursing*, 45(6): 559-67.

While, A. E. and Rees, K.L. (1993) The knowledge base of health visitors and district nurses regarding products in the proposed formulary for nurse prescription. *Journal of Advanced Nursing*, 18: 1573-77.

Whiting, B. et al (2002) Clinical pharmacology: principles and practice of drug therapy in medical education. *British Journal of Clinical Pharmacology*, 54: 1-2.

Whittock, M and Leonard, L. (2003) Stepping outside the stereotype. A pilot study of the motivations and experiences of male nurses in the nursing profession. *Journal of Nursing Management*, 11: 242-49.

Wigton, R.S. (2008) What do the theories of Egon Brunswick have to say to medical education? *Advances in Health Sciences Education*, 13: 109-21.

Wilmshurst, P. et al (2000) Improving door to needle times with nurse initiated thrombolysis. *Heart,* 84: 262-66.

Wolf, Z.R. (2007) Pursuing safe medication use and the promise of technology. *MedSurg Nursing*, 16(2): 92-100.

Woods, L.P. (1997) Designing and conducting case study research in nursing. *NT Research*, 2(1): 48-56.

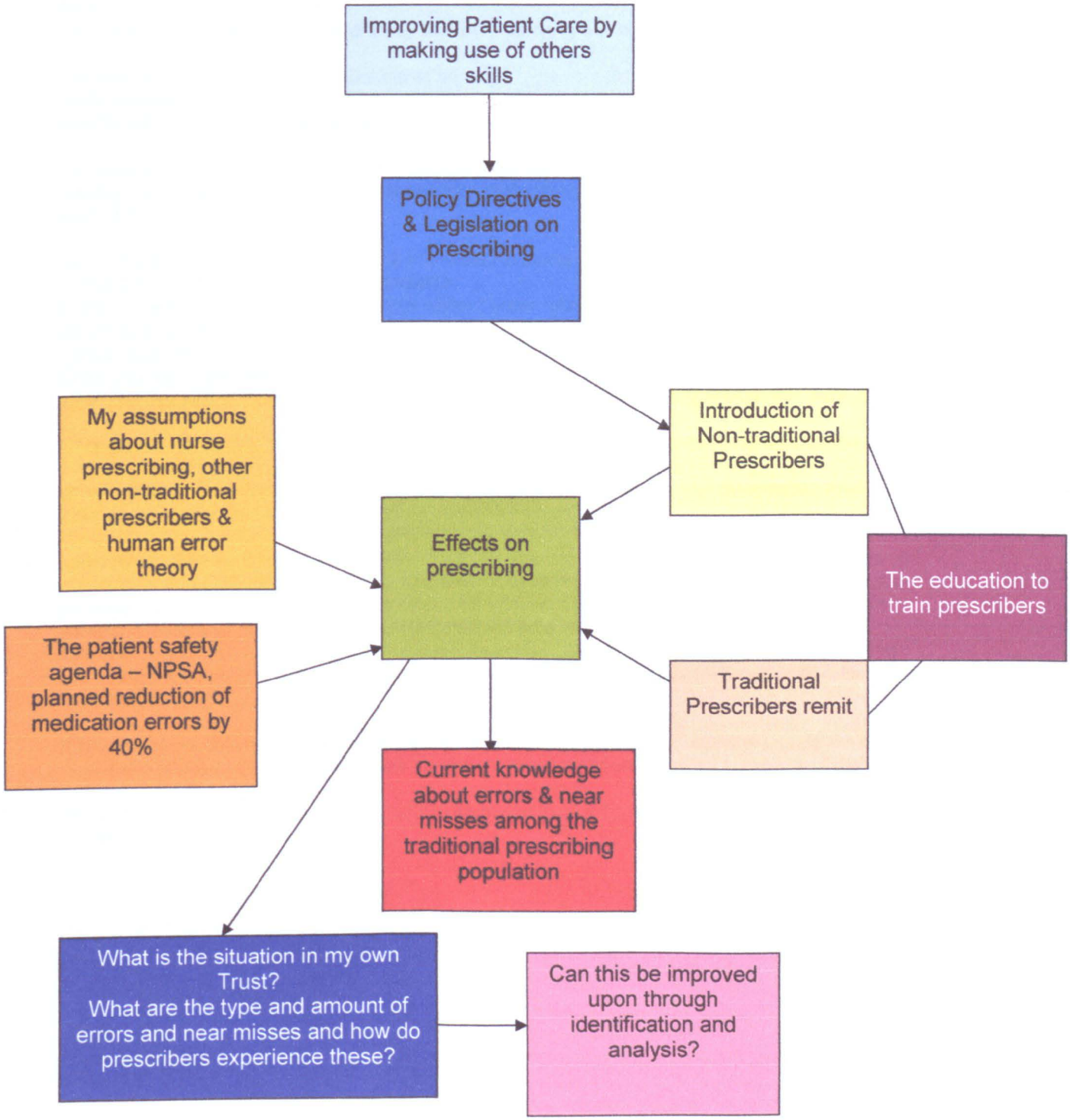
Wright K. (2009) Do calculation errors by nurses cause medication errors in clinical practice: A literature review. *Nurse Education Today*, 30: 85-97.

Yin, R.K. (2003) *Case Study Research – Design and Methods.* 3rd Edition. California. Sage Limited.

Yin, R.K. (2009) *Case Study Research – Design and Methods.* 4th Edition. London. Sage Limited.

Zucker, D.M. (2001) Using case study methodology in nursing research. *The Qualitative Report*, 6(2): Available from: http://www.nova.edu/ssss/QR/QR6-2/zucker.html (Accessed July 2010).

Appendix One – Conceptual Framework



Appendix Two - Invitation Letter

Dear
I am writing to you with regard to a study that I am carrying out in the Trust.

The research question that I am looking at is:
'How frequent are prescribing errors and near misses among traditional and non-traditional prescribers and how are they experienced?'

During this study, I am looking at data from the Trust DATIX system as well as prescriptions themselves. The final part of the study involves performing taped qualitative interviews with a selection of prescribers.

I am writing to you to enquire if you are interested in being part of the study. If so, I need your consent to two different parts of the research.
Firstly, I need your consent to review out-patient prescriptions written by you as they come into the pharmacy department. Secondly, consent to being part of the interview sample.
I have enclosed an information leaflet to provide you with more detail on the study itself.
Once you have read the information enclosed and if you are still interested in taking part in the study, please return the enclosed slip of Letter of Interest to me by **Wednesday 23rd June 2010**.

Once I have consent, I plan to review around 1000 prescription episodes which will include both traditional (medical) and non-traditional (non-medical) prescribers. Data from this arm of the study will be anonymised and will be compared to a validated error tool allowing better analysis. Your consent is all that is required for this part of the study.

I also aim to interview twenty members of staff, ten traditional prescribers and ten non-traditional prescribers and I will be looking for the most representative sample in relation to experience and seniority. Therefore from those who express an interest to be involved I shall be choosing this sample of twenty. That will mean that not everyone who responds will be interviewed. I will however be in touch to let you know if you will finally be chosen and to arrange a date and time which are convenient to you in order to go over the consent process and subsequently to arrange the interview itself.

If you would like any more information about the study or how it will be undertaken, please do not hesitate to contact me on the extension number or email address provided at the top of the page.

Many thanks for reading the enclosed information and I hope to hear from you in due course.
Yours sincerely

Appendix Three – Letter of Interest

Dear

I am happy to consent to my out-prescriptions being reviewed in pharmacy by you.

I am also happy to participate in qualitative interviews as part of your study looking at errors and near misses among the prescribing population in Trust (name removed).
I understand that I may not finally be part of the sample but that I will receive notification of this.

My name is:

_____

My title is (please provide your full designation here i.e. ST1, Specialist Nurse etc):

_____

My best contact telephone number is:

_____

Bleep number:

_____

Email address:

_____

My current specialist area is:

_____

I currently prescribe out-patient medications (please circle)

Yes **No**

Please post in the envelope provided in the INTERNAL MAIL by Monday 26th July 2010.

Appendix Four - Participant information leaflet

(Trust logo removed)

Study Title:

How frequent are prescribing errors and near misses among traditional and non-traditional prescribers and how are they experienced?

I would like to invite you to take part in a research study.
Before you decide you need to understand why the research is being done and what it would involve for you.
Please take time to read the following information carefully. Talk to others about the study if you wish.

Part 1 tells you the purpose of this study and what will happen to you if you take part.

Part 2 gives you more detailed information about the conduct of the study.

Ask if there is anything that is not clear or if you would like more information. I can be contacted on extension 53747 (or bleep 1528) should you require more details.
Take time to decide whether or not you wish to take part.

This study has been approved by Trust(name removed)and is being undertaken as part of a Doctoral programme at the University of Sheffield.

Part 1 – about the study

What is the purpose of the study?
The purpose of the study is to examine the number of errors and near misses that occur in the Trust in relation to prescribing. In order for this to be established existing records and data will be examined, as well as current prescriptions.
The study also seeks to look at prescribers own experience of prescribing including the process of making or being involved in errors and near misses but also including the education and training they underwent to gain this skill.
This information will be useful to inform our future training needs analysis as well as improve our clinical governance strategy; with the ultimate aim, being that future patient care will be further safeguarded.
The process of undertaking this study will also form part of a doctoral thesis.

Why have I been invited?
You have been invited as you are part of a group of individuals with prescribing privileges within (name removed) Trust, and as you are actively prescribing as part of your role. Your involvement is being sought due to this expertise and in particular because of your prescribing experiences. Prescriptions from a range of prescribers will be reviewed and a group of twenty prescribers will be selected for interview.

Do I have to take part?
It is up to you to decide. The researcher will come to talk to you to tell you a bit about the study and why you have been asked to participate. They will go through this information sheet, which they will then give to you. The researcher will then ask you to sign a consent form to show you have agreed to take part. You are free to withdraw at any time without giving a reason. This will not affect your status within the organisation.

What will happen to me if I take part?
The study itself is in three parts, you are being asked to be involved with the second and third part of the study. The first part involves reviewing currently held data within the Trust. The researcher needs to look at prescriptions written by you as they arrive in the pharmacy department for the second part and needs your consent to do so. For the third part, the researcher also wishes to undertake semi-structured interviews with active prescribers. If you decide to take part, prescriptions, which you have agreed to be reviewed, will be identified within the pharmacy department and you need do nothing else. The interview however, will involve you talking to a researcher about your experience of prescribing errors and near misses as well as the training that you received to become a prescriber and how you think this affects your practice. The interview will be tape-recorded and will last 40-60 minutes.
You will also be invited to read a transcription of the interview in order that you can clarify if this is a true and accurate representation of what was said.

Expenses and payments?
There is no provision for payment or travelling expenses for you to take part in the study. All interviews will be conducted within the hospital and whilst you are at work, therefore your inclusion should not cause you any undue expense.

What will I have to do?
Firstly, your consent is sought to look at your active prescriptions. Once this has been given, the researcher will identify and review these with some help from the pharmacy department. Only your written consent is required for this part.
For the interviews, you will be expected to talk in some detail about your experiences of prescribing, of the education and training that you undertook prior to prescribing and your involvement in any incidents of prescribing errors or near misses (these may not be directly related to your own personal prescribing practice) during your career.

What are the possible risks and disadvantages to taking part?
Whilst there are no direct risks or disadvantages to being involved in this study, there is the possibility that practices may be highlighted that are deemed unsafe or unprofessional. This would include unsafe practices contrary to the codes of conduct or policies governing the prescription or administration of medicines within the Trust.
Should this occur the researcher will discuss these issues with the participant themselves in the first instance but may then be required to subsequently discuss them with the participants director. Participants will be advised of this requirement at the time of the interview.

What are the possible benefits for taking part?
We cannot promise the study will help you but the information we get from the study will help improve the quality of care delivered to patients in the future and may also benefit those prescribing practitioners who come after you.

What happens when the research study stops?
When the study is complete, a short summary will be sent to all of those who participated so that you will get a chance to see the results. There will also be presentations within the hospital as well as publications as a result.

What if there is a problem?
Any complaint about the way you have been dealt with during the study or any possible harm you might suffer will be addressed. The detailed information on this is given in Part 2 of this document.

Will my taking part in the study be kept confidential?
Yes. We will follow ethical and legal practice and all information about you will be handled in confidence. The details of which are included in Part 2.

This completes Part 1.
If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.

Part 2 – more information

If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.

What if new information becomes available?
Sometimes we get new information about a topic being studied. In this case the study may be stopped. You will be given advice if this occurs.

What will happen if I don't want to carry on with the study?
You can withdraw from the study at any time.
If you withdraw from the study, the data collected up to that point will still be used.

What if there is a problem?
Every effort has been made to ensure that this study will be completed in an ethical and legal manner. Should any problems be encountered the researcher can be contacted in the first instance. Otherwise, the Trust or the University should be contacted.

Complaints
If you have a concern about any aspects of the study, you should ask to speak to the researcher who will do their best to answer your questions (Lynne Paterson, extension number 53747 / 54871). If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the Hospital.

Harm
Whilst it is not anticipated that any harm will occur when taking part in this study, it is covered by the NHS Indemnity Scheme.

Will my taking part in this study remain confidential?
All information that is collected about you during the course of the study will be held by the researcher and will be anonymised.
All data collected from prescriptions will be anonymised at source and will not be traceable back to you. This will then be stored in a computer file on the researchers password protected computer.
Taped data will be transferred and also stored onto the researcher's computer. The transcripts of the tapes, as well as any other research documents will be kept in a securely locked cabinet only accessible by the researcher. Some parts of this data may be looked at by authorised persons and/or by representatives of regulatory authorities to check that the study is being carried out correctly. All have a duty of confidentiality to you as a research participant and we will do our best to meet this duty.
Any data used in reports or future publications will not identify any participant by name.
As previously mentioned however, the researcher has a duty of care to report any unsafe or unprofessional practices to the participant's director. This will be undertaken in conjunction with the participants themselves.

What will happen to the results of the research study?
The results of the study will be available in 2012. A short report will be sent to all of the participants. The results will be used for presentations locally, regionally, nationally and internationally. They will also be published in health related journals.

Who is organising and funding the research?
The study is being organised by Sheffield University and is being sponsored by (name removed) Trust.

Who has reviewed the study?

All research carried out in the NHS is looked at by an independent group of people, called the Research Ethics Committee, to protect your safety, rights, well-being and dignity.
This study has been reviewed and given a favourable opinion by Supervisors at the University of Sheffield as well as the (details removed) – 1 REC Ethics Committee.

Further information and contact details:
Should you require further information on the study please contact:

Lynne Paterson
(Details removed)

Telephone extension: 53747 / 54871
Email address: (Details removed)

Or:

Dr Tony Blackett
(Details removed)

Appendix Five – Consent Form

Project Reference Number:_____
Participant identification/code number:_____ (Trust logo removed)

CONSENT FORM

Title of Project: ***How frequent are prescribing errors and near misses among traditional and Non-traditional prescribers and how are they experienced?***

Name of Researcher: Lynne Paterson, (Title removed)
Hospital (title removed)
Email address (removed)

Please initial box

1. I confirm that I have read and understood the information sheet dated Jan 09 (version 2) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without my legal rights being affected. Data collected to this time will be retained and used. ☐
3. I understand that data collected during this study may be looked at by individuals from within the (trust name removed) as well as supervisors from the University of Sheffield. I give permission for these individuals to have access to this data. ☐
4. I understand that any fitness to practice issues identified, which is considered unsafe or unprofessional, will be reported to my director, following discussion between the researcher and myself. ☐
5. I agree to take part in the above study, **to have my prescriptions reviewed and to be interviewed.** ☐
6. I agree for the interview data to be tape-recorded. ☐

The data will be destroyed before December 2013

Name of participant	Date	Signature
Name of person taking consent	Date	Signature

When completed, 1 for participant and 1 for researcher (original) to be kept in file

Appendix Six – Incident Form

Datix Incident Form (Representation of electronic format)

(This only includes a flavour of the questions contained within the form as an example)

New Form: Login

Incident details:

Incident date (dd/mm/yyyy)

Time of incident (24 hour clock) (hh:mm)

Please select the department or area that you work in (*drop down menu*)

Site responsible (*drop down menu*)

Division responsible (*drop down menu*)

Please code this to the area responsible for investigating the incident (*drop down menu*)

Speciality responsible (*drop down menu*)

Ward responsible (*drop down menu*)

Description of the incident – DO NOT USE ANY NAMES IN THIS

Description:
Please ensure that all relevant facts are recorded (not opinions) to enable an investigation to be carried out. *Please do not type the description entirely using capital letters. *Please enter details of people in the relevant sections below (*free text*)

Please enter the immediate action taken at the time of the incident (*free text*)

Riddor?
Did this incident arise as a result of work activities, a major injury (e.g. fracture), or one involving absence from normal duties for more than 3 days? RIDDOR reportable incidents should be reported to Health & Safety on Ext ----

Type of incident (*Drop down menu*)

Category – Please select the category which best describes this incident type (*Drop down menu*)

Staff involved
Please record the Job Title, Full Name, Professional Registration number e.g. GMC, NMC (if known) and role each person played in the incident. Separate each person listed by inserting a comma. In addition to the contact and notepad section this is the only field where names may be recorded (*free text*)

Injury (*Drop down menu*) **Body Part** (*Drop down menu*)

Additional Information
Do you want to add the name of a witness, the consultant in charge or anyone else involved? (*Drop down menu*)

Was any equipment involved? This involves pain management devices

Please print a copy of this incident form and send it with the equipment to medical engineering (*Drop down menu*)

Is this an incident of physical or verbal violence and aggression?
(*Drop down menu*)

Has a patient suffered harm as a result of this incident? (*Drop down menu*)

Does this relate to isolation of a patient? (*Drop down menu*)

Does this relate to chemotherapy? (*Drop down menu*)

Was this an inpatient fall? (*Drop down menu*)

Does this incident relate to any loss of trust data or information? (*Drop down menu*)

Has the patient had a positive scan for PE/DVT? (*Drop down menu*)

Does this incident involve a blood transfusion? (*Drop down menu*)

Does this relate to a same sex breach? (*Drop down menu*)

Appendix Seven – Error and near miss data collection form

Traditional prescriber ☐ Non-traditional prescriber ☐ Prescription number:

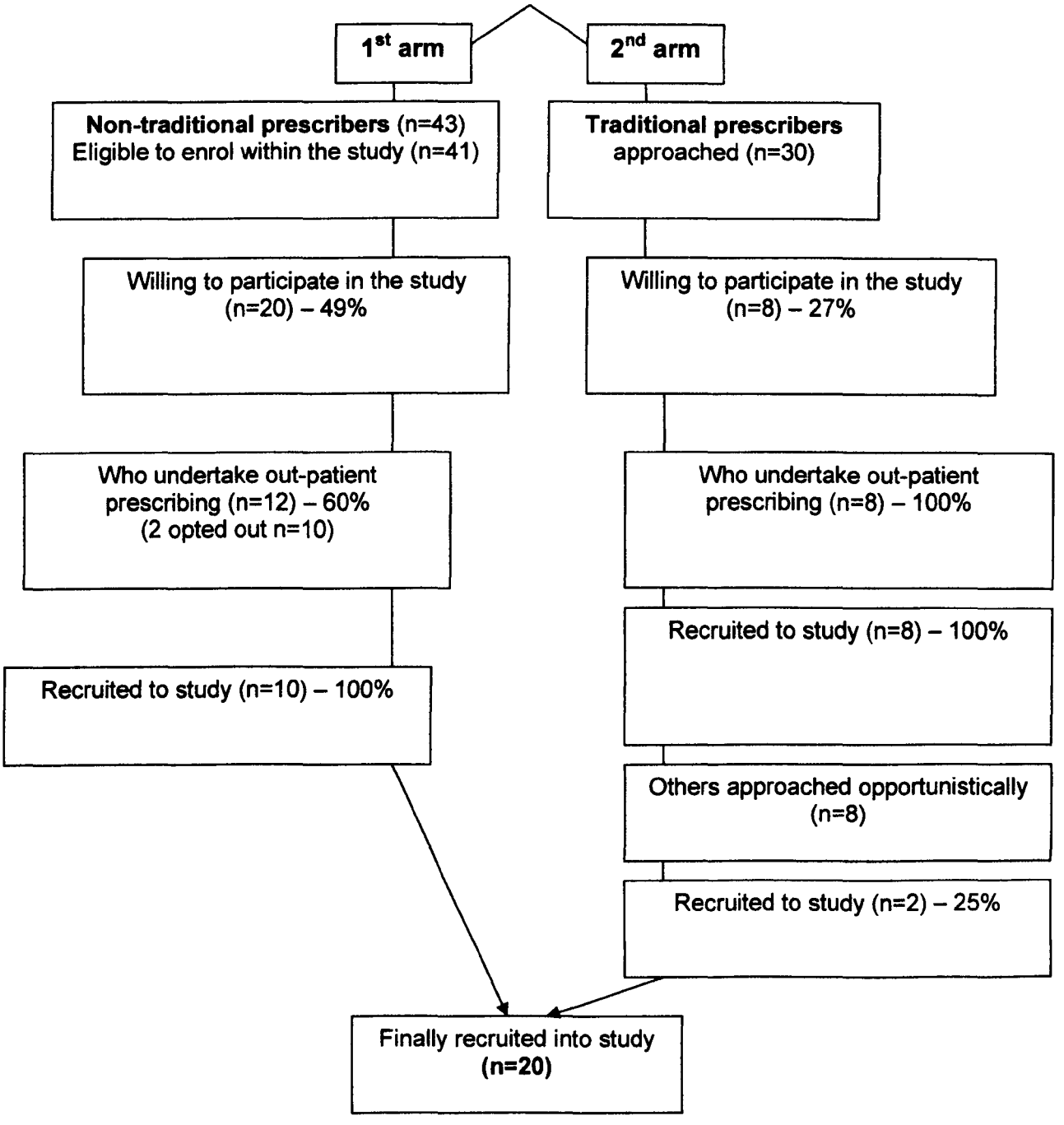
Data Collection Chart

Types of errors	Seen	Not seen	Not identifiable
1. Prescription of a drug to which the patient has a documented clinically significant allergy.			
2. Not taking into account a potentially significant drug interaction.			
3. Prescribing two drugs for the same indication when only one of the drugs is necessary.			
4. Prescribing a drug to be given by intravenous infusion in a diluent that is incompatible with the drug prescribed.			
5. Prescribing a drug to be infused via an intravenous peripheral line, in a concentration greater than that recommended for peripheral administration.			
6. Prescribing a drug, dose or route that is not that intended.			
7. Writing illegibly.			
8. Writing a drugs name using abbreviations or other non-standard nomenclature.			
9. Writing an ambiguous medication order.			
10. Prescribing 'one tablet' of a drug that is available in more than one strength of tablet.			
11. Omission of the route of administration for a drug that can be given by more than one route.			
12. Prescribing a drug to be given by intermittent intravenous infusion without specifying the duration over which it is to be infused.			
13. Omission of the prescribers signature.			
14. Writing milligrams when micrograms was intended.			
15. Writing a prescription for discharge medication that unintentionally deviates from the medication prescribed on the in-patient drug chart.			
16. Prescribing a drug in a dose above the maximum dose recommended in the BNF or data sheet.			
17. Misspelling a drug name.			
18. Prescribing a dose that cannot be readily administered using the dosage forms available.			
19. Prescribing a dose regimen (dose/frequency) that is not that recommended for the formulation prescribed.			
20. Continuing a prescription for a longer duration than necessary.			
21. Prescribing a drug that should be given at specific times in relation to meals without specifying this information on the prescription.			
Situations that may be considered prescribing errors depending on the individual clinical situation	**Seen**	**Not Seen**	**Not Identifiable**

8. Prescribing a drug in a dose above the maximum dose recommended in the BNF or data sheet. 9. Misspelling a drug name. 10. Prescribing a dose that cannot be readily administered using the dosage forms available. 11. Prescribing a dose regime (dose/frequency) that is not that recommended for the formulation prescribed. 12. Continuing a prescription for a longer duration than necessary. 13. Prescribing a drug that should be given at specific times in relation to meals without specifying this information on the prescription. 14. Unintentionally not prescribing a drug for a clinical condition for which medication is indicated.			
Situations that should be excluded as prescribing errors	**Seen**	**Not Seen**	**Not Identifiable**
8. Prescribing by brand name (as opposed to generic name). 9. Prescribing a drug without informing the patient of its uses and potential side effects. 10. Prescribing a drug for which there is no evidence of efficacy, because the patient wishes it. 11. Prescribing for a child a drug that has no product license for use in children. 12. Prescribing a drug that is not in the hospital formulary. 13. Prescribing contrary to hospital treatment guidelines. 14. Prescribing contrary to national treatment guidelines. 15. Prescribing for an indication that is not the drug's product license.			

'Near Miss' Details	Identified by whom i.e. pharmacist or via Datix & reported by whom (nurse, medic, manager etc.)	Details of any relevant ensuing action

Appendix Eight – Sampling Framework



Appendix Nine – Interview Schedule

NRES Number: (Details removed)

Study Title:

How frequent are prescribing errors and near misses among traditional and non-traditional prescribers and how are they experienced?

Thank you for agreeing to be part of this research study. Can I just reiterate that any data collected today will remain confidential?

I would like to divide the interview into two. I will first ask you about your education to become a prescriber and about your confidence in prescribing. Secondly, I will ask you about your experiences in relation to prescribing errors and near misses as well as what you believe may improve this.

- Can I first ask you about your experience in the education to train you to become a prescriber? How would you describe your education?
- What form did your education to prescribe take? What did you have to do?
- How useful has that education been in relation to clinical practice now that you are actively prescribing for patients?
- Would you describe this as being an effective way of teaching this skill? I wonder if you have any suggestions as to how this could be improved for the future.
- How long have you been practising and how long have you been prescribing within that practice.
- Would you consider that you are a confident prescriber?
- Can you describe the support that you receive in your role as a prescriber?
- Would you like to see any changes to this support in the future and what might that look like?

Moving onto errors and near misses within your prescribing experience, I would like to explore that a little.

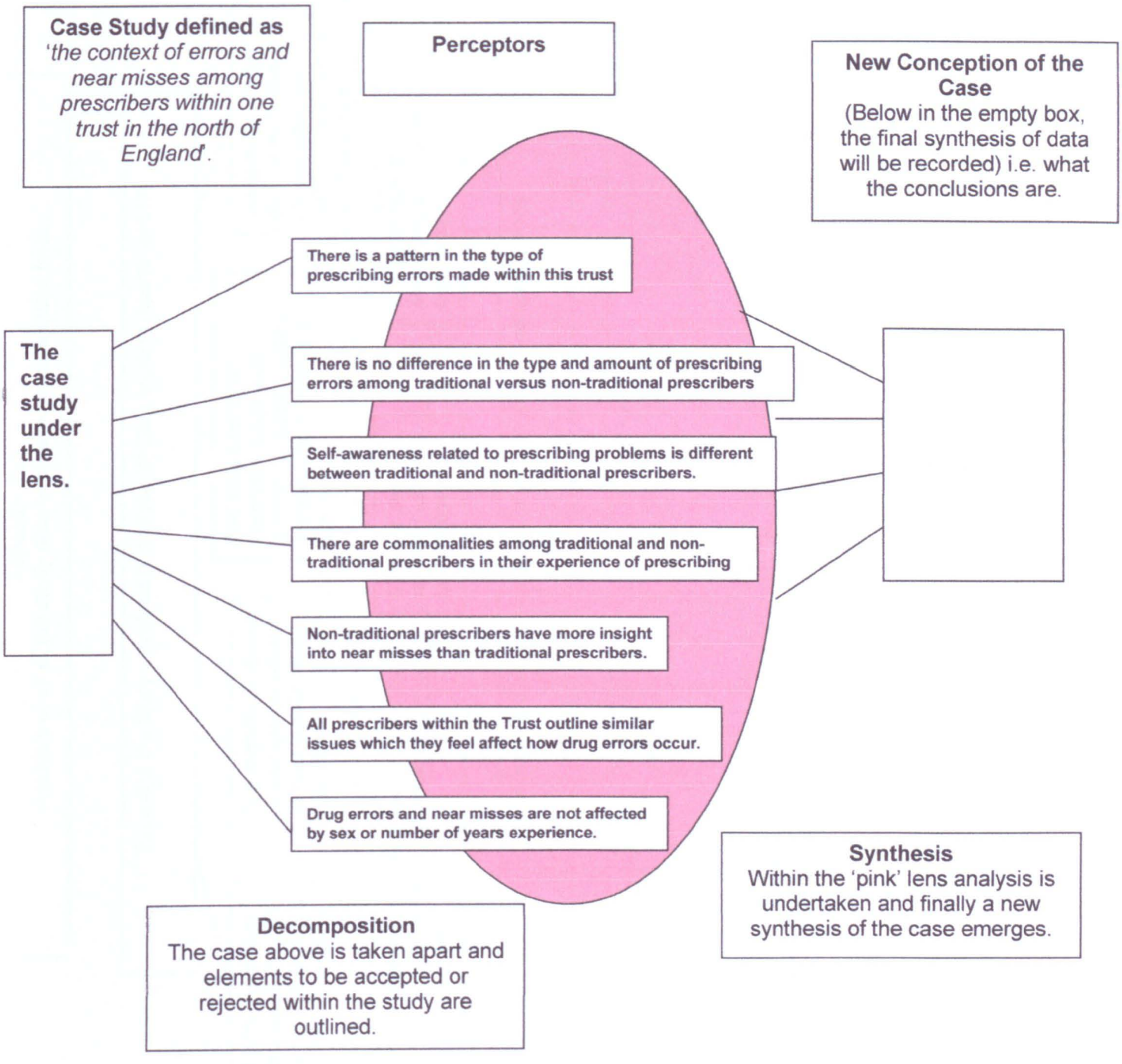
- Can you tell me a bit about any prescribing errors that you have been involved in either directly or indirectly? Either as a prescriber or as a clinician when you were not prescribing.
- Can you explain how this incident was handled and were you satisfied with how this was done?
- I am also interested in your views on whether these errors could have been avoided.
- Can you remember any near misses that you have been involved in either directly or indirectly? That means a prescribing error that was identified and altered before it caused any harm to the patient.

- How was that handled?
- Have you been involved in reporting prescribing issues such as these via the trust Datix system (or similar system in other hospitals)? Whose responsibility do you think it is to report and catalogue these errors?
- In your opinion how should prescribing errors and near misses be handled within the NHS?
- I am sure that you know that there are many medication errors made within the UK, I wonder if you could tell me your views on how prescribing could be improved especially around safety to the patient.
- Finally is there any other information that you would like to provide.

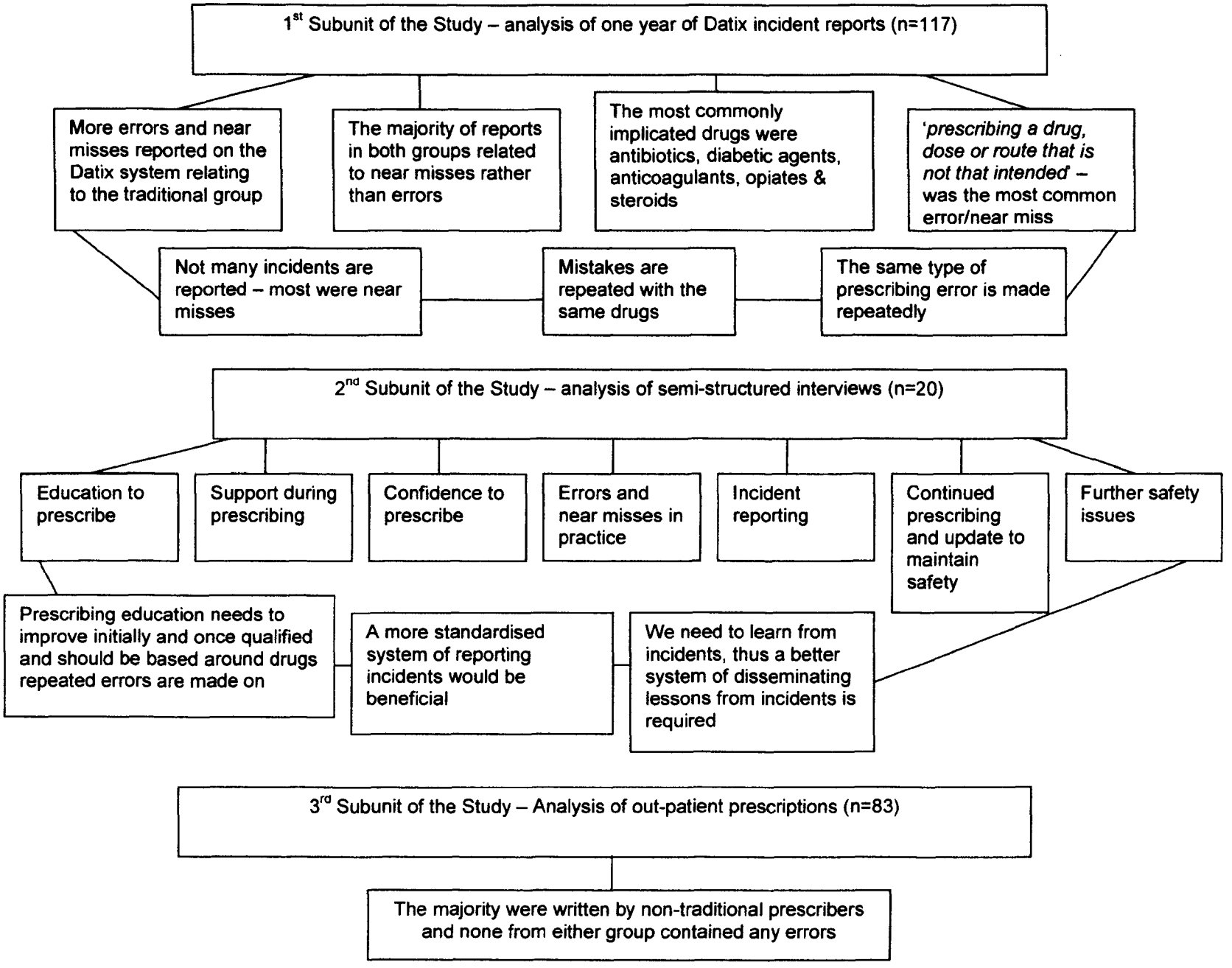
Thank you for agreeing to be part of the study and giving up the time to be interviewed.

Appendix Ten – Case Study Schematic

Case Study Schematic using the Brunswickian Lens & Predetermined propositions



Appendix Ten
Analysis of all of the study data expressed in schematic form.



Appendix Ten
Detailed thematic analysis using Colaizzi's Procedural Steps (1978)

i Understanding of what was discussed	ii Extracted statements specific to the phenomenon being studied	iii Extracted meanings from the statements	iv Themes identified	v Integrating this with the study topic	vi Reducing and identifying the structure of the phenomenon	vii Validation by participants
Non-traditional Prescribing Participants						
The non-traditional prescribing course could be improved and be made more specific for everyone. It does not prepare you to prescribe in specialist areas. It is too focussed on primary care and there also needs to be a secondary care focus. It needs to include more specialist teaching and to recognise more that acute patients are involved. It needs to be improved to make it fit for purpose. It needs to improve, to be more specific and to be led by someone with current clinical experience. It was poor. It would benefit from being benchmarked with	*'I thought it was dreadful and didn't really get very much out of it at all'.* *'…I'm obviously with a cardiac background so I had two hours in the whole of the six months on the key drugs for my speciality…'* *'It was very much pitched at primary care and some of the things that I would have liked them to go into in more detail are things like pharmacokinetics and things like that and that was… just skirted across…'* *'So if there was a little weakness about it… it was that it didn't … there was less emphasis on the*	Education to prepare non-traditional prescribers is generally felt to be poor. It is not specific enough for non-traditional prescribing needs. There needs to be more input which pertains to the specific specialist nature of secondary care. Most non-traditional prescribers did not feel prepared to prescribe as a result of their education. For a few the education was felt to be good but these prescribers were in the minority.	Non-traditional prescribing education is generally poor and not specific enough to make prescribers fit for purpose. Education needs to improve.	Errors and near miss rates within prescribing could be affected if the initial education given to non-traditional prescribers was improved. Their overall experience of errors and near misses would benefit.	Education to prescribe is lacking	All were returned to participants. One participant queried a particular statement made, since the researcher had misunderstood what was said, but this was not used within the final analysis, neither did it impact upon what was outlined within the text and so was not altered.

other areas of the country where different, better models exist. It was helpful in some ways but did not improve knowledge of diabetic drugs. It was generally good and covered many aspects relevant to practice. Prescribing course was good, a useful update, made easier since other skills were already achieved.	*secondary care side of it…'* *'...So I didn't feel that any of that training, any of the education that was given to us actually taught us how to be safe prescribers, there wasn't an actual safe prescribing element to it…'* *'So you could, maybe do it generically how drugs are absorbed, taken, how they affect the body... but then branch off to your specific areas… if you're an ENT nurse and you want to prescribe in ENT, then you just study that area of the body so you become quite skilled at doing your assessment and prescribing in that area…'* *'it would have been nicer if you'd have done some kind of clinical skills before…I hadn't done my clinical skills and the girls who have done clinical skills…they seemed to have a better… preparation*					

	for it....' *'...I thought it was...actually I thought it was quite good...I've heard other people saying they didn't but I thought it was quite good; but it wasn't what I expected...'* *...'I got a lot out of the course and I was glad I did it and I've recommended it to other people that I work with...'* *'...so it was about a four month course, and I thought it was a very good course actually...'*					
Non-traditional prescribers prescribe cautiously until confidence increases. Still only prescribe from a limited number of drugs within field. Confident within own	*'Probably not* [confident]*... I always feel apprehensive about prescribing. ... I think sometimes it's a good thing isn't it to be ... but I always have to be really sure of what I'm prescribing, because you go on the wards as a nurse prescriber and people are like, 'Oh you're a prescriber, will you do this..?'*	Most non-traditional prescribers were cautious at the beginning of prescribing but have gained in confidence. All prescribe a limited number of	Knowledge and education impact on confidence to prescribe.	Education plays a large part in ensuring that non-traditional prescribers have the knowledge required for them to prescribe effectively and thus reduce	Confidence to prescribe comes with education and training	

speciality and specifically own set of specialist drugs especially as side effects can be monitored. Not confident to prescribe drugs out with own specialist remit. Confidence comes with time but everyone should be aware of limitations. Was not confident to begin with but this has grown and is in part due to sticking to a limited number of drugs within own area of expertise. Prescribing is something that should only be done by nurses who have experience. Would not advocate the addition of nurse prescribing training into general training.	*'...I mean I'm fine, I'm quite happy to prescribe... things that I'm comfortable with, but I've always got to read the BNF from cover to cover before I really feel like I can prescribe it...'* *'...I'm a lot more confident than I was with my... with the drugs that I prescribe... so there's still the odd occasions where I still don't want to sign it...I just don't want to sign it cause you know, I'm not, I'm not au fait with all the other medications that they are on... I can't see anything in the BNF but I just don't feel comfortable to write them up or sign it...'* *'...because I have this set group of drugs and it's the same things all the time... so I'm very familiar with the drugs and the side effects and that helps you when you're prescribing for somebody else so... yeah, I feel quite*	drugs within their specialist areas. Some have gained in confidence as they are able to monitor their own patients and the medication which they may have prescribed via clinic situations. Still caution about what could go wrong in non-traditional prescribing situations but confidence grows with information or continued education. A few non-traditional prescribers felt that prescribing should not be taken on by newly qualified staff neither should it be added to pre-registration training for issues of safety.		potential errors.		

	confident…' *'…I worry in some respects that it becomes… well nurses prescribe now and in a couple of years it will be …well you'll all go and just do some prescribing and if you dilute it too much, you do open up to more problems…its not as tightly controlled…its not specific roles, you're not quite sure what type of practice is going on…I think we need to be careful to allow it to do what its meant to be doing which is making medicines safer…'* *'…You just need that little bit of support from someone who's been through what you've been through as well… it's really nice to have the consultants to ask, and they're extremely helpful, they would never look down on you, you don't feel embarrassed asking them, you don't feel silly at all, but it is really nice to get the*	Support for prescribing has been gained from	More specific mentors would improve the support	There is still some scope in the educational support	Support during prescribing is always required	

Peer support is very important to non-traditional prescribers as is the use of actual prescribing issues to improve practice. Time to attend non-prescribing meetings is problematic. Support has been developed among peers within the community which better meets the needs of non-traditional prescribers. Support needs to be given by someone who can provide it at the right level for the correct types of things required and this should be specifically sought. Has good support from medical colleague and non-medical prescribing groups. Support from non-medical prescribing group to maintain practice would be good. Mentors would be specific not a certain grade to satisfy the university. Pharmacy and the	*perspective or the advice from somebody who knows what you do and understands it from your point of view..'.* *'...the consultant that I work for is very pro nurse specialists and development... so he's always been very supportive...'* *'...So what we've done now is, we've set up a (area wide) network and we meet every six weeks... we do nurse prescribing supervision... So we actually do give dedicated time to nurse prescribing supervision... We bring all our queries about drugs, if something's changed and we didn't know anything about it, if something should be prescribed differently... So it is a good group and it does bring a lot of issues up, ...We get a lot of support from that... I suppose it's a way of educating each other because we're learning new things...'*	several areas. Staff have used medical mentors with varying degrees of success but this is the guidance from the educational institution. There is an appetite for using peer support more comprehensively. Some staff have already developed the type of supervision that they need in practice in order to satisfy their own prescribing requirements.	for non-traditional prescribing.	for non-traditional prescribers in order to increase the usefulness of the experience.		

trust prescribing meetings have been a good source of support. Other non-traditional prescribers could be used by student non-traditional prescribers as buddies and also to teach. Medical staff could have a lead for each specialist area for ensuring that nurse prescribers remain competent. Non-traditional prescribing colleagues and the prescribers group provide sufficient support. The mentor was busy and not always available for support. New staff may benefit from having better information about drugs when they start. More education is needed for nurses and doctors in relation to the use of insulin. Errors with newly qualified staff are common everywhere which needs to be addressed. There is a potential	*'...I saw this patient...* [and increased his medication – inadvertently by too much as the drug chart was unclear] *thought no more of it, wrote it in the notes... Then came back to work the following day, an incident report had gone in... If the patient had got it, he probably would have died and I would have killed somebody and that... I mean I must have cried for a week, two weeks... and the thought of that... in my prescriptions now I take a long time... I go back and read through the notes to see what's been written from the doctor's point of view and all the rest of it... But my colleagues at the time, when they got the incident report through... they were kinda trying to reassure me but it*	There are many areas identified by non-traditional prescribers as being 'risky' in terms of drug errors. There are elements of education within this including learning from previous errors within the organisation. Medical staff and nursing staff deal with errors differently.	Non-traditional prescribers know that there are areas which are more error prone than others. Education is required to highlight these and also to ensure that we all learn from mistakes.	There is much to be learnt from sharing experiences of errors and near misses and this could be incorporated into training and education for prescribers.	Error and near miss information needs sharing in practice	

for learning from errors. How nurses and doctors deal with making an error is different. Prescribing is safer when there is a distinct group of patients to prescribe for. Clinical skills should be undertaken prior to non-traditional prescribing. Errors are still possible form electronic prescribing/discharge but how they are managed will affect future practice. Sharing feedback on errors as well as prescribing issues would help to keep everyone's practice safer. Few non-traditional staff have made a prescribing error. Non-traditional staff still class a near miss as being the same as an error, despite the fact that no one has been hurt. Non-traditional staff can remember any error that they have been involved in with	*didn't, you know, its not their error, its my error… it was my error and I'll never ever forget that for as long as I live…'* *'…if it happens to you you don't forget do you…? you don't because you're mortified, which I was, I was mortified…ehm, I prescribed a tablet…* [which was fairly new on the market] *and I wasn't quite sure of the dose, cause I don't use it… and read it up in the BNF… wrote it down in the notes, this is what I suggest, then went to prescribe it and got interrupted by one of the nurses asking me to look at somebody else… 'will you look at these* [results]*' and 'can you write…will you change this', so I was doing that in the middle of doing the other thing… So when I wrote it in the notes I wrote it correctly but when I wrote it on the actual drug chart, which I was half way through writing… I wrote it wrong…*	Non-traditional prescribers did not mind talking about errors or near misses that they had been involved in and they continue to feel very guilty about what happened.				

absolute clarity and they continue to berate themselves. A description of incidents involved in being very traumatic and questions the use of disciplinary action as being 'positive' and useful.	*nothing happened because pharmacy rang and said 'this is the wrong dose' which was...thank God...thank God...but...oh I was mortified...absolutely mortified... it should have been a milligram and I'd wrote a gram, so it would have been a thousand times higher, the dose...and of course pharmacy said you know you'd have to give the patient a thousand tablets, that can't be right... but I was absolutely mortified...'* *'...for us we'll come back and think... I must fill in an incident form about that and we'll chat to each other and sometimes it does and sometimes it doesn't...* [get completed], *I don't know if that's a 'nice' culture, that we don't want to offend people, but at the same time if you don't say that this is dangerous, nothing ever improves about it...'* *'...if nothing does*					

Error reporting was synonymous with disciplinary action in the past so judgements were made about their seriousness. The culture has changed now. Incidents around incident reporting such as time to complete and the impact on the relationship with staff highlighted. No feedback received specifically from the incident reporting system. The incident reporting system can probe to be very unpleasant and does not provide feedback so people are reluctant to use it. Everyone should feel comfortable to report incidents and we should learn form them. Datix forms are time consuming and this probably inhibits people from completing them. Shorter ones would be better supported. Patient safety issues	*happen, if there is somebody in pharmacy who is just looking at that and then there isn't any feedback like you say, people think 'well, what's the point?' they fill their DATIX form in and then you don't get any feedback, nobody ever comes back to you so, is it just a waste of time..?'* *'...I can't say I've had much in the way of feedback from them... Because people probably will think nothing comes of that, I'll fill the form in and what comes of it, so why fill it in...?'* *'...if it's been a simple error... I think you make a judgement on to how serious the error is, to go down the route ... because I think a few years ago, it was very much, not a learning experience, it was a telling off...'* *'...I think it's... possibly about having some sort of structure as to what you actually use Datix*	Incident reporting was connected with disciplinary action and people still remember that today and use the forms with mistrust. Staff do not always want to use them since it may affect the relationships that they have with the personnel included in the incident. Staff make judgement calls on whether or not an incident is serious enough to complete a form. There is a lack of structure as to how forms should be completed. There is a lack of useful feedback from the incident reporting system, thus staff feel that they are pointless since no learning occurs as a result.	People are anxious about the use of incident reporting and may not use them as they should be used. Thus staff do not learn from others mistakes as they may never have been reported. Staff do not receive feedback on the incidents which have been reported and again no one learns from mistakes.	If staff are not learning from errors and near misses they are not going to learn. Education again is paramount here.	Incident reporting and lessons learnt from this must be shared	

within the trust are not shared and they should be and we also miss an opportunity to share them with other institutions. An environment needs to be fostered which encourages people to admit their mistakes as well as share them so that others can learn. Staff will not complete incident reports for near miss type errors and also that since there is no useful feedback from this system it makes it difficult to advocate using it. Nurses are more likely to report things via the Datix system than medical staff, but these should be made compulsory with more guidance as to when they should be completed. Lack of general feedback from the incident reports as well as many things that go unreported. Structure around incident reporting would be useful	*forms for and having some other way to report back on things like that…'*					

especially with today's litigation. An electronic method of prescribing would be useful especially with today's litigation. E-discharge can lead to errors is misused. An electronic method of prescribing which would alert the user to drug interactions would help to prevent error. Reducing problems with the documentation on prescription charts is one way of reducing avoidable errors. Consistency of practitioner will reduce errors. Non-traditional prescribers should have their mandatory updates with OSCE's every couple of years to maintain their practice. Improvements in safety may come about if there were better electronic links between hospitals and GP's and also if nurses about to embark on the course had more experience before	*'...it maybe that you could do with a refresher day... a refresher study day every year or every two years, like you do for your mandatory training... this is as essential as that is really... I think we need it cause although you're doing it day to day new things crop up all the time...'* *'...I think you do your prescribing and then that's it, then you're let loose and I think it should be a bit like your ALS* [Advanced Life Support] *and every so often you then have to go back and do a refresher like an OSCE or something like that, I think that would be good...'* *'...Documentation... It's my biggest bug-bear.... People don't feel it's important to put the correct patient's details on, their allergies on, they don't feel it's important to re-write a drug which is ... the most*	There are mixed messages about whether electronic prescribing is safer or not in terms of medication errors. Some form of update or further training or examination is required to ensure that the practice of non-traditional prescribers' remains fit for purpose. Other issues such as the accuracy of documentation are also likely to impact on safety in prescribing and should be highlighted.	Safety is not just about the act of prescribing itself. Staff require to be continually updated.	Other methods of increasing the safety of prescribing such as electronic prescribing need to be addressed. Sustained education is something that is crucial to the continued good prescribing practice of prescribers.	Continued prescribing education must be utilised to maintain safety	

they did it. Non-traditional prescribing should include updates 1-2 yearly in the same way as mandatory training and should include critical incidents as a means to maintain staff competence. There are still educational issues that could be picked up but the university running courses throughout the year.	*common that I see across the Trust wherever I go where they'll say, oh, we'll increase that drug, they stick a line through it and then write it in the corner instead of re-writing that line of drug… I don't know why it continues…'*					
i **Understanding of what was discussed**	**ii** **Extracted statements specific to the phenomenon being studied**	**iii** **Extracted meanings from the statements**	**iv** **Themes identified**	**v** **Integrating this with the study topic**	**vi** **Reducing and identifying the structure of the phenomenon**	**vii** **Validation by participants**
Traditional Prescribing Participants						
Education is an issue and we could get better.	*'…they did a lot of very good pharmacology*	Whilst there were some personnel who felt that	Education for traditional prescribers could	Initial education for traditional prescribers could	Education for prescribing needs to be improved	All were returned to participants. No participants

Medical training is different now and improved. Prescribing education today in relation to own training has improved, it also includes patient safety elements. Had concentrated prescribing training as a junior, this has been reduced today as juniors spend less time on the ward. Overall medical education needs to improve. Training to prescribe was good. Since most prescribing is learnt on the job, new prescribers should be supervised and have their prescriptions checked and countersigned initially until they are accurate. Medical training would improve if they received more theoretical training and this included repeated information on the common high risk drugs such as insulin and	*teaching… and clinical pharmacology… A lot of that would be on interactions of drugs and …the basic science of it all. When it comes to prescribing I think in my day… you were taught on the floor by your senior… See it, do it, teach it… So I think today's way is better if it's directed teaching…'* [Prescribing training was] *'…Pretty limited for us, there was no structured education as an undergraduate…You'd be taught pharmacology and you'd be told 'these drugs do this, these are the doses we give' but I can't remember any sessions at all as an undergraduate where they sat us down with drug charts and said 'here's a drug chart, this is how you fill one in…'* [Today's junior doctors] *'…They have no training whatsoever in terms of they know nothing about drugs*	traditional prescribing training was good, there were many who felt that it could be improved. The issues which were raised were a little different to the non-traditional prescribers and revolved around the actual hands on writing practise rather than the theoretical training.	be improved to make traditional prescribers more fit for purpose.	be improved so that this had some impact on the rate of errors and near misses and their overall experience of prescribing.		asked for any alterations.

anticoagulants.` Medical staff education needs to be more robust and juniors need a lot more educational input as well as on the job training and assessing. Prescribing education has improved in the last few years.	*when they come out of medical school... They may know about a group of agents that you prescribe for a condition but they do not know individual drugs, they do not know the doses or anything like that and they should... medical school is not just theory, its practice as well..'* *'...I think how they do it now is pretty good because they know that there's a problem with junior doctors prescribing... on the generic skills course there's a patient safety module and a lot of that is around prescribing errors...'*					
Confident to prescribe and has good support in both personnel and resources. Confident to prescribe and has a supportive network which includes pharmacists and on-line resources. Under confident to prescribe initially and a simple A4 sheet	*'...I felt very under confident... because I felt like I had a theoretical background but not the practical background... I'm just trying to remember back and I think I used to check stuff up all the time...'* *'...I think I'm confident in my own field and*	Traditional prescribers did discuss having some angst around initially prescribing but most felt confident to prescribe given some time. Similarly to the non-traditional prescribers they tended to stick to a limited number of	Most traditional staff are confident prescribers with some experience. There are similarities with the non-traditional prescribers since they stick to a small number of specialist drugs once a consultant. The margin for error is therefore smaller.	Errors and near misses are less likely to be made when clinicians prescribe from a smaller group of drugs and when they are confident in their practice. Good support mechanisms will also strengthen this.	Confidence to prescribe comes with education and the correct support.	

with common drugs, dosages etc. on helped to reduce potential errors. Has good support to prescribe thus feels confident. Confident to prescribe within own speciality and support is good. Confident to prescribe drugs within specialist area. In the specialist areas there are good support mechanisms. Confident to prescribe within own area.	*expertise. But I actually prescribe a relatively small number of drugs…'* *'…Yes, I think so… there's a bit of hesitancy there, isn't there? In terms of, on a day to day basis, on a ward round, you use the drugs that you're comfortable with and I'll only do cardiology as opposed to general medicine, so that really narrows what sort of… the drugs I use…'* *'…there's a fantastic website… which is set up by Liverpool University… You just type any old drug and it will tell you, if there's a data on interaction, the data that's saying it's safe or it's dangerous or there's no data at all proceed with caution that will give you an answer almost immediately so that's a well used site…'* *'…The pharmacists are on the wards all the time, you're constantly bumping*	drug within their own specialist area and also used a combination of resources for support.	Pharmacy, the BNF and on-line resources make up their support.			

	into them so if there's any queries 'oh we're going to use something slightly unusual' we just speak to them and they say 'yeah we can do it, we'll sort it out' or 'we'll find out what dose it should be and we'll get back to you…' *'…I was also very aware that the best medical book I have is definitely the BNF by far… It's the book I've used most often throughout my career and it's a book, if I had one book only, it would be the BNF…'*					
Improve feedback on error information within the trust to raise awareness. Drug errors are dealt with in-house but there is no mechanism within the trust to learn from all incidents either via Datix or from other departments. There is less chance of drug errors occurring when there is a core team of consistent	*'…I guess it's not having a witch hunt, although these mistakes happen it's incredibly rare something like that is because of one person and it's the whole no blame culture isn't it? That there's a mistake, it's generally a series of system errors as opposed to deliberate, there's a difference between a mistake and being completely*	There is little useful feedback from errors and near misses and the current reporting system does not seem to be helping this situation. Medical staff do not engage with the reporting system like other staff do. Medical staff do not own up to their errors. When mistakes are made then there	The incident reporting system is viewed with caution rather than used as a learning tool. Teaching people to engage with it more usefully and also being able to use it better as a teaching and learning tool would be more beneficial to all prescribing staff. Improved feedback may reduce anxiety around incident	Staff need more education in engaging with the incident reporting system in order that their anxieties around prescribing errors and near misses are reduced. Using this as a learning tool would help to reduce errors. The organisation needs to ensure that feedback is given and is freely	Error and near miss information needs sharing in practice	

prescribers. There is a large issue around communication to patients, with other staff and with GP's which would improve prescribing errors. When incidents do happen they should be looked at without a witch hunt. Prescribing errors should be shared so that we can all learn and break down barriers to incident reporting. Many errors are caused because people are busy and the majority of these will not be reported via the Datix system. Errors are reported if they are repeated. No one likes their name to appear on a Datix form. Doctors don't use the Datix reporting system. Do not get useful feedback from the trust Datix system and this could be useful as a teaching/learning tool. Errors can easily happen with simple	*negligent or going out to deliberately harm someone... Yes suspend him but what they need to do is step back and say 'okay, a horrible mistake's happened, the patient's died, the people involved are going to feel horrible, they're going to be blaming themselves. We just need to take stock of this, they need counselling and support and we just need to start at the beginning and just unpick it and get all the facts and see what happens... As opposed to saying 'it's clearly your fault', the impression at the time was it was more that, it was the knee jerk reaction 'you must have done something wrong' without having all the facts. And when you look at it he was a small cog in what went wrong but just the important one...'* *'...I know Datix is non-blaming, non-criticising open system but people would not*	should be an appropriate method of dealing with them and others should learn as a result. The incident reporting system is viewed cautiously and this possibly reduces the buy in from staff.	reporting.	available for teaching and update sessions.		

things such as a fountain pen. The Datix reporting system needs to be simplified. Would complete a Datix form for a potentially harmful error. To reduce errors, feedback on drug errors trust wide should be fed back to the staff that undertake the majority of prescribing. Due to the time that Datix forms take to complete only those classed as serious are highlighted via this method, others will be lost. The lessons learned are not always fed back to the person making the mistake due to time taken to track them down. Feedback is not always forthcoming from the Datix system. Employing someone who had the sole task of reporting and chasing via the Datix system would be a better way of making sure it was done.	*like their name to be put into the Datix form I'm sure... you'll still be hurt by it I suppose... So I think it's not quite as open as it maybe should be...'* *'...Datix* [reporting] *is a good record of an error and the subsequent trail... The problem is it takes time and you have got to sit down and fill it in and to be honest in the real world a lot of people, unless if it is a very, very serious error, don't bother for two reasons... One it is more work and two it is often the perception that once you are logging it, it is becoming really serious and I think junior colleagues often feel intimidated by the fact that there is a Datix run incident form against them...'* *'...it's the ward staff, it's the nursing staff who report them... we don't quite have a culture of medical staff reporting their own drug errors... I have*					

Medical staff admit that they do not own up to making errors. There are issues with the reporting system since it is a source of angst among staff.	*seen drug charts with the wrong, a wrong dose on it and it goes on for a couple of days…'* *'…Sometimes, if it's an error in terms of administering the drug… that will always get reported and will go through ridiculously complicated and bureaucratic systems to be sorted out because that's what the nurses do, of course…'* *'…you're encouraged to push it in through Datix and I have to admit I haven't put one in myself … personally no, I've usually told other people to do it, a bit of passing the buck there I'm afraid…'* *'…You will not find, I suspect, doctors self reporting about when they've made an error… You may find the odd one who will do that but I suspect most of them won't and because they don't realise or because they'll never*					

	own up to it...' *'...If you're not confident of the real value of putting them in, I expect we've all got very busy lives and it's one extra thing to do which you'd rather not do if you didn't have to...'* *'...When I do a Datix form, which I do not infrequently for these kinds of things, you never hear anything more about it... You fill the form out and that's it... You never hear a thing... All the ones I've done, you never hear any result of what happened. Datix has no method of feeding back the results of the enquiry, investigation to the person who filled the form out...'* *'...I've never, of all the incident forms I've ever filled in I've never had any feedback from any of them...'* *'...when I come across a significant error... I contact the prescriber... But*					

	these days what you very commonly find is the prescriber's on nights or on days or happen to be on call, and you page them and there's no answer... You page them the next day and there's no answer and then by a week's time you've forgotten about it and you haven't got hold of them still, because they've been on leave because of the European Working Time Directive, hours reduced. So you've never actually ... the prescriber never actually learned of their error because they're on shift and... in the end it just gets passed by... So it gets hard to feed it back, directly about what people have done wrong sometimes... you have the best intentions to try and find this prescriber and say "Look you did this wrong ..." but it comes to three or four days down the line and you haven't got hold of them and suddenly things kick off and you're really					

	busy, then it just gets passed by and after that you lose the impetus that you had...' *'...I think we are getting better, certainly much more safer because I think nurses have taken on an extended role and nurses are, because they have got a finite knowledge about the limited drugs they know a lot about those drugs and can often be very, very valuable in getting junior medical staff who often have got a lot more drugs to think of, a lot more theory to deal with, I think working in partnership definitely is the way forward...'*					
Traditional prescribers make mistakes. Most errors are human errors and unsure if electronic prescribing would help with this though pre-prepared charts may. Exams are useful to identify deficits and these should be	*'...I'd be a bit dishonest if I said no, I can't think of anyone who's never...'* *'...I'll do about 25, 30 prescriptions a week so I must make mistakes, it's impossible not to make mistakes...'*	Traditional prescribers also make mistakes since most errors are human errors. Mixed messages about the usefulness of electronic prescribing in the reduction of errors. Several things	Traditional prescribers are no different to non-traditional when it comes to their potential for making errors. They are also concerned about the lack of feedback from the incident reporting system and would	Several things could improve the experience of prescribers in relation to errors and near misses and this includes education. Education on keeping practice safe, learning form errors and even	Incident reporting and lessons learnt from this must be shared Continued prescribing education must be utilised to maintain safety	

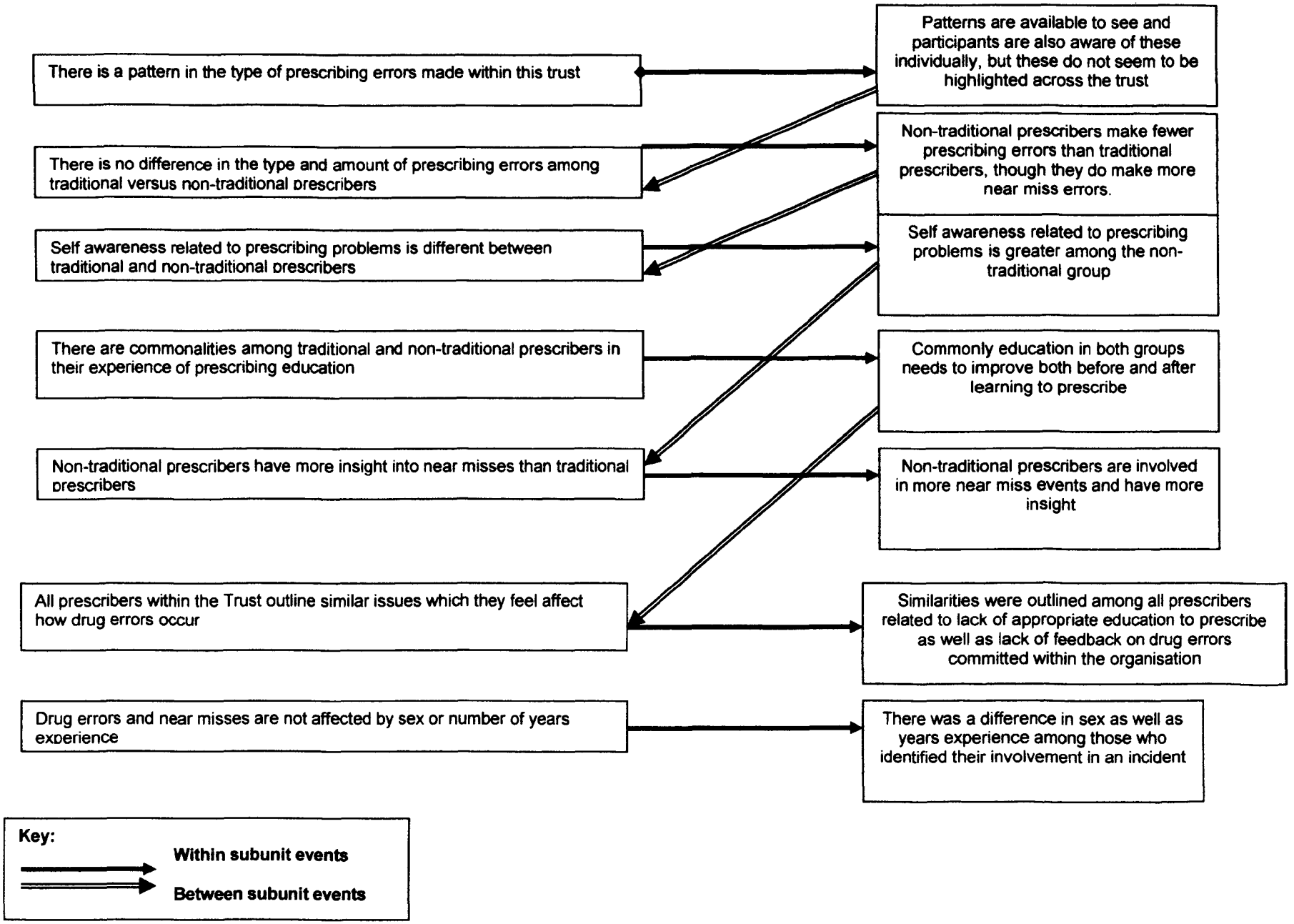
used for all prescribers. Education will be more effective at reducing errors than things like electronic prescribing. Pharmacy plays a role in identifying and feeding back prescribing errors and near misses though this needs a robust dissemination structure. Junior prescribers within the trust often miss out on vital information which would improve errors. A monthly update for all prescribers on current problems would help to reduce errors. Targeted education for staff regarding insulin errors and how to reduce them has shown to minimise these in the trust, this may also work for others. Using reflection following an error is a useful way to ensure that the same mistakes do not reoccur. The incident	*'...I think... maybe the link that's missing in this Trust as well is... how do we go about prescribing it properly because... I've not seen that link in the education here whereas in other Trusts I've worked in, pharmacy had regular input in divisional teaching ...'* *'...I think we can teach and teach and teach but only when you're examined you realise where the deficits are... And I think that's a reasonable thing to do, all prescribers will do an exam, you're not allowed to go and look up the answers, honestly answer it...You give a five minute on-line* [exam] *and you've got five minutes from opening it to closing it this way you can't run off and look up the BNF. Or some way of doing it so you can tell what people are doing...'* *'...I think it's just education, that's all it is, it's just reminding*	identified as being useful in order to reduce errors in practice and most of these relate to having further education or regular update, this even includes using reflective practice. Other personnel such as pharmacists should also be involved. Many also focus on the information that is not being fed back to the prescribers from the incident reporting system. Having someone who has sole responsibility for following up errors was suggested as a way forward. Exams also mentioned as a means of testing all prescribers within the organisation and making sure that they remain fit for purpose. Protocols also mentioned as a method of safeguarding practice. The issue of junior medical staff not	be keen to use this as a teaching aid. They too would like some method of update or testing to ensure that they remain fit to prescribe and that their practice is current. They would also welcome this for their colleagues.	being tested on knowledge.		

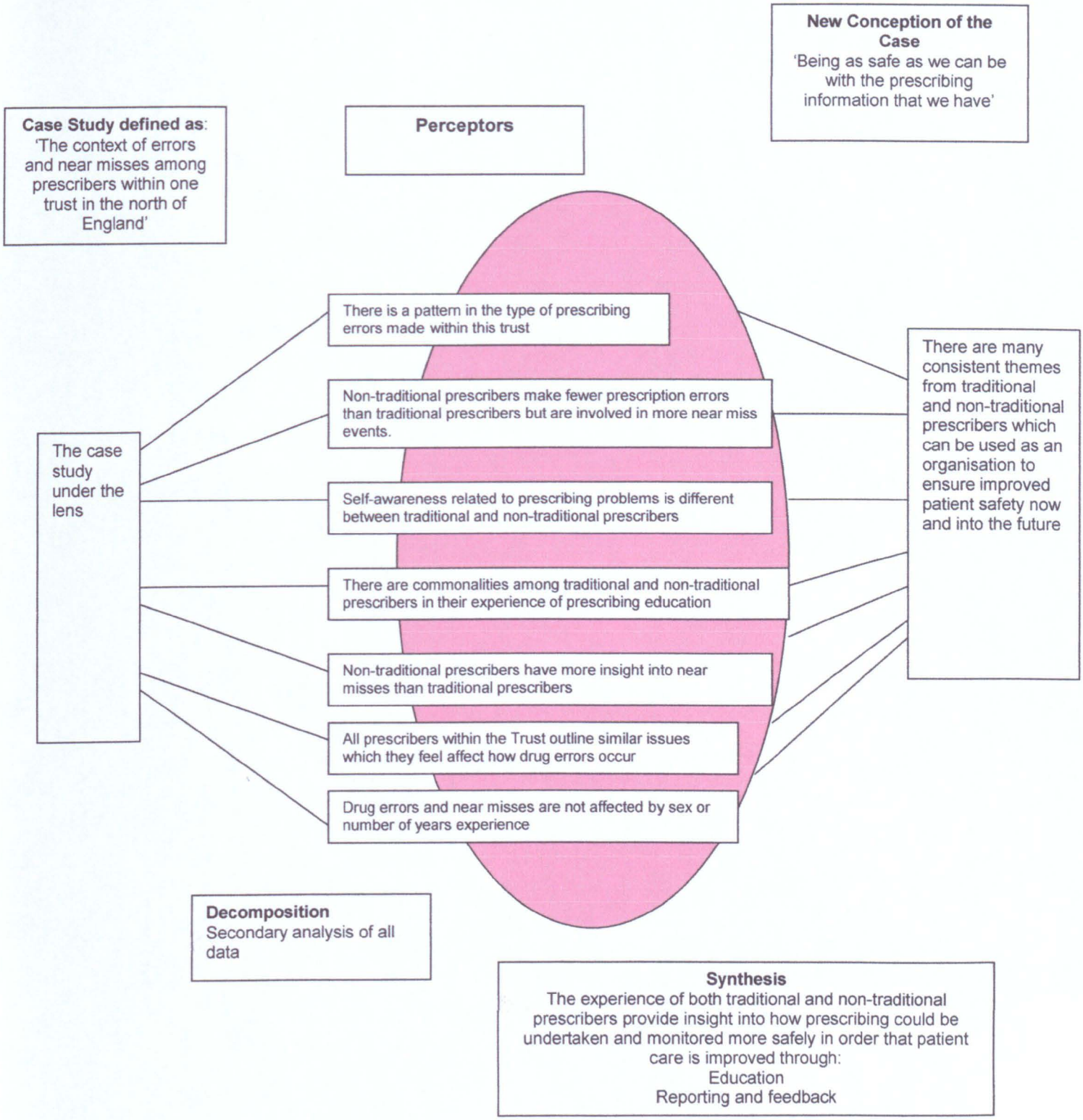
reporting system needs to be used more as an academic tool in order to highlight errors that have occurred and to percent them happening again. Errors are less likely where there are tight protocols. There is a place for more trust education around the act of prescribing certain drugs.	*people ... it's teaching people in the first place and then reminding them afterwards so I think things like feedback from Pharmacists is a good thing... These are the common errors just to remind people, do it every month, these are the top five errors this month, things like that... It's just keeping it ticking over...'* *'...Education, education and more education I think... I feel you can learn a lot from anecdote when you know that some disaster has happened on a ward recently because of errors of wrong prescribing or something has been missed and people will automatically take notice if they say "that could have been me"... So I think we need a way of actually getting that information on errors in a non-threatening way to a wide audience...'*	receiving emails which may help in the dissemination of useful feedback highlighted.				

	'...I guess to make it as simple as possible and taking that workload off the person who picked the error up and putting it on to somebody else... I mean it's not going to happen as the Trust's not going to employ anybody but, if I could pick the phone up, and just say Peter, Error Manager person, and say, look this happened, this, this, this, this... They jot it all down, they write down who's concerned they contact the prescriber and say look you did this wrong, were you aware of that...? Then they were back from night shift a week later... They fill the Datix form in physically, they coordinate the response... So just shifting the workload off the busy clinician who's picked that error up onto someone who's doing this as their fulltime job; would probably make it a lot easier...'					

	'...I think e-prescribing would definitely minimise errors considerably but doesn't negate it completely... *The human element has to be there...'* *'...It's all about communication... its difficult isn't it...? Because I think you've got that problem with high and, the fast turnover of medical staff because you're in a four month job now... I've been here over a year and we don't get a trust email address and that kind of communication with the medical staff, if you're talking about traditional prescribing, it's difficult... And I don't know how that's going to be resolved but that's the main issue...'* *'...If there was a Trust wide problem that needs to be fed back to us, not only to the Consultants... we're prescribing them day in day out, much, many more times than the Consultants are...*				**Final 7 Themes Identified:** Education to prescribe. Support during prescribing. Confidence to prescribe. Errors and near misses in practice. Incident reporting. Continued prescribing education and update to maintain safety. Further safety issues.	

	if there's a trend emerging, okay fine this has happened, this has happened, or it's something that's happening quite frequently then yes definitely all of us, and juniors who are below like F1, F2, SHO's, we need to be fed back because we are prescribing, we are the prescribing factories really…'					


There is a pattern in the type of prescribing errors made within this trust
Patterns are available to see and participants are also aware of these individually, but these do not seem to be highlighted across the trust
There is no difference in the type and amount of prescribing errors among traditional versus non-traditional prescribers
Non-traditional prescribers make fewer prescribing errors than traditional prescribers, though they do make more near miss errors.
Self awareness related to prescribing problems is different between traditional and non-traditional prescribers
Self awareness related to prescribing problems is greater among the non-traditional group
There are commonalities among traditional and non-traditional prescribers in their experience of prescribing education
Commonly education in both groups needs to improve both before and after learning to prescribe
Non-traditional prescribers have more insight into near misses than traditional prescribers
Non-traditional prescribers are involved in more near miss events and have more insight
All prescribers within the Trust outline similar issues which they feel affect how drug errors occur
Similarities were outlined among all prescribers related to lack of appropriate education to prescribe as well as lack of feedback on drug errors committed within the organisation
Drug errors and near misses are not affected by sex or number of years experience
There was a difference in sex as well as years experience among those who identified their involvement in an incident
Key:
Within subunit events
Between subunit events


New Conception of the Case
'Being as safe as we can be with the prescribing information that we have'
Case Study defined as:
'The context of errors and near misses among prescribers within one trust in the north of England'
Perceptors
There is a pattern in the type of prescribing errors made within this trust
Non-traditional prescribers make fewer prescription errors than traditional prescribers but are involved in more near miss events.
Self-awareness related to prescribing problems is different between traditional and non-traditional prescribers
There are commonalities among traditional and non-traditional prescribers in their experience of prescribing education
Non-traditional prescribers have more insight into near misses than traditional prescribers
All prescribers within the Trust outline similar issues which they feel affect how drug errors occur
Drug errors and near misses are not affected by sex or number of years experience
The case study under the lens
There are many consistent themes from traditional and non-traditional prescribers which can be used as an organisation to ensure improved patient safety now and into the future
Decomposition
Secondary analysis of all data
Synthesis
The experience of both traditional and non-traditional prescribers provide insight into how prescribing could be undertaken and monitored more safely in order that patient care is improved through:
Education
Reporting and feedback