Information flow in general practice: Investigating the processing of discharge summaries to improve patient safety

Dr Rachel Ann Spencer, BMBS BMedSci

Thesis submitted to the
University of Nottingham
For the degree of
Doctor of Philosophy

July 2018

Abstract

Discharge summaries are an essential tool for communicating patient information from secondary care to general practice on hospital discharge. Although there has been extensive research into their design and completion in secondary care very little is known about primary care perspectives on the processing of these documents. There is a need for greater understanding of the epidemiology of primary care patient safety in order to learn from current actions and processes and generate solutions to prevent future harm.

This study explored a high risk patient population of patients aged 75 years and older who had experienced emergency hospital admission. The study had two main aims. The first aim was to investigate failures in processing actions requested in hospital discharge summaries and sequelae for elderly patients. Aim 1 was met by achieving four objectives which included: estimating the rate of failures in processing actions requested in hospital discharge summaries; estimating the rate of subsequent harm and determining factors associated with these failures. The second aim was to explore staff perceptions of the factors associated with failure to respond to actions requested in discharge summaries and what practices do to mitigate this. Aim 2 was met by achieving five objectives related to an interwoven field work and interview process informed by data from aim 1. The five objectives were: to explore practice's administrative and clinical processing systems in relation to discharge summaries; construct practice-specific process maps; produce individual practice reports; discuss these reports and process maps with general practice staff in an interview setting and then allow staff to describe existing strategies for safety improvement and generate new strategies within the interview.

The quantitative part of the study was a retrospective records review undertaken after exploration of administrative systems at practice sites. The study population was emergency admissions for patients aged ≥75 years, drawn from 10 general practices in three areas of England. One General Practitioner (GP) researcher reviewed the records for 30 patients at each of 10 practices (n=300) after hospital discharge to determine the rate of adherence to the actions requested in the discharge summary and to estimate the rate of associated harm from non-adherence. Where GPs documented decision making contrary to what was requested, these instances were not classed as failures. Data were also collected on time taken to process discharge communications. The qualitative part of the study consisted of 20 semi-structured, audio-recorded interviews with general practice staff. Interviews were conducted with one practice manager and one GP at each of the 10 practices sampled purposively for the quantitative part of the study. Anonymised data from the quantitative part of the study (including harm vignettes and process maps for their practice) were presented to participants in advance of interviews to stimulate discussion.

There were failures in processing at least one action requested in 46% (112/246) of discharge summaries (95% CI 39-52%). It is important to note that a proportion of 'failures' may represent considered, but undocumented, decisions taken by GPs. Medication changes were made as requested in the majority of instances but were not made in 17% (124/750) of requests (95% CI 14-19%). Tests were not completed for 26% of requests (95% CI 16-34%) and 27% of requested follow-ups were not arranged (95% CI 20-33%). Although this does mean, again, that the majority of requests are acted upon. There were 23 harms associated with these failures. Three patients suffered two harms each, therefore the harm rate per patient is 8% (20/246). This equates to a Number Need to Harm (NNH) of 13, showing that harms are relatively frequent in this high risk group. Harms were, on average, of moderate severity and moderate preventability. Increased risk of failure to process test requests was significantly associated with the type of clinical IT system and male patients. Other factors associated with failures included: newly started medicines, delay in uploading the discharge summary to the electronic record and reconciliation of cardiovascular medications. From the quantitative data it is difficult to make conclusions about the causality of failures and this is why the qualitative elements of this study were deemed important. From the qualitative work, five themes developed which describe the journey of the discharge summary and shed light on the causes of failures. *Secondary care factors* describe participants' perspectives on creation of discharge summaries and included subthemes relating to the design of discharge summaries, to delegation, to safety of information transfer and to pressures within the wider NHS. *Safety features of processing systems* collates participants' thoughts on document handling in primary care. Subthemes included: continuity of care, team-working, protocols, training/staffing issues and workflow targets. The third theme has a specific focus on how *medicines reconciliation* is managed and included subthemes relating to: communication with patients, medicines related factors, patient vulnerability factors and changing responsibility for prescribing. *Error and harm as a result of failure to process discharge summaries* describes 'human error' and other factors that participants believed contributed failure to respond to requested actions (particularly time pressures and workload). Finally, *strategies for safety improvement* describes initiatives, both implemented and hypothetical, to prevent failure to adequately process discharge summaries. Examples include: changes to administrative systems, use of information technology as a patient safety aid and national schemes such as the unplanned admissions scheme.

Failures occurred in the processing of requested actions in almost half of all discharge summaries, and with all types of action requested. Associated harms were not uncommon in this high risk group and most were of moderate severity. Practice staff are aware of the importance of accurate and timely processing of requests on discharge summaries, and the potential for error. Strategies are recommended to mitigate against faults in processing discharge summaries including a list of 'Always Events'® to enable the development and prioritisation of interventions.

Publications arising from work undertaken as part of this thesis

Spencer R, Rodgers S, Salema N, Campbell S, Avery A. *Accepted by Online Br J Gen Pract*, June 2018. Processing discharge summaries in general practice – A qualitative interview study with GPs and practice managers.

Output from chapter 6

https://bjgpopen.org/content/early/2019/02/07/bjgpopen18X101625.abstract

Spencer, R.A., Spencer, S.E.F., Rodgers, S., Campbell, S.M. and Avery, A.J., 2018. Processing of discharge summaries in general practice: a retrospective record review. *Br J Gen Pract*.

Output from chapter 5

https://bjgp.org/content/68/673/e576.long

Campbell, S.M., Bell, B.G., Marsden, K., Spencer, R., Kadam, U., Perryman, K., Rodgers, S., Litchfield, I., Reeves, D., Chuter, A. and Doos, L., 2018. A patient safety toolkit for family practices. *Journal of patient safety*. February 15, 2018 - Volume Publish Ahead of Print - doi: 10.1097/PTS.0000000000000471

Output related to chapter 1 and 2

https://journals.lww.com/journalpatientsafety/Abstract/publishahead/A_Patient_Safety_Toolkit_for_Family_Practices.99384.aspx

Spencer,R., Campbell, S. (2014) Tools for Primary Care Patient Safety; a narrative review. BMC Family Practice. Oct 26;15:166

Output from chapter 2

https://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-15-166

Bell, B., Spencer, R., Avery ,A.J, Campbell ,S. (2014) Tools for measuring patient safety in primary care settings using the RAND/UCLA appropriateness method. BMC Fam Pract. 2014 Jun 5; 15:110.

Output related to chapter 1 and 2

https://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-15-110

Spencer, R., Bell, B., Avery, A.J., Gookey, G. and Campbell, S.M., 2014. Identification of an updated set of prescribing-safety indicators for GPs. Br J Gen Pract, 64(621), pp.e181-e190.

Output related to chapter 1 and 2

https://bjgp.org/content/64/621/e181.long

Presentations

Processing of discharge summaries in general practice: A retrospective record review. Poster presented at the International Forum on Quality and Safety in Healthcare May 2018, Amsterdam

Investigating the processing of discharge summaries in general practice to improve patient safety. Poster presented at RCGP conference Oct 2017, Liverpool

Investigating the processing of discharge summaries in general practice to improve patient safety -Quantitative Results. Poster presented at NIHR communications training camp May 2017, Leeds

Investigating the processing of discharge summaries in general practice to improve patient safety. Poster presented at RCGP symposium Aug 2017, University of Warwick

Investigating the processing of discharge summaries in general practice to improve patient safety. Poster presented at postgraduate research forum June 2017, University of Nottingham

Discharge summaries in general practice - An Impact Poster. Poster presented at postgraduate forum June 2016, University of Nottingham

Information flow in general practice: investigating the processing of discharge summaries to improve patient safety. Oral presentation (PhD aims, methods and pilot results) June 2016, Warwick medical school symposium.

Acknowledgements

RS would like to thank the whole supervisory team who gave invaluable input throughout. Ndeshi Salema was particularly helpful with the qualitative data analysis and gave up her time freely to help with this. RS also thanks the study statistician, her amazing husband, for putting up with the creation of this work while looking after our small twins.

Supervisors

First - Professor Anthony Avery (University of Nottingham)

Second – Dr Sarah Rodgers (University of Nottingham)

Third (external) – Professor Stephen Campbell (University of Manchester)

Contents

List of figures

List of tables

List of abbreviations and acronyms

AE	Adverse Event
AHRQ	Agency for Healthcare Research and Quality
APM	Assistant Practice Manager
BMA	British Medical Association
BNF	British National Formulary
CCG	Clinical Commissioning Group
CDSS	Clinical Decision Support Software
CMUH	Central Manchester University Hospitals
CPRD	Clinical Practice Research Datalink
CRF	Case Report Form
CRN	Clinical Research Network
DHSC	Department of Health and social care
EDMS	Electronic Document Management System
HER	Electronic Healthcare Record
EMIS	Egton Medical Information System (clinical IT system)
EThOS	Electronic Thesis Online Service
GMC	General Medical Council
GP	General Practitioner
HFMEA	Healthcare Failure Modes Effects Analysis
ICD 10	International Classification of Disease 10^{th} revision
III	NHS Institution for Innovation and Improvement
IHI	Institute for Healthcare Improvement (US and UK)
IOM	Institute of Medicine (US)
JCAHO	Joint Commission on Accreditation of Healthcare Organisations
MDU	Medical Defence Union
MeSH	Medical Subject Headings
MPS	Medical Protection Society

NCC MERP	National Coordinating Council for Medical Error Reporting and Prevention
NHS	National Health Service
NICE	National Institute for health and Care Excellence
NIHR	National Institute for Healthcare Research
NLM	National Library of Medicine
NNH	Number Needed to Harm
NPSA	National Patient Safety Agency
NRLS	National Reporting and Learning Service
OR	Odds Ratio
OOH	Out Of Hours care provider
PI	Principal Investigator at a local centre
PIS	Participant Information Sheet
PM	Practice Manager
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
QMC	Queens Medical Centre (Main Nottingham Hospital)
QOF	Quality Outcomes Framework
RAND	Research ANd Development Corporation
RCGP	Royal College of General Practitioners
REC	Research Ethics Committee
SPCR	NIHR School for Primary Care Research
UAS	Unplanned Admissions Scheme
UHCW	University Hospitals of Coventry and Warwickshire
UoN	University of Nottingham
UoW	University of Warwick
U+E	Urea and Electrolytes
WHO	World Health Organisation

Chapter 1 – Introduction

1.1 General introduction and structure of thesis

The introduction initially describes the current state of research in patient safety and more specifically general practice patient safety in order to establish the arena in which the research was conducted. It then moves on to describe personal motivations which directed the focus of this study towards information flow in general practice. From there, the introduction moves to discussing the discharge summary, as an important part of the information flow process. These issues arose from the literature review (described in chapter two) as some of the least well understood topics in general practice patient safety with unknown potential to cause or be associated with harm. Lastly the research aims and objectives are presented.

1.1.1 Structure of thesis

This is a mixed methods thesis with separate chapters describing quantitative and qualitative methods and results, hence the number of chapters is greater than in a standard thesis. The methodological strands are drawn together in the discussion.

Chapter 2 Description of the narrative review conducted for the NIHR Patient Safety Toolkit Project in 2011. This work was the basis of a thesis intended for submission for Masters of Research Methods prior to conversion to doctoral training in 2013. A shortened version was published as a paper (Spencer and Campbell, 2014).

Chapter 3 Description of the quantitative methods, including pilot work and sample size calculations. This chapter also describes the ethics process undertaken in 2015 and the final study protocol. Data management and statistical tests are described.

Chapter 4 Description of the qualitative methods including data management and analysis.

Chapter 5 Quantitative results grouped by type of 'failure' to complete actions requested in the discharge summary (failure to make changes to medications, failure to organise tests and failure to follow-up). This is followed by analysis of harms resulting from failures.

Chapter 6 Qualitative results are presented according to five themes which describe the journey the discharge summary takes from secondary care through primary care which may result in failures to process correctly or in harm. Finally, strategies which practices have put in place to mitigate for failure to process discharge summaries are investigated.

Chapter 7 Discussion of the study results, drawing the quantitative and qualitative findings together, and a discussion of the strengths, weaknesses, impact and implications of the work.

1.2 Introduction to patient safety

Safety is a concept broadly applicable to many fields of human endeavour. The so called 'high risk industries' (for example aviation, space travel and nuclear power) have led the way in the understanding of how human error interacts with systems design (Hudson, 2003). Medicine can certainly be viewed as a 'high risk' industry; the consequences of error (harm) may be disastrous for the physical and mental wellbeing of patients. The patient safety movement in healthcare is widely acknowledged to have begun in the early 1990's with the work of Lucian Leape 'father of patient safety' (Brennan and Leape 1991) and his subsequent promotion of the shift away from blame cultures to the systems based approach to medical error (Leape, 2010). The main goal set out in the US Institute of Medicine's (IOM) landmark report in

2000 'To Err is Human' was to provide better care for patients by the provision of safe care (Kohn et al, 2000).

So what is 'patient safety'? A leader of the UK patient safety movement defines patient safety as:

> *'The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare'* (Charles Vincent, et al, 2013).

Patient safety has been on the agenda of hospital physicians, particularly in the US, since the publication of the IOM report in 2000 revealed that more people were dying in the US as a result of medical error than of road traffic accidents (Kohn et al, 2000). Following on from the IOM report, the publication by the UK government of 'an organisation with a memory' reiterated the extent of the problem within the NHS (Department of Health and social care (DHSC), 2000). A rate for adverse events in secondary care has subsequently been established (de Vries et al, 2008). The Francis Report (Mid Staffs. report, 2013) described protecting patients from avoidable harm as 'crucial' and following the publication of the Berwick report it is clear that placing patient safety 'above all other aims' is a national goal within the NHS as a whole (DHSC, 2013). This was reiterated in 2014 by the UK Secretary of State who invited hospital trusts to 'sign up to safety' with the target of saving 6000 lives by 2017 (DHSC, 2014). Priorities in this campaign were to reduce emergency admissions and longer stays especially for older patients which are associated with increased frequency of adverse events in hospital (Mayor et al, 2017). The epidemiological situation in primary care settings and general practice is more uncertain (National Patient Safety Foundation, 2015).

1.3 Patient safety in general practice

Most healthcare interactions in the developed world occur in general practice: 85% of contacts in the NHS take place in primary care (House of Commons, 2010). In England there are approximately 300.4 million general practice consultations per annum (at last count, HSCIC, 2008) and 1.1 billion prescriptions dispensed each year (HSCIC, 2017). Consultation rates in general practice are rising, 10% between 2007 and 2014 (Hobbs et al, 2016). The potential for adverse events is therefore huge but the knowledge base about patient safety in this context is still sparse. An early literature review of the nature and frequency of error in primary care (Sandars and Esmail, 2003) suggested that there were between 5-80 safety incidents per 100,000 consultations, which in the UK would translate to between 37 and 600 incidents per day. Patient safety research in primary care has lagged behind that in secondary care (Lorincz et al, 2011); yet, it is likely that staff and systems in primary care environments do contribute to serious error which can cause both morbidity and mortality. In 2015 a more comprehensive systematic review of patient safety incidents in primary care was undertaken which found a highly variable rate of <1-24 incidents per 100 consultations, of which 4% were 'severe harms' (Panesar et al, 2015). Harm in primary care has been particularly demonstrated in the fields of prescribing (Avery et al, 2012 (b)) and diagnostic error (Panesar et al, 2015). Evidence for other types of error had been largely confined to the statistics of the medical defence organisations and small pilot studies (Bhasale, 1998). However, recent analysis of a selection of the 40,000 GP reports to the National Reporting and Learning Service (NRLS) gives more detail (Carson-Stevens et al, 2016). They found four main types of error which lead to serious harm or death: communication errors and discharge and referral; physician's decision making; diagnosis of cancer and failure to recognise acute deterioration in patients.

Interventions that have the potential to improve patient safety in the primary care environment generally suffer from a lack of epidemiological study. Understanding the epidemiology of hospital errors was crucial in developing hospital based safety and public support for efforts to improve safety (Wynia and Classen, 2011). This needs to be duplicated in primary care; the American Medical Association's (AMA) 10 year report on ambulatory patient safety (Lorincz et al, 2011), concluded that major gaps persisted in our understanding of patient safety in the ambulatory setting and with virtually no credible studies on how to improve safety. Some progress has been made since, for example, the publication of a RAND/UCLA consensus 'Never Events' list for general practice (de Wet, O'Donnell and Bowie, 2014). The Institute for Healthcare Improvement (IHI) have described a more positive type of event; the 'Always Event'® (IHI online toolkit, 2016) which they define as:

> "those aspects of the patient and family experience that should always occur when patients interact with healthcare professionals and the delivery system"

The challenge remains to develop 'Always Events'® that are specific to general practice.

1.4 Personal motivations

As part of a study undertaken by our research team for the National Institute of Health Research (NIHR) to develop a Patient Safety Toolkit for general practice, there existed an opportunity to lead a scoping review to identify patient safety tools in primary care. This review (described in chapter 2) aimed to identify existing material (published and grey literature) pertaining to patient safety in general practice that could be used to inform and generate a 'Patient Safety Toolkit for general practice'. Prior to conducting doctoral work the author had an interest in prescribing safety indicators for general practice, a specifically focused area of patient safety. The scoping review allowed exploration of a wider research area specifically to identify arenas of patient safety which are not as fully developed as medication safety. The literature review, now published, (Spencer and Campbell, 2014) formed the basis for the selection of a toolkit of measures of patient safety. The NIHR SPCR toolkit is now hosted by the Royal Collage of General Practitioners (RCGP) website (RCGP Patient Safety Toolkit, 2015).

Notable gaps in the literature base for primary care (found while conducting the toolkit review) helped shape the focus of this doctoral work. Diagnosis, investigations and referrals to secondary care were underrepresented but nevertheless were present in the literature. However no tools in relation to 'information flow' in general practices were identified despite taxonomies and defence organisation literature recognising it as a crucial and underexplored field.

1.5 Information flow

1.5.1 Definitions and importance of information flow

The umbrella term 'information flow' originates from the workflow terminology of the business world but in a healthcare context refers to the movement of paper and electronic information relating to patients. The term is similar to 'patient flow' used by NHS Institute for Innovation and Improvement which describes uninterrupted movement through a sequence of processes (NHS III, 2017). A number of under-explored but important issues relating to administration in general practice and communication with other care settings can be grouped under this heading. Following Donabedian principles that good structure increases the probability of good outcomes (Donabedian, 1980), it seems reasonable that high quality information flow in general practices would help to ensure the best care for patients and avoid harm associated with failure to identify and act on clinically important information.

The primary/secondary care interface is crucial for information flow as the consequences of not acting on advice from hospitals are potentially very serious. The author's previously published narrative review, which is described in chapter 2 (Spencer and Campbell, 2014) showed that communication at the interface of primary and secondary care receives relatively little attention (5% of the total published literature). Papers addressing clerical issues and investigation results processing in general practice account for a negligible amount of the published literature (around 1% of the content of the review). Data from the medical defence organisations of the UK show that lack of communication between secondary and primary care is an important cause of adverse events (Esmail et al, 2004). A major factor in unsuccessfully defended claims relating to information flow is the mismanagement of test results (Medical Protection Society (MPS), 2018). One of the most influential taxonomies of GP patient safety, which was compiled from 433 event reports from the TAPS (Threats to Australian Patient Safety) study, included information flow as an important issue (Makeham et al, 2008). Within the NIHR SPCR Patient Safety Toolkit project, two processes highlighted the importance of information flow. Firstly, the discussions of the international advisory group and secondly, the results of our international Research ANd Development Corporation Method (RAND) consensus exercise (Bell et al, 2014). Most recently, communication with and about patients was shown to be one of the most common reasons for a report to be submitted to the NRLS by general practice (21% of reports) (Carson-Stevens, 2016). The leading reason for these communication problems was errors in information transfer between providers (27% of communication related harms).

1.5.2 Context of information flow

Studying information flow (as with any workflow system) is context dependant (Unertl et al., 2009). English general practice has obvious differences to some other primary care settings worldwide (Kringos, 2010). The funding basis of UK general practice is fundamentally different to most other countries. UK patients register with only one general practice and therefore the records held by that surgery are a repository for all the information pertaining to that patient in the community. In many respects this represents a simpler system for communication across care levels compared with the US, for example, where patients often visit more than one primary care provider. This 'simpler' system with a delineated general practice registration structure provides an ideal environment for exploratory work in what is anticipated to be a complex set of interactions although it is clear that errors can and do occur in the chain of information in the UK . However, the learning from the results of this study will still be applicable to international settings, and indeed, if significant errors are found in UK practice the problem may be expected to be worse in countries with less formally organised primary care.

1.6 Discharge summaries (communication across the interface)

This thesis focuses on the discharge summary as one important link in the information flow chain. The discharge summary is used as a 'trigger' point for reviewing the medical record and is also a way to identify patients who might be at higher risk of medical error.

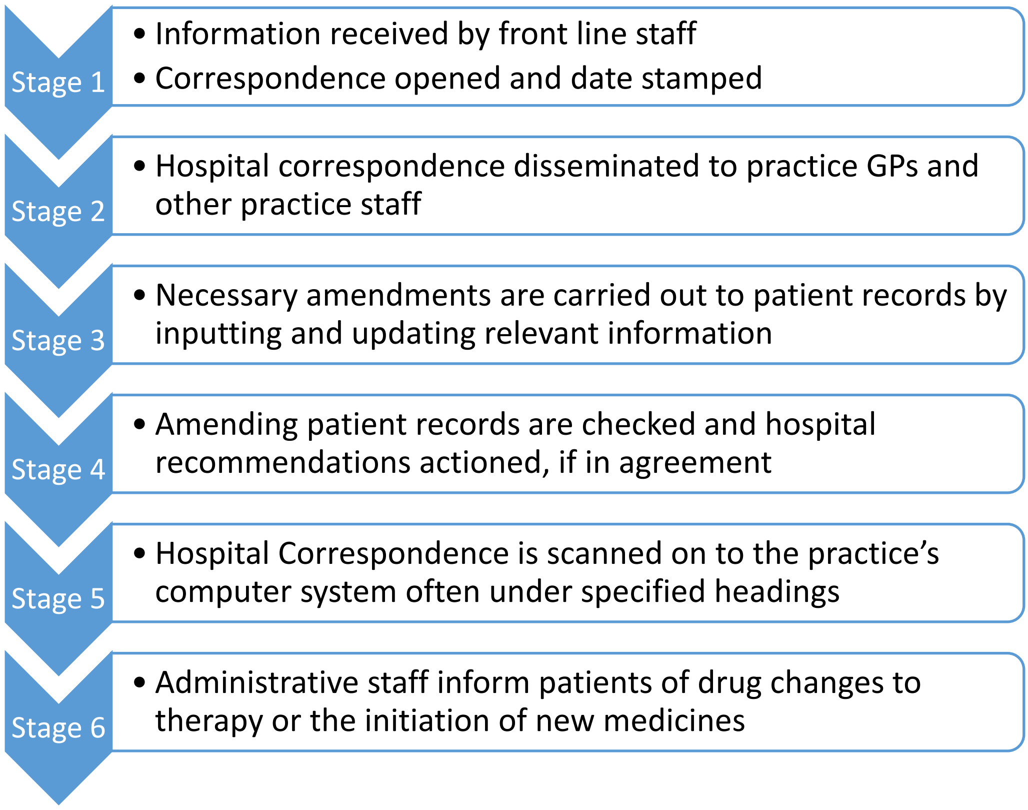
Analysis of error reports about discharge processes submitted by GPs to the NRLS revealed four main themes: errors in discharge communication; errors in referrals to community care; medication errors and failure to provide care adjuncts (Williams et al., 2015). Patients were most likely to be harmed by lack of care adjuncts such as dressings (94% of patients were harmed) (Williams et al., 2015). In a wider study of GP NRLS reports, safe discharge assessment also made up a proportion (19%) of diagnostic/assessment related severe harm reports (Carson-Stevens, 2016). The majority of NRLS reports (53%) relate to the elderly (aged 65 and over) and they are particularly vulnerable to harm related to errors in transfer of information at care transitions (Cooper et al, 2017).

A limited amount of previous research has investigated how well general practices deal with discharge summaries once they reach the practice. A US teaching hospital study was able to access primary care records for 191 discharged patients (with an average age of 58 years) requiring follow-up (Moore et al, 2007). They found that 36% of requested 'work-ups' (follow-up tests requested of the GP by the hospital) were not completed, 85% of these were for laboratory tests. If the discharge summary was available at the time of the first appointment with the GP, the odds ratio (OR) of completing the 'work-up' was 2.35. Increasing time to first follow-up appointment with the

GP was associated with lower OR for completion 0.77. The longer the hospital stay the less likely the work-up was done. Again, a limited amount of research has been conducted to see whether failure to act on requests made by secondary care results in harm. A small study (81 patients) found that failure to arrange 'work-up' resulted in a 6 fold readmission rate within 3 months of discharge (Moore et al, 2003).

The first step in developing a rationalised approach to discharge summaries is to better understand the primary care management processes including where those processes might be lacking and indeed where their strengths lie. Previous work by colleagues studying information flow from secondary to primary care identified common features of GP systems and highlighted the need for further investigation (Crowe, Tully and Cantrill, 2009). They developed an information flow model which contains six steps which was used as the basis for my investigation of practice systems (see figure 1).

Figure 1 – The information flow model (reproduced from Crowe, Tully and Cantrill, 2009)



1.6.1 Tools to assist post-discharge in primary care

Following the production of the Care Quality Commission (CQC) report "Managing patients' medicines after discharge from hospital" (CQC, 2009) greater attention has focused on the medications aspect of the interface process. Problems with miscommunication of medications information on discharge summaries are widely acknowledged (Grimes et al., 2011). Advances in secondary care discharge summary implementation have been made (RCP, 2011) but while these aimed to standardise the information GPs receive they are not designed to assist primary care in processing the discharge summary. General advice for GPs on the best ways to handle the discharge process is available (Blythe and Buchan, 2017). Some primary care medications reconciliation tools already exist and these are discussed in section 2.4.1.

1.6.2 Rationale for the study population

The chosen population of study is emergency admissions for patients aged 75 years and older who are particularly at risk of emergency admission (Purdy, 2010). One in every five emergency admission patients have been discharged in the previous 48 hours (British Red Cross, 2018). Modern population aging studies recognise that '75 is the new 65' (Sanderson and Sherbov, 2014). Another rationale of choosing this group is the increased frequency of hospital admissions for the elderly; 24% of all admissions occur in the over 75s (HSCIC, 2013), and the increasing frailty/multi-morbidity associated with these admissions (Payne et al., 2013). Increasingly multi-morbidity of the elderly is recognised as a challenge for general practice (Déruaz-Luyet et al., 2015), evidence which lends weight to the importance of improved hospital discharge. . Discharge summaries for elderly patients often contain an increased number of drugs and are therefore more complex to process (Stitt, Elliott and Thompson, 2011). Often the discharge of elderly patients from emergency hospital admissions involves a change of accommodation (e.g. from own home to nursing/residential home). This may often involve a new GP caring for them to whom they are unknown and vice versa, further intensifying the risk of care transition.

1.7 Study aims and objectives

This study had two main aims:

1. To investigate failures in processing actions requested in hospital discharge summaries and sequelae for patients.
2. To explore staff perceptions of the factors associated with failure to respond to actions requested in discharge summaries and what practices do to mitigate this.

Aim 1 will be addressed by achieving the following objectives:

1. Estimate quantitatively the rate of failures in processing actions requested in discharge summaries.

2. Determine which factors are associated with failure to process actions requested in discharge summaries
3. Estimate quantitatively the rate of harm ensuing from failures to process actions requested in discharge summaries
4. Grade the severity and preventability of harms ensuing from failures in order to determine the effect on patients

Aim 2 will be addressed by achieving the following objectives:

1. Exploring practice's administrative and clinical processing systems in relation to discharge summaries
2. Using the field work in objective 1 to construct practice-specific process maps
3. Using data from aim 1 (objectives 2 and 3) to produce individual practice reports
4. Discussing these reports and process maps with general practice staff in an interview setting
5. Allowing general practice staff to describe existing strategies for safety improvement and generate new strategies within the interview

Chapter 2 – Interventions for patient safety in primary care – a scoping review

2.1 Introduction to the literature review

This chapter describes in detail the processes of a literature review originally conducted as part of larger NIHR research project described in section 1.4 (Spencer and Campbell 2014). The purpose of this scoping review was to inform the construction of a patient safety toolkit for general practice but it was also used as the literature review for this PhD study. The research question which the review addressed was:

> What interventions have been developed to assess, measure or improve patient safety in general practice?

It is acknowledged that the subject of the literature review is broad and that only a subset of the literature relates directly to the subsequent PhD study (hence its production in a stand-alone chapter). Also, as mentioned earlier, the idea for focusing on hospital discharge communication came from the literature review, and conducting the review gave the author a good grounding in patient safety literature and developed research skills in literature review design. A systematic review was not conducted because the research question was too broad and could be more appropriately answered through a broader scoping review. Also it was anticipated that the literature outputs would be highly heterogeneous, therefore making systematic review methods very difficult to apply (Arksey and O'Malley, 2005).

2.1.1 Scope of the literature review

The aim of this work was to descriptively review the existing literature describing interventions for patient safety in general practice. Scoping reviews may 'borrow' established techniques from other types of review, especially those used for systematic review (Arksey and O'Malley 2005). Where it was appropriate to use these techniques I have referenced standard systematic reviewing texts.

Although this review concentrates on interventions relating to general practice designed to improve safety systems it also recognises the human factors at play in the field of patient safety – both in terms of healthcare professionals and patients. Indeed there are a number of interventions specifically designed to promote these human elements within the system (for example, general practice safety climate measures – e.g. The Manchester Patient Safety Framework). The term 'tool' was used as an umbrella term for interventions as the purpose was to create a 'toolkit'. This review could potentially have variable scope depending on how the terms; 'tool', 'outcome assessment' and 'general practice' are defined, and indeed definitions do vary and are open to subjective interpretation. Multiple synonyms for these terms were included in the search to capture as much of the literature as possible, and to help give the review an international perspective (Appendix 1). Similarly, the inclusion strategy was broad to reduce the chances of missing important literature.

2.2 Methods for the literature review

Reviewer 1 (RS), the author, is an academic GP. Reviewer 2 (SC) is a specialist in healthcare quality and safety in general practice from the University of Manchester, and the external supervisor for this thesis – he was involved with all stages of the review in line with best principles outlined in the Cochrane Handbook for Systematic Reviews of Interventions (Cochrane Handbook).

2.2.1 Defining search terms

The starting point for determining the search terms used in the literature review was a three stem definition of the search question. Setting in general practice was the first stem, safety synonyms was the second. Further detail can be seen in Appendix 1. This follows principles stated in the Cochrane Handbook for Systematic Reviews of Interventions (Cochrane Handbook). Consideration was given to a variety of established methods of evidence synthesis. SPIDER (Sample, Phenomenon of interest, Design, Evaluation) (Cooke, Smith and Booth 2012) structure might have better suited the data but this approach was not well established at the date my review was conducted and I was not aware of it. Another qualitative approach is SPICE (Setting, Population, Intervention, Comparison, Evaluation) (Booth, 2006) which maps closely to the data extraction headings I used (section 2.2.8). Given that the aim was not to compare tools or determine which of two interventions produced the best clinical outcome, traditional methods of systematic reviewing such as PICO (Population, Intervention, Comparison, and Outcome) (Richardson, et al. 1995) were not appropriate. The limitation of the search strategy was that it could never be completely exhaustive; there may be more terms or synonyms not included. It was felt, however, that the way in which the terms were sourced from multiple resources and reviewed by a NIHR toolkit project expert advisory panel, including national and international experts, achieved as much scope as was feasible while refining the search enough to produce manageable numbers of abstracts for review.

2.2.2 Design of the literature review, databases and search limits

The Transparent Reporting of Systematic Reviews and Meta-analyses (PRISMA) guidelines were adhered to. The search strategy was applied, with necessary modifications, to six different databases which are commonly used for health care and sociology research (Appendix 2). The search was performed on the following databases; Embase, CINAHL, Pubmed, Medline (Ovid 1996 onward), Health Management Information Consortium and Web of Science. There was no cut off in terms of year of publication. The searches were conducted on the 1.11.2011.

2.2.3 Inclusion and exclusion criteria

All languages and types of publication were considered eligible. There was only one relatively simple over-arching inclusion criterion;

- The document describes tools or strategies to improve or analyse safety which are of relevance to Primary Care *(the fail-safe was to include if unsure - for example, 'good advice' publications which might later inform other tools were included).*

This review was complex and involved a large quantity of literature; therefore, the process of exclusion is described in detail including the consensus between reviewers. The following exclusion criteria were applied at the title, abstract and final reading stages in order to ensure relevant material was passing on to the next stage. In some cases it was extremely unclear, even in the abstract, which settings the research took place in, resulting in more papers passing to full reading stage which were thereafter excluded.

Exclusion criteria:

- hospital care/setting - unless directly transferable ('directly transferable research' was defined as research of relevance to primary care and included all literature relating to the primary/secondary care interface)
- opinion pieces / editorials – thereby excluding newspaper reports

- single drugs / conditions where the focus was felt to be on the specific drug or condition rather than on transferable tools
- papers which related to quality of care domains other than safety. Extensive discussions between reviewers took place in relation to the definition of patient safety.   Using the IHI's six domains of health care quality (Safe, Timely, Effective, Efficient, Equitable and Patient centred (IOM, 2001)) helped us to rule out work which related to domains other than safety. Examples of excluded work include: cost reduction strategies; the Quality Outcomes Framework (QOF) and patient satisfaction surveys.
- economic impact of errors

2.2.4 Reference management

An *Endnote* library was set up to export the details of the articles. Duplicates were removed after all databases had been uploaded prior to reviewing titles manually for relevance. A pilot of the inclusion and exclusion criteria was run against a convenience sample of *titles* from authors with surnames beginning with A and B. Concordance between the two reviewers was reasonable (out of 274 selected titles reviewer 1 (the author) included 84 titles which reviewer 2 did not and reviewer 2 included 20 titles that reviewer 1 did not). In general, the author (reviewer 1) had a more inclusive style and this cautious approach was adopted by the other reviewer in order not to miss publications. This process was continued, resulting in 1311 abstracts. A three level categorisation was used (Glaziou et al., 2002) when reading abstracts – 'definitely include', 'uncertain', 'definitely exclude' (some abstracts were discussed during the process to further inform the exclusion criteria). Where one or both reviewers rated an abstract 'definitely for inclusion' it went forward to the next stage. Where both rated it uncertain it was included and where one rated 'uncertain' and the other 'exclude' it was excluded. Using this process the following results were obtained for each reviewer (see table 1)

Table 1 – Breakdown of status of abstracts in the literature review

Abstract for Inclusion?	Number of abstracts from Reviewer 1 (RS)	Number of abstracts from Reviewer 2 (SC)
Definitely include	211	129
Uncertain	54	137
Definitely exclude	1046	1045

Status of abstracts as rated by each reviewer was either: included, uncertain or excluded

The process was not as perfect as it appears from the raw figures as there was some degree of disagreement resulting in 290 papers selected for final review. A Cohen's Kappa was calculated as a measure of inter-rater agreement and found to be 0.58, indicating fair agreement (Appendix 3). Considering the difficulty defining some of the concepts in the review this level of correlation seems acceptable. By the inclusive nature of the strategy there was a low probability that papers of interest were missed.

2.2.5 Snowballing

Additional papers were garnered from reference listings in papers found in the review process and also from papers known to two expert sources (Tony Avery (TA) and SC). A pragmatic snowballing technique was used due to the sheer quantity of literature, key papers exploring subject areas that were felt to be crucial and underrepresented were identified in a meeting of the two reviewers. Titles from reference listings were screened for relevance by hand and papers felt suitable for inclusion by both reviewers were fully analysed. An attempt to use the 'related citations function' of *Pubmed* revealed that this was not possible in term of manpower and budget within the study. The technique was run on one paper relating to safety climate, a theme which is well documented (deWet et al., 2010). The process yielded 134 citations; 17 of these titles were felt to be relevant. Eight of the papers were already in the review and nine new papers were found. Despite this labour intensive strategy of reading large numbers of titles and abstracts, only three were felt suitable for full reading and none of these revealed any useful data. This was an exhaustive process which ultimately did not yield any extra useful information so the strategy was abandoned.

2.2.6 Grey literature

Internet sources of grey literature from international organisations were suggested by a NIHR toolkit project expert advisory panel at the beginning of the project (Appendix 2 - box). These sources were searched manually and exhaustively by the author in order to retrieve documents relevant to the review.

2.2.7 Theses

The British Library search engine for theses was consulted (EThOS) but could not cope with the search strategy. A much simplified strategy was attempted using the key UK terms 'safety' AND 'general practice' OR 'primary care'. Searches did not reveal any results so an even broader strategy of setting alone was used – 47 results were returned but none related to patient safety. Using the topic 'patient safety' alone, 94 theses were found but from titles alone it was very difficult to determine if they related to primary care, most of these are not available online so further systematic reviewing was not possible. Another search engine (Open thesis online) allowed more detailed searching but still would not allow the full search strategy to be performed. The simplified strategy used gave 1697 results when limited to English language; on closer inspection most of the theses were not available online and would have required requests from the libraries of international institutions. This was not within the scope or resources of the NIHR toolkit study. Two theses (Makeham, 2007 and McKay, 2009) were uncovered in the process of the review from contacts of the steering group but both of these authors have subsequently produced published papers which are already in the toolkit review.

2.2.8 Pilot and design of data extraction forms

Both reviewers were involved in design of the two data extraction forms; a *Microsoft Excel* spread-sheet for purely numerically encoded data (see Appendix 4) and a *Word* free text table with pre-set headings (see Appendix

5). The forms were designed to be filled in contemporaneously by each reviewer. The free text document was based on systematic review guidelines, containing headings recognised as essential elements of data extraction (Cochrane Handbook and PRISMA). The *Excel* file provided us with an easy way to analyse and keep track of such a large amount of data and was also useful for determining at what stage papers had been ruled out according to exclusion criteria. The forms were further informed by the extensive experience of SC in the field of patient safety and in prior systematic reviews on other subjects. A pilot of 10 papers was conducted. The papers were not chosen at random; a mixture of different types of study, subject and outcomes were selected on the basis of abstracts. All the papers chosen for the pilot were felt to be highly relevant to the project with the aim that none of the pilot papers should be excluded. A high degree of concordance (128/160 rated items, 80%) was seen between the reviewers at this stage in using the *Excel* document. The main area of disagreement was the extent to which tools had been validated in primary care. Minor revisions to the *Word* document were made in order for it to be more user-friendly.

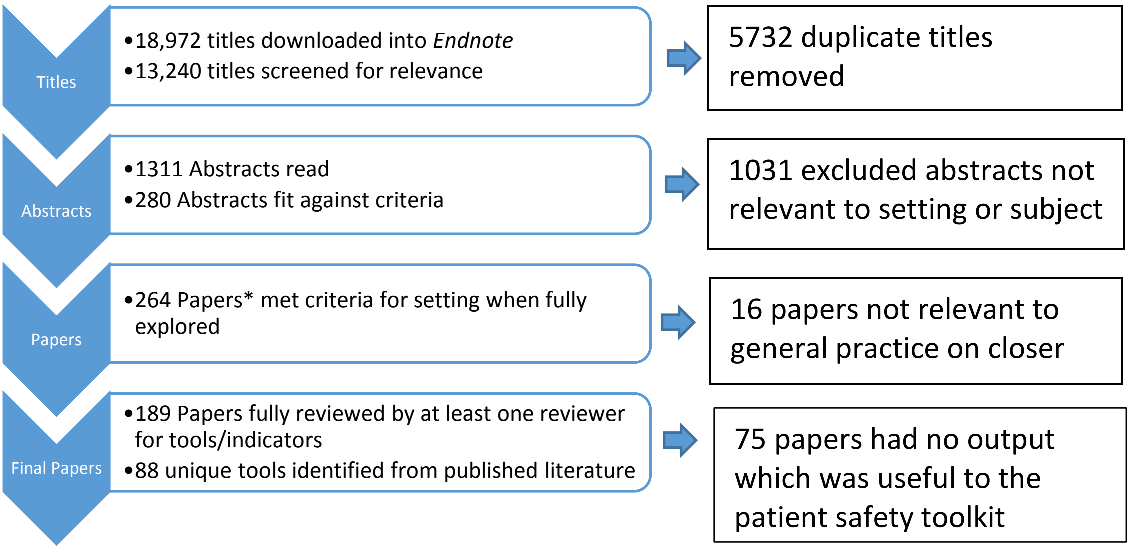
2.3 Results of the literature review

2.3.1 General results

The results are presented in a similar manner to that used in my publication (Spencer and Campbell, 2014) and a discussion of the results from papers which pertain to topics pertinent to the ongoing work of the PhD follows. Sections on medications safety, for example, have been included but shortened and sections on subjects like training and occupational health and safety have not been included.

As shown in figure 2, 18,972 titles were downloaded into *Endnote*. The 'remove duplicate' function of Endnote was used, reducing this number to 13,240. Titles were screened for relevance by the two reviewers. Of these, 1311 titles were taken forward to the abstract stage at which 280 papers were deemed relevant for inclusion. On full reading of these papers 91 were subsequently found to fit the exclusion criteria and so were not included. The majority of the included studies (101) did not describe fully formed tools but their findings were extracted for use in indicator development and RAND/UCLA Appropriateness Method processes.

Figure 2 – Diagram showing the stages of the review process with numbers of papers at each stage and excluded papers



**SC did not process two papers*

There are more papers than tools as some of the papers yielded only indicators, criteria or findings thought to be useful as evidence in planned RAND/UCLA processes (Bell et al, 2014 and Spencer et al, 2016). The aim of the RAND/UCLA process was to ask experts in the field to consider the array of evidence and, in combination with their experience and professional opinion, help us make judgements on what types of tools and strategies should be included in the subsequent NIHR SPCR toolkit. Including the output from grey literature, 114 tools were collected (Spencer and Campbell, 2014 – web Appendix 5) – many of these were adaptations of earlier tools so it is difficult to 'count' them. Where the tool was given a new name it was counted as a separate item. For example the updated Beers prescribing indicators (Beers, 1997) do not count as a separate item to the original Beers criteria (Beers et al, 1991) but the PINCER indicators (Avery et al, 2012 (a)) do count as a separate item because they differ substantially from the Beers indicators. The following section discusses the detail of the published literature according to the columns of the Excel spreadsheet used to gather the data, starting with a table to summarise the results (table 2). Description of the data variables for each column of spreadsheet can be seen in Appendix 4 but include, as examples of the complexity of this form; 13 types of community healthcare settings, 15 types of study design, 19 options for patient safety focus and a full description of aims/methods/data handling and analysis.

2.3.2 Results related to setting of research

The reviewers agreed on 13 possible healthcare settings or states within primary care, five which were combinations of two settings e.g. 'general practice AND pharmacy'. After face to face discussion, the reviewers managed to reach consensus on 99% (275/278) papers, largely by exploring the definition of the terms 'health system' and 'ambulatory care'. As can be seen in table 2 the commonest setting is, unsurprisingly, general practice. The second largest group of papers described the wider healthcare environment but were still relevant to general practice e.g. studies in more than one setting or studies describing the whole healthcare system. The interface of primary and secondary care was also found to be a focus for literature.

2.3.3 Results related to country of origin of research

A high level of concordance on country of data origin was found after data cleaning (96%, 251/262 papers). Where differences do exist they are attributable to the inclusion of 'more than one country' as a category which in retrospect was not a helpful classification. The US is the clear leader in production of published literature (41%, 108 papers) with the UK second (23%; RS 59/264, SC 62/262 papers). Other countries are not producing literature on the same scale as the US and UK (Spain and Australia each contribute 5% of the total).

Table 2 – Detail of main data categories within the literature review

Setting	**Number of papers (RS Total=280)**	**Number of papers (SC Total=278)**	**Mean percentage across both reviewers (of papers in the review)**
General practice	170	165	60
Health system	40	42	15
Exclude (purely secondary care)	16	16	6
Interface of primary and secondary care	13	13	5
Pharmacy	9	9	3
Country	**Number of papers (RS Total=264)**	**Number of papers (SC Total=262)**	**Mean percentage**
USA	108	108	41
UK	59	62	23
Spain	13	13	5
Australia	12	14	5
More than one country	13	6	4
Netherlands	9	10	4
Canada	9	8	3
Study type	**Number of papers (RS Total=264)**	**Number of papers (SC Total=262)**	**Mean percentage**
Mixed methods	68	65	25
Observational	39	40	15
Quantitative (medical record review)	32	33	12
Opinion/guideline	30	34	12
Consensus technique	26	25	10
Randomised Controlled Trial	19	16	7
Quantitative (database analysis)	18	16	6
Focus	**Number of papers (RS Total=189)**	**Number of papers (SC Total=182)**	**Mean percentage**
Prescribing	98	106	55
Adverse events (SEA, event reporting, harm description)	20	10	8
Safety climate/culture	15	15	8
Interface of primary and secondary care (admissions and discharges)	11	8	5
Generic error (pertaining to whole systems, involving multiple areas of patient safety)	7	12	5

Frequency by reviewer, of the most commonly ascribed categories of setting, country, study type and focus of patient safety. Grey highlighting shows the preponderance of prescribing focused studies and of US studies. Mean percentages are averaged across reviewers according to that reviewer's denominator.

2.3.4 Results related to toolkit outcomes

Due to the scoping question posed by the review the reviewers had to make a judgement about how useful output of the paper was after reading it fully, thus papers could still be excluded at this stage. There was interest not only in 'tools' explicitly described as 'tools' but also in criteria, indicators and conclusive findings which could be adapted into indicators and used in the planned RAND/UCLA process. This process of categorisation allowed us to determine which of the papers would be included in the final stage of the review (table 3). Improvement in agreement between reviewers in this highly subjective category was achieved after a face to face meeting of the reviewers, resulting in 76% final agreement (202/262 papers). Foreign language papers (n=6) with English abstracts were also excluded at this stage, the constraints of the project budget meant that further analysis could not be conducted on these papers.

Table 3 – Detail of the most common outcomes and their relation to usage in the Patient Safety Toolkit

Toolkit outcome	Number of papers (RS Total=264)	Number of papers (SC total=262)	Mean percentage
Not a toolkit; but indicators may be derived from the paper's findings	95	82	34
Indicators or RAND output	33	29	12
Toolkit (electronic)	22	29	10
Toolkit (paper/mixed)	15	17	6
Questionnaire	12	22	6

Frequency, by reviewer of the most common outcomes for the toolkit. Mean percentages are averaged across reviewers according to that reviewer's denominator.

2.3.5 Results by focus of patient safety

Analysis of the papers providing useful output from the literature review revealed five major themes or subject areas emerging from within the data (prescribing, adverse events, safety climate, interface with secondary care and patient role – see table 2). Some of these categories need no explanation (e.g. prescribing) but some are less obvious to non-experts in the field: 'Adverse Events', for instance, refers to errors and near misses. An example of a tool in this category is the National Reporting and Learning Service (NRLS) online reporting system for adverse events in the NHS. 'Safety climate' refers to the concept of team culture or practice environment with respect to patient safety and has been a focus of a number of self-scoring 'tools'. 'Patient role' literature encompasses a variety of strategies including education campaigns and questionnaires on patient safety.

'Focus of patient safety' contained 19 variables, including '>1 type' and 'unclear'. Considering this ambiguity, a reasonable final level of 78% (144/182 papers) concordance between reviewers was achieved after discussion of errors and disagreements. Apart from the five major themes all other categories of patient safety combined represented less than 16% of the literature (less than 5% of the total published literature each).

2.3.6 Results relating to final output of studies

The nature of the final output of selected studies was subjective and so required extensive discussions to reach consensus (table 4). The subtleties between reviewers' interpretation of 'indicators extracted' as opposed to 'indicators taken directly' from the paper was the main cause of pre discussion disagreement.

Table 4 – Detail of final output of studies included for full analysis

Final output	Number of papers (RS total=189)	Number of papers (SC total=182)	Mean percentage
Indicators extracted as part of review process	67	67	36
Indicators harvested as written in paper	38	36	20
Toolkit	33	33	18
Taxonomy/framework	15	15	8
No useful output after full analysis	11	10	6
Questionnaire for staff	10	8	5

Frequency, by reviewer of the most common final output for the toolkit. Mean percentages are averaged across reviewers according to that reviewer's denominator.

2.3.7 Quality assessment of various elements of the selected papers

The following elements of papers were assessed for quality: Aims, Methods, Sampling, Data Collection, Results and Strengths/Limitations. Due to the heterogeneity of the output of the review it was not possible to use an established rating score for assessing quality (these are mostly designed for Randomised Controlled Trials). I did attempt to construct a rating score based on the reporting and validity elements of an established scale (Downs and Black, 1998), taking each paper on its individual merits. The eight point scoring system created did not helpfully distinguish between papers due to a ceiling effect, most papers scored 7 or 8. The scoring system was abandoned in favour of the more general quality check incorporated into the data collection, the elements of which are described as follows. A clear description of aims was recorded in 98% of papers and agreement on this between reviewers was 97% (176/182 papers), >85% of papers had clear methods (83% agreement, 151/182 papers). The quality of the sampling process in the papers was assessed according to the standard accepted sample size and characteristics for the method detailed in the paper. Correctness of sampling caused more disagreement between reviewers (68% concordance, 123/182 papers) and was in rated appropriate in 74% (139/189) of papers by RS and in 78% (142/182) by SC. Rating concordances were over 80% for quality of data collection, results and strength/limitations (which were of high quality in 80-90% of cases.)

2.3.8 Limitations of the results

In addition to the 88 tools identified from published literature, 26 tools were identified in the grey literature. Written descriptions and discussions of the 114 toolkit items were produced by RS in the format of preparatory material for the two RAND panels (these multiple page booklets are too long for reproduction within the appendix of this thesis). Detailed descriptions of the indicators extracted from papers for inclusion in the two RAND consensus processes which took place within the NIHR SCPR Toolkit project are published (Bell et al, 2014 and Spencer et al, 2014). Tables 1-4 refer only to published literature. Grey literature was analysed only by RS due to time constraints on the other reviewer. Timescales for the toolkit project were tight; a summary of the review was required just 8 months after the original search was run. The literature search has not been updated since 2012 mainly due to the amount of time taken to conduct the original review, which was substantial. As this thesis demonstrates, the author has read widely in the subject area in the intervening years to stay abreast of current material.

2.4 Discussion of the results pertaining to individual areas of patient safety

Analysis of the main themes of the literature review revealed five major themes or subject areas emerging from within the data (prescribing, adverse events, safety climate, interface with secondary care and patient role). The evidence is summarised here in order of importance for the subsequent PhD work rather than by weight of literature; with a focus on interface issues and adverse events. Due to the constraints of thesis length, content on three main areas of the review has been excluded: safety climate, patient role and prescribing (unless related to medicines reconciliation). Other topics were also excluded: CDSS (Clinical Decision Support Software), practice risk assessments and diagnostic error (as they were less relevant to the ongoing PhD).

2.4.1 Primary/secondary care interface (including medicines reconciliation)

The admissions and discharge process has been identified as a crucial area for patient safety research in general practice – hence the focus of this PhD. Most papers discussing this issue are set in secondary care but an increasing body of literature arising from primary care was detected by this literature review. Thirteen papers were identified as primarily describing interface processes, mostly the discharge summary. Recurring themes included: quality of information, speed with which it arrives in general practice and method of delivery. A decision was made not to include the majority of the discharge summary literature captured by the review as it pertained mainly to US projects which have been superseded by electronic discharge summaries now common in most areas of the UK; much of this information is summarised in chapter three of a previous thesis from department in which I was working (Zedan, 2012).

Medication reconciliation, an essential part of the admission and discharge process. Material from the literature review which pertains to medication reconciliation is highly relevant to the rest of the PhD. The Institute for Healthcare Improvement (IHI) define medicines reconciliation as:

> "The process of creating the most accurate list possible of all medications a patient is taking — including drug name, dosage, frequency, and route — and comparing that list against the physician's admission, transfer, and/or discharge orders."

The IHI has a "goal of providing correct medications to the patient at all transition points". The literature review identified four tools to assist with medicines reconciliation – they are described here.

The NHS Education for Scotland (NES) team who collaborated on the RCGP Patient Safety Toolkit project have produced a range of audit measures to monitor the discharge process (HIS Ihub (a)) which were explored in the grey literature part of the review. The measures are 'bundled' together into topics to give patients optimum care, for example the medications reconciliation bundle (HIS Ihub (b)). One requirement of these measures is that GPs workflow their discharge summaries within two working days of receipt (a more demanding target than that set in the National Institute for health and Care Excellence (NICE) guidelines on medicines reconciliation, which allow one week (NICE, MOS, 2015)). Since the literature review was conducted, the NES team have produced results handling measures which are also pertinent to the discharge process.

A Swedish team failed to demonstrate that their tool to improve the quality of hospital discharge summaries made a significant difference to the risk of medication error (Bergkvist et al, 2009). However, the level of detail for patients and the use of lay language really made this tool stand out against the standard discharge summary.

The Partners Post-Discharge Medication Reconciliation Tool (Schnipper et al, 2011) is an IT tool for medicines reconciliation at discharge. The system can compare any two medication lists, classify medications and report differences. A one click button displays the old and new medications listings side by side organised by class, all differences are highlighted, there are options to add, modify or verify. Trials in Boston (US) showed 41% of eligible patient records had had the tool applied.

Another tool derived from the grey literature section of the review was the Medications Discrepancy Tool® (MDT, Care transitions program online).This tool is a checklist for reconciliation of medications at the point of discharge. It is designed to be used by the primary care team and was tested by GPs. Essentially it is a checklist of potential causes of and solutions to an identified difference in medications pre and post discharge, it does not contain any way of spotting the discrepancies in the first place, the assumption being that they are discovered during standard medication review.

2.4.2 Adverse events literature

This was the second largest theme of the literature review; it was the main theme in 19 papers. Adverse events are highly relevant to this PhD because I describe adverse events occurring following failures detected in retrospective record review (see section 3.2.3). In the literature review, error reporting systems and Significant Event Analysis were the predominate topics in this category. The adverse events literature is described in the four sections that follow: Significant Event Analyses (SEA), reporting systems, taxonomies of error and 'miscellaneous'. Vaccines and medicines reporting systems are not reported here as they have no bearing on the PhD. Root cause analysis (RCA) is not specifically considered as no papers were found discussing application in general practice which were not primarily about SEA. A separate review into RCA and Healthcare Failure Modes Effects Analysis (HFMEA) was conducted by RS in summer 2013 in order to investigate its usefulness as a potential method of collecting data for the further PhD study (the results were disappointing– see justification of methods section 3.3.1). Grey literature tools related to RCA, such as the National Patient Safety Agency's (NPSA) root cause analysis toolkit and incident decision tree (NHS improvement) were identified but none were specific to general practice.

2.4.2.1 Significant Event Analyses (SEA)

SEA has become a standard process in the UK and has been part of the Quality Outcomes Framework (QOF) since 2004 (Cox and Holden, 2007). A very brief summary of the extensive literature base is given here. A large scoping review of SEA in the NHS has been conducted (Woloshynowych et al, 2005) but none of the work described was specific to general practice. NHS Education for Scotland (NES) investigated common factors in unsatisfactory SEA reports in primary care (Bowie et al, 2005) and tested an 'ideal' SEA format culminating in creation of a tool for assessing the quality of SEAs which was included in the RCGP Patient Safety Toolkit (McKay et al, 2007). A later literature review by the NES team (Bowie, Pope and Lowe, 2008) concludes that evidence is lacking that SEA produces measureable impact in practices. Participants do, however, report unverifiable changes and express greater commitment to change and SEA does seem to work as a team building tool. It is conceivable that increased team cohesion could lead to improvements in safety culture at a practice that engages in SEA.

2.4.2.2 Error reporting

Error reporting databases are very relevant to this study and are a useful source to investigate medical error. However, they cannot be used to determine rates of error (see justification of methods section 3.3). A variety of different types of reporting systems have been used worldwide. The literature described in this section is that identified by the scoping review undertaken in 2011 and so does not include highly relevant, recent publications described in the introduction section of this thesis. UK reporting has largely focused on the National Reporting and Learning Service (NRLS). By 2009 over 3 million reports had been submitted to the NRLS, only a proportion of which had been fully analysed (Vincent, 2012). Historically, reporting levels from general practice have been very low, accounting for less than one per cent of the total reports submitted to the NRLS from September 2007 to October 2008 (NRLS online). The Welsh Assembly Government's Review, Agree, Implement, Demonstrate (RAID) program (Evans et al, 2007) undertook a project to improve incident reporting in primary care. The main actions agreed by the team were: to develop a simpler system and process for reporting incidents; to target key individuals who would be influential in ensuring implementation of a reporting system (e.g. GPs and practice managers); to produce clinical governance newsletters with regular updates of examples of lessons learnt; to raise awareness during practice development visits and clinical governance visits and to hold a workshop for staff. In Europe, two language-specific reporting systems were in operation: a web-based reporting system that receives incident reports from anonymous

German-speaking users (Hoffman et al, 2008) and a reporting system specific to general practice in the Netherlands (Zwart et al, 2011). In the US, reporting systems for primary care were restricted to small networks (Fernald et al, 2004) and consensus work on the essential features of GP reporting systems (Beasley, Escoto and Karsh, 2004).

2.4.2.3 – Taxonomies and error classification

Taxonomies are both developed from, and can be used to inform, error reporting systems. Reviewing and using taxonomies of primary care error was essential to creating data collection forms for this PhD study. The definitive literature on error taxonomies was produced by an Australian research team, based on the Threats to Australian Patient Safety studies (TAPS) series (Makeham, 2008 et al, 2008). The taxonomy was based on error reports from small numbers of non-randomly selected GPs in Australia, Canada, the Netherlands, New Zealand, the UK and the US. The taxonomy is broadly based on 2 categories; *process errors* (including: Errors in office administration, investigation/treatment/communication and payment errors and errors in workforce management) and *knowledge and skills errors* (including: diagnosis, treatment and execution of clinical tasks). At around the same time, a UK team were also attempting to develop a much more simple classification system for error from reporting systems (Rubin et al, 2003). The 6 domains identified were: prescriptions, communication, appointments, equipment, clinical care and 'other errors'. As a result of the literature review a taxonomy was developed for the RCGP Patient Safety Toolkit (Spencer and Campbell, 2014 web Appendix 4).

2.4.2.4 Retrospective and prospective analysis of errors

Most analysis of error is retrospective – as indeed is the quantitative method used in this PhD. Using retrospective personal reflection of GPs to understand causes of error has been reported (Fisseni, Pentzek and Abholz, 2007). This small group of GPs reported more diagnostic (54) than therapeutic errors (19). Common reasons cited for 'committing' the error were inadequate reasoning and diligence. Personal reflection resources were not used in the Patient Safety Toolkit but the principles gathered from this literature were used to inform interview schedules for our subsequent work. An attempt to prospectively identify error by asking 15 US GPs to complete reporting forms for consecutive patients found an error rate of 23.6% based on subsequent interviews (Elder, Meulen and Cassedy, 2004). As might be expected there was wide variability in inter-doctor reporting rates, most of the errors were administrative.

2.4.2.5 Trigger tool methodology

Trigger tools are a method of retrospectively detecting unreported adverse events by refining a sample of patient notes (using 'triggers') in order to detect where harms or errors have occurred. Triggers are healthcare events which may or may not be indicative of error (e.g. multiple primary care attendances by a patient in one week) and are highly relevant to the design of data extraction forms in the PhD. Grey literature is an important source of trigger tools, primarily the IHI website. Trigger tools have been used in US secondary care for a number of years and have been adapted for primary care use (IHI, online). In general, trigger tools are more time efficient when compared to classical audit and non-clinical practice staff can easily be trained to use them to extract data from patient records. Triggers can be electronic queries which can easily be fed into GP clinical record systems by untrained users, for example; 'find all INR readings >6'. Essentially this is a screening process to attempt to uncover small numbers of cases involving error, from a larger sample of patients whom the triggers identify to be at increased risk of error. There are no statistical measures in trigger tool analysis, most papers quote raw percentages of error in their results sections. There is, therefore, no objective 'number' that can be used to compare trigger tools and not all authors tested the reliability or specificity of their tool. During the early stages of the PhD the author spent some time using these tools in her clinical practice to see how they might help identify patients at risk. Using trigger tool methodology was essential to development of the author's techniques in retrospective record review that were used in the PhD (personal communication in form of training session with C. de Wet, 2013). The main primary care trigger measures are compared and contrasted in Appendix 6 and the development of the tools is described.

2.5 Broader discussion of the results of the literature review

2.5.1 Comparison to the findings of the AMA primary care patient safety report

The AMA clearly state in their report (Lorincz et al, 2011) that the number of reported interventions is low and that where they do exist the results have been contradictory and confusing. In contrast to the AMA report a substantial body of intervention literature (albeit often with contrasting findings) has been found by this review. There is a definite dominance of US literature in the AMA report but I have been able to demonstrate a more global perspective. The importance of medicines reconciliation is highlighted by both reviews. It is clear that international patient safety bodies have promoted this as a priority issue and are taking steps to reduce error in the primary-secondary care interface with respect to medications error primarily by target-setting in primary care. Indeed very similar conclusions have been made by both reviews in relation to all aspects of the primary-secondary care interface.

2.5.2 Use of the literature review output in RAND/UCLA processes of the toolkit project

Output from the literature review was used to inform and generate consensus statements and also as guidance information for panellists in two RAND processes at which the author was present. One RAND/UCLA process (Spencer et al, 2014) focussed entirely on prescribing indicators for general practice and utilised experts from the UK. The very specific aim was to add to the RCGP prescribing indicators which the team had previously developed (Avery et al, 2011). The second RAND was much broader (Bell, et al 2014). A panel of international experts was asked to consider the entire output of the literature review in a condensed format. The panel included representatives of the World Health Organisation (WHO) and the NPSA. The aim behind this process was to generate an idea of importance weighting for inclusion of various tools or types of patient safety within the toolkit. As a result of the process I helped develop a tool 'the concise safe systems checklist for general practice' (RCGP Patient Safety Toolkit online, see also appendix 19). This checklist addresses specific areas of the literature where tools were found to be lacking (including requirement for reviewing 'vulnerable' patients within a month of hospital discharge). In 2015 the NHS Education for Scotland (NES) team produced a different prototype safety checklist for general practice which is also included on the RCGP patient safety toolkit website (Bowie et al 2015). This exhaustive checklist was developed using mini-Delphi techniques and contains 78 items in comparison with just 9 on my concise checklist. The NES checklist has a different remit and was not based on my literature review.

2.5.3 Impact of the literature review on the thesis

The literature review has given the author a very good grounding in patient safety literature. By conducting a literature review with such a broad scope I have been able to read more widely than would usually be allowed within the constraints of a thesis literature review. This has enabled me to place the ensuing work about discharge processes in a wider context of patient safety in general practice. Much of the content of the review was also highly relevant to the interface of primary care as described in the results section of this chapter. Conducting grey literature searches according to the recommendations of the patient safety toolkit project advisory group opened more resources of which the author and her immediate research contacts would not otherwise have been aware.

Chapter 3 Quantitative methods and overall study design

3.1 Introduction to the methods

This PhD has two main aims:

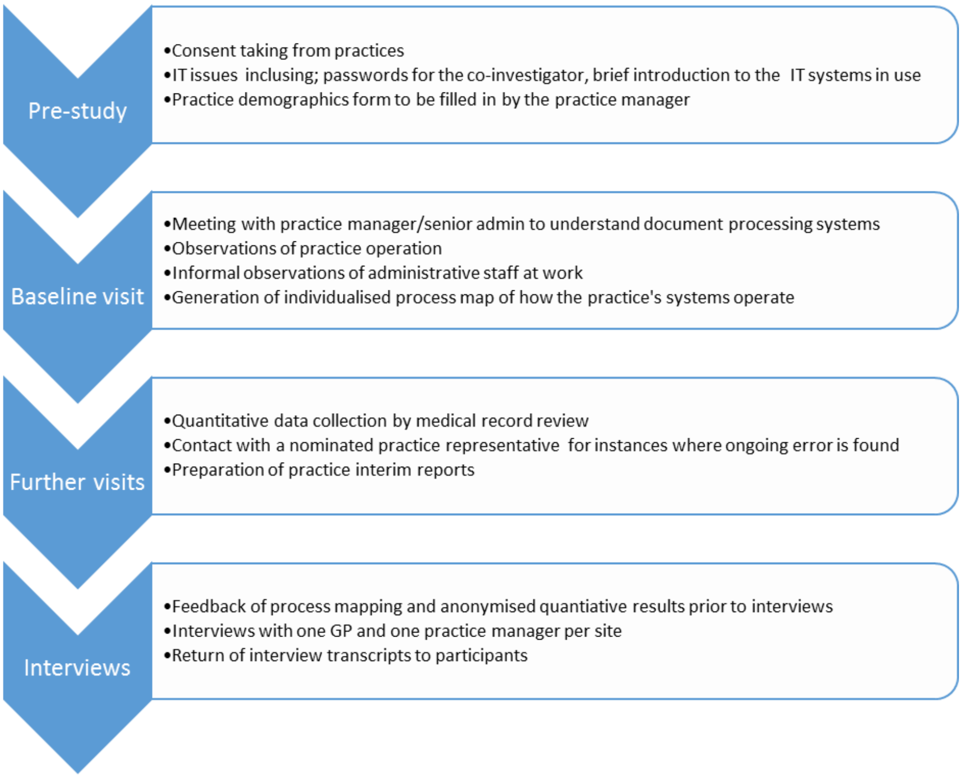
1. To investigate failures in processing actions requested in hospital discharge summaries and sequelae for patients.
2. To explore staff perceptions of the factors associated with failure to respond to actions requested in discharge summaries and what practices do to mitigate this.

This PhD study is a mixed methods study which has collected both quantitative (aim 1) and qualitative (aim 2) information in relation to the processing of discharge summaries by GP practices. A decision was taken to divide the methods section into two chapters: chapter 3 (which focuses on quantitative methods) and chapter 4 (which describes the qualitative methods). The quantitative methods are described first as this research activity took place prior to interviewing. The quantitative aim is addressed by the following objectives:

1. Estimate quantitatively the rate of failures in processing actions requested in discharge summaries (see primary outcome below)
2. Determine which factors are associated with failure to process actions requested in discharge summaries (see secondary outcomes below)
3. Estimate quantitatively the rate of harm ensuing from failures to process actions requested in discharge summaries (see secondary outcomes below)
4. Grade the severity and preventability of harms ensuing from failures in order to determine the effect on patients

In order to set up the quantitative work, a period of field work and observation was required in each practice which took place first at each site (see figure 3 – study regimen). An initial meeting with the practice manager and/or senior administrative personnel was held in order to understand the surgery systems and processes for document management.

Figure 3 – Study regimen flowchart



.

3.2 Quantitative methods

3.2.1 Introduction to quantitative methods

This study used retrospective Electronic Healthcare Record (EHR) review by one GP researcher (RS) to extract data (including manual reading of the free text of consultations and documents). Data pertaining to failures in the processing of discharge summaries in general practice and associated harms were collected. This section begins with a description of the study outcomes and data collection points. These are followed by justification of the methods used. Pilot work and the changes to the methods are described in section 3.4. General considerations such as the ethical principles, sampling and statistical approach are discussed next. The final study design is described last in this section (3.9).

3.2.2 Primary outcome

The primary outcome was the rate of non-compliance with the instructions in the discharge summary in the 90 days following receipt of the summary. The numerator was the number of discharge summaries where one or more requested actions had *not* been completed in accordance with directions contained within the discharge summary (unless there was documentary evidence in the GP record to explain why requested actions had not been completed). The denominator was the total number of discharge summaries with directions requiring at least one action. Using this definition of the denominator it follows that only those discharge summaries where an action is required are of interest in the primary outcome.

3.2.3 Secondary outcomes

Data were also collected on aspects of discharge summary processing which may highlight associations with better or worse management by general practice at the interface between primary and secondary care. The following data were collected to enhance the analysis of the errors detected and to place them in context (the rationale behind collecting these data is described in Appendix 7 and in many cases stems from the evidence collated from the literature review conducted for this study):

- Basic demographic information on the patient: age, sex and diagnosis; information about their admission: duration of hospital stay; hospital of origin of the summary; type of admission; main diagnosis on admission and dates of stay. Further information was collected from the GP record as to whether the patient made/ was made contact with following the discharge and by whom.
- Speed of discharge summary processing – the time taken by both administrative and clinical staff to handle the discharge summaries and fulfil their roles in relation to handing on the summary to the person at the next stage of the chain or prior to final filing. In order to standardise this data it was measured in whole working days (not including weekends or bank holidays) rather than 'working hours' which may have generated confusion.

- Medicines reconciliation process – the following data concerning repeat medications were collected: presence/absence of medicines reconciliation and medicines review; evidence of discussion of the reconciliation with patients/carers or not; failure to add new repeat medicines; failure to stop old repeat medicines; failure to make dose changes and whether success or failure with stopping/starting/dose adjusting repeat medications has any relation to the presence within the discharge summary of the hospital's reasoning behind the decision to make these changes.
- Information on follow-up appointments and tests ('other actions') – including documented reasons why these may not have been organised as requested (or required) by the discharge summary. Where this involves tests, the data include breakdown of the detail of whether tests were completed as ordered and whether appropriate action was taken on results obtained.
- Information on 'harms' – where it became apparent that harm had occurred as a result of less than ideal discharge summary processing, an additional data collection form was be used to describe this harm. Consideration was given to multi-factorial harms where the error was just one possible cause of the event (e.g. a fall after failing to discontinue anti-hypertensives).

A set of 'business rules' was created in order to standardise the approach to the collection of quantitative data (see Appendix 8). With only one researcher collecting data these rules were easy to apply consistently.

3.3 Justification of the quantitative methods

This section describes the reasoning behind the chosen methods and details why other methods were not appropriate. The advantages and limitations of the chosen methods are discussed.

3.3.1 Other quantitative methods

Alternative quantitative data sources were not suitable to the project aims as described here.

3.3.1.1 Databases

Using databases such as the Clinical Practice Research Datalink (CPRD) to obtain data for this study was considered but the richness of data required for full analysis could not be achieved from this source. In particular it is very hard to judge whether error or harm have occurred using Read coded items as codes relating to error are rarely used in normal clinical practice – most studies use subsidiary outcomes such as codes for injury and poisoning (Tsang et al, 2013). Medical error reporting databases do have the advantage that errors and associated harms are clearly reported together but they cannot be used to calculate rates of error due to the non-compulsory nature of these systems. Unfortunately studies using the NRLS database also show that two thirds of reports are not of sufficient quality to fully determine the causes of error or harm (Carson-Stevens, 2016). Nor would I have had the ability to link the qualitative data to quantitative data had I used database methods.

3.3.1.2 Natural data

Data available on the internet from online forums on patient experienced error was not considered appropriate to the research objectives due to the high level of bias in this type of data and the inability to calculate rates from it.

3.3.1.3 Medical indemnity data

There are difficulties accessing this type of data in full from the indemnity organisations, published reports are lacking in the level of detail required to meet the study aims. A significant bias is also involved as these reports all involve known cases of harm where legal action has been taken. It is unlikely that there would be enough reports related to the topic of this study from which to draw meaningful conclusions.

3.3.1.4 Healthcare Failure Modes Effects Analysis

Given the lack of description of information flow systems in UK general practice, one of the aims of this doctorate was to understand, from staff who work in the systems themselves, how and why systems work well or fail. Allowing staff to describe maps of their own systems is a standardised technique in Healthcare Failure Modes Effects Analysis (HFMEA). Combining this approach with traditional qualitative interviewing techniques to place the results in context was considered. After reviewing the literature on HFMEA, it was found to be a technique rarely used in primary care, likely due to a number of significant drawbacks. Firstly the Joint Commission on Accreditation of Healthcare Organisations (JCAHO) guidelines on HFMEA require a team of 6-10 members of the multi-disciplinary team to meet face to face, this is costly and impractical in general practice – requiring a practice to close its door to patients. Secondly, substantial time-investment, up to 96 hours, is required per FMEA (Franklin, Schebel and Barber, 2012, Habraken et al, 2009). There were not sufficient resources within this study to undertake such time and staff- intensive analyses. A common failing of HFMEA cycles in secondary care has been to look at too many processes at once, or look at too complex a system. Information flow in general practice, even when just related to discharge summaries, is complex. On the basis of this literature and considering the multiple methods already used in the thesis it was decided not to pursue HFMEA methods.

3.3.2 Advantages and limitations of mixed methods

It is possible to study a topic by conducting separate projects to investigate a quantitative and a qualitative angle as self-contained entities. This separated approach risks the conclusions of the two projects having less relevance to each other or being at odds with each other. I set out in this PhD to conduct a piece of work which involved a true integration of qualitative and quantitative methods, a 'mixed methods' study. Defining 'mixed methods' is challenging, in an attempt to produce an all-encompassing definition one paper (Johnson et al, 2007) reviewed 19 definitions of the term to come to the following conclusion:

> "Mixed methods research…combines elements of qualitative and quantitative research approaches…for the broad purposes of breadth and depth of understanding and corroboration"

My study uses the practice sites as systems in which to conduct a holistic investigation. The quantitative data could not first be collected without a period of observational field work and the qualitative data were framed around the practice reports which contained quantitative results. This demonstrates 'mixing' at the data collection and data analysis stages as described in Johnson et al 2007.

According to best principles for mixed methods research, triangulation of findings was anticipated by using complementary methods (Becker et al, 2012). Gaining insights from observing staff at work in the practice study sites enabled the researcher to develop process maps specific to each surgery. These maps were used to inform interviews with staff as were the findings from the quantitative data collection, in the form of a practice report. To satisfy 'completeness' the loopholes of one method might be closed by the others. For example, one limitation of the quantitative data was that it might be difficult to establish what might be problematic with a practice's systems with the limited sample of 30 records. In presenting the same quantitative findings to an individual working in that system though, one might uncover problems. The interviews were also designed to illustrate the quantitative findings, for example does a practice with shorter processing times operate any special system for dealing with discharge summaries.

3.4 Quantitative pilot work

3.4.1 Initial quantitative pilot – autumn 2013

Exploratory pilot work was conducted prior to defining the primary outcome of the study. Data were collected in two surgeries in two different regions of England; they are not identified here due to confidentiality reasons. The practice sites both serve suburban populations, practice one (around 12,000 patients) and practice two (around 6000 patients). Both surgeries used *Docman* embedded within *EMIS*. At practice one, an informal field-note taking process, coupled with data collection on efficiency of processing from the audit trail feature of the electronic document management system, revealed that administrative staff were incorrectly filing discharge summaries so that they did not reach the inboxes of GPs and this problem was rectified immediately with subsequent demonstrable impact on patient safety. Clinical staff were very unsure of their IT systems having only very recently migrated to *Docman* (1 month prior to the period audited) and so had yet to establish processes. For this reason further data were collected here in 2015 and recent *Docman* migration was set as an exclusion criteria in the main study. At practice two, informal interviewing of staff revealed a 'safe' but somewhat inefficient system of document management (with some duplicate processes). IT and administrative training issues were highlighted by staff at both sites. These early experiences allowed the author to practice the skills of field note taking and producing process maps.

Quantitative data were collected on around 30 patients at each site in 2013. The denominator was the number of summaries at each site requesting action(s). The rate of summaries in which there were failures to undertake requested actions was found to be 47% at both practices (9/19 at practice 1 and 8/17 at practice two). A breakdown of other results (secondary outcomes) can be seen in table 5. I identified 10 discharge summaries which never reached the GP at practice one. In total eight medication related failures were found including: failure to stop anti-hypertensives and continuing to prescribe potentially dangerous medications. At practice one, the failures in completing tests placed patients at potential harm of missed Acute Kidney Injury (AKI), heart failure and anaemia. There were four instances of actual harm detected in the pilot which were mainly attributable to failure to process the discharge summary:

- respiratory tract infection where a follow-up chest x-ray was missed

- a fall following failure to stop anti-hypertensives
- renal impairment following failure to stop anti-hypertensives
- admission with constipation following failure to stop amlodipine

Table 5 – Primary and secondary outcomes in the 2013 pilot – comparison of two practice sites

2013 pilot data	Practice 1 *n*=30*		Practice 2 *n*=26	
	Number	Percentage	Number	Percentage
Follow-up tests requested	9	NA	5	NA
Follow-up tests not completed	8/9	89%	1/5	20%
Follow-up appointment requested	4	NA	3	NA
Follow-up appointment not arranged	0/4	0%	1/3	33%
'Other' request made of GP	10	NA	7	NA
'Other' request not actioned	2/10	20%	2/7	28%
Discharge summary work-flowed within 2 working days	7/20**	35%**	9/26	35%
Mean time to workflow (working days)	6.6**	NA	3	NA
Maximum time to workflow (working days)	30**	NA	19	NA
Discharge summaries requiring medication reconciliation	22/30	73%	15/26	58%
Medication reconciliation not achieved where indicated	8/22	36%	2/15	13%
Medication reconciliation occurring in <2 working days from receipt	6/14	43%	9/13	69%
Documentation of the medicines reconciliation	11/14	79%	12/13	92%
Communication of meds reconciliation to patient or carers	6/14	43%	8/13	61%
Discharge summaries with conflicting information	8/30	27%	5/26	19%
Discharge summaries containing at least one request for action	19/30	63%	17/26	65%
PRIMARY OUTCOME Overall failure rate	9/19	47%	8/17	47%
Cases where harm occurred	1/19	5%	3/17	18%

30 summaries at practice 1 include 10 discharge summaries which were not work-flowed to GPs. only 20 records had workflow data available for study.*

3.4.2 Repeat quantitative pilot at practice one – summer 2015

This repeat pilot was conducted to see if there were any substantial differences in the error or harm rates once Electronic Document Management Systems (EDMS) had been thoroughly embedded at the practice. Significant issues around protocols for mail handling and staff training were still present. A new system of Read coding discharge summaries had been adopted and 18 patients were found who matched the inclusion criteria for the study. Processing speeds were slightly longer (8 working days on average) but all except one discharge summary were successfully work-flowed to doctors. Unfortunately the practice performed rather worse on a number of the outcomes related to medication reconciliation and arranging tests and follow-up. Four attributable harms were detected:

- Failure to follow-up abnormal Urea and Electrolytes (U+E) with subsequent decline in condition eventually leading to death at home (a 'best interests' decision may have been taken but was not documented).
- Failure to test vitamin D level or prescribe calcium or vitamin D following hip fracture.
- Failure to refer to memory clinic; a violent incident involving the patient and others followed.
- Failure to monitor INR, followed by readmission with anaemia and high INR.

The ability of the method to detect harm and error was demonstrated by this repeat testing and the enhanced data collection made possible by paper forms allowed the practice to use the data as a stepping off point for SEA and further audit.

3.4.3 Changes to the method as a result of the pilots

The complexity of the data is better captured within a paper form rather than an electronic spreadsheet and prototype paper forms were used in the 2015 pilot. Additional demographic information on hospital of origin and on follow-up contacts with the practice was collected in the main study as this information was found essential for further work conducted by practice one after the pilot. Exclusion criteria were developed from this pilot work (e.g. using only emergency admission discharge summaries and the requirement for practices to have at least two years of EDMS). Experience from the pilot lead us to remove summaries without any requested actions from the denominator in the definition of the primary outcome.

3.5 Sample size and justification

The study statistician, Simon Spencer (assistant professor in statistics at Warwick University) assisted with sample size calculations. Sample size calculations are based on the primary outcome (rate of non-compliance with the instructions in the discharge summary) in the 2013 pilot (47%). Using the normal approximation to the binomial distribution the sample size was calculated to ensure 90% confidence that the estimated proportion would be within 5% of the true proportion (Fleiss et al, 2003). This resulted in a total of 269 patient records required to be in the denominator. A sample size of 300 discharge summaries in total gives a 90% chance of obtaining an estimate within 4.73 percentage points, if 47% is the true proportion. Irrespective of the true proportion, a sample size of 300 gives at least a 93.5% chance of being within 5 percentage points of the true proportion. This study was not designed to comment on the significance of practice variables, which would require a much larger sample size.

3.6 Ethical considerations

A self-contained ethics application was made for this study with NHS Research and Development (15/WM/0442) and the Confidentiality Advisory Group (16/CAG/0007). There were two key ethical issues in this study. The first was patient consent. Access to EHR data without individual patient consent was necessary because the study is principally a study of error prevalence and it was essential to have access to an unbiased sample of clinical records. Obtaining individual patient consent was also impractical due to the large number of records required (300). Indeed previous attempts to gain individual patient consent for similar studies within our department have struggled to achieve a 25% response rate. The author was further able to justify accessing records without patient consent due to her role as an academic GP, undertaking similar clinical record reviews in general practices as part of normal work activities as a GP in the NHS. Live access to the EHR of study patients was required due to the complexity of the research objectives (downloading the medical record into a word processing programme was not practical due to the very large amount of redaction time required of practice staff). Quantitative data were also obtained from the records of patients who are considered to be 'vulnerable' (the frail elderly with co-morbidities and often dementia). These patients cannot be excluded without introducing significant bias into the study as they may be significantly more at risk of error and harm from incomplete discharge summary processing, another reason why individual patient consent was not sought. Practices were asked to identify local Read codes for patients who do not wish to have their EHR included in research and these patients were excluded.

The second ethical issue was that of instances of ongoing error, potential harm or actual harm which might be uncovered by the study. A lead contact was nominated at each practice to deal with instances where patients were felt to be at risk of harm if an error was allowed to perpetuate. This involved a gradated urgency scale and the method of contact was chosen by the practice (often in the form of electronic 'tasks' on the computer system) similar to the approach used in the GMC Practice study (Avery et al, 2012 (b)) Practices and interview participants were consented separately by the author after reading participant information (Appendix 9).

3.7 Final study design

3.7.1 Configuration, duration and participation

The study was a retrospective cohort using retrospective record review. This study was performed in three geographical locations: Coventry, Nottingham and Manchester. Manchester and Nottingham were chosen due to links with the academic departments in these two cities. Connections with the NIHR Clinical Research Network (CRN) in these areas were developed during the Patient Safety Toolkit project. The author lives and practices as a GP in the Coventry area. Data collection took place over one year (from May 2016 to May 2017). The author was present for approximately four days at each site.

3.7.2 Recruitment

The study was adopted on the NIHR portfolio (CPMS ID 20632) which was important to practice recruitment. Nottingham and Coventry practices were sent an expression of interest email from the local CRNs in those areas. In Manchester the CRN was not directly involved because two practices who were in direct contact with the external PhD supervisor volunteered to participate.

3.7.3 Inclusion criteria with rationale

Practices:

- Had an electronic health record with integrated electronic document management system which had been in use for at least two years at the time of data collection for the study.

Patient records for quantitative data collection:

- Age – 75 years and older
- One or more discharge summaries – from an emergency hospital admission episode not longer than 15 months and not less than 3 months prior to data collection in the practice.

The experiences of the pilot described in section 3.4.3 led the author to conduct the research in practices where the document management systems were stable and embedded. The rationale for the sampling window is described more fully in Appendix 8.

3.7.4 Exclusion criteria with rationale

Patient records for quantitative data collection:

- Patients without three months of GP record data following discharge
- Discharge summaries from elective hospital admissions

- Patients who have declined to have their medical records used as part of any study

Based on the experience of the pilot, summaries following minor surgical admissions often make no requests of the GP and rarely contained a full medications listing for reconciliation. Patients deceased or de-registered less than three months after discharge (and those who die during the hospital admission episode) were excluded. These patients were excluded because of inadequate time interval for follow-up after discharge. Patients who registered with a new GP after discharge were not excluded. Many of the patients in the pilot sample had been discharged from hospital to residential/nursing homes and changed GP in the process. Excluding such patients would have missed a vulnerable group who might be at increased risk of harm.

3.7.5 Study regimen

The study was conducted according to an activity flow at each site (figure 3). A practice demographics form was given to the practice manager to fill out prior to site visits (Appendix 10). Practices were asked if there were any local Read codes they used to identify discharge summaries within the electronic record to assist with generating the sample of medical records for review. Based on the experience of the pilot, it was not possible to undertake the medical record review satisfactorily without first completing the observational phase of the baseline visit. As each practice had a slightly different document handling system in place the author needed to 'learn' that system to understand how to collect the data. This was achieved via a combined observational/training ('on-the-job') approach, similar to induction of a new member of staff. This seemed to fit in well around the day to day running of the practice as long as the relevant members of senior administrative staff were present on the day of the baseline visit. Field notes were taken during this process to assist with the drawing up of a process map for the practice (example in practice interim report - Appendix 11). Administrative staff were made aware by the practice manager, prior to the study that this process would take place and were reminded again at the beginning of the observation period. Written consent was not sought from these members of staff as they were not quoted or interviewed formally. Quantitative data were collected over approximately two days at each practice. Individualised practice interim reports were then created with a summary of the practice's quantitative data (Appendix 11). Qualitative interviews followed (see chapter 4).

3.7.6 Sampling

The sampling strategy for the study was driven by the mixed methods purpose and was a mixture of purposive (maximum variation) and convenience sampling. The aim was certainly not to sample practices at random as this would have reduced the transferability of the results. Volunteer practices were sampled purposively to include a reasonable spread of practice characteristics. Three broad categories of list size were included (small, medium and large). Two of the main three clinical IT systems in use in the UK were included (a practice using *Vision* could not be found in any of the three geographical areas). Not all practices had training status. The CRNs were aware of these requirements and expressions of interest emails were sent to those practices which best fitted the study requirements. I was only able to recruit practices that were interested in taking part in the study (which did not involve any financial incentives for the practice). I was initially generally accepting of practices who volunteered, having anticipated difficulties with recruitment which never materialised. I also did not wish to decline those who wanted to take part and this lead to an increased number of practices in the Nottingham cohort (six) because they recruited first. The Coventry and Manchester practices were also chosen subsequently because they fulfilled requirements for list size and different clinical IT systems as compared with the Nottingham practices already recruited. 30 patient records were analysed at each practice site. These patients were chosen using random number generation from the sample of patients found using the search strategy. In smaller practices, this meant that almost the entire search population was included in the study.

3.8 Quantitative data handling

A data management plan was submitted as part of the study protocol and approved by the ethics committee. All data were collected on paper forms (Appendix 12) and entered into the *Microsoft Excel* study database by the author. Standard techniques for data cleaning were applied, for example ensuring factor variables were coded consistently throughout and ensuring processing times were all non-negative. The spreadsheet consisted of seven data sheets: practice demographics, details of the discharge summary, medicines reconciliation, individual medicines changes, tests, follow-up and harm. These corresponded to the secondary outcomes (section 3.1.). The database was imported into the statistical programming language 'R' (R core team, 2016) with the assistance of the study statistician (SS).

3.9 Statistical methods

All analyses were conducted by the author using the statistical programming language '*R*' (R core team, 2016). After generating simple descriptive statistics, univariate and multivariate logistic regression models were used to test associations in the outcome variables. Multivariate models were constructed including all variables found to have a p-value of ≤ 0.15 in the univariate modelling. Otherwise the significance level was set at $p<0.05$. Logistic regression models have been extensively defined in standard statistical texts (Cox 1958, Freedman 2009). The Wald test was used to identify whether or not single coefficients were equal to zero and the likelihood ratio test (ANalysis Of VAriance - ANOVA) was used for groups of coefficients, such as identifying when a factor with several levels (i.e. a discrete variable with more than two possibilities) influenced the outcome variable. For example, the hospital to which the patient was admitted may affect the rate of failure.

Five outcome variables were considered in separate models (overall failure to complete actions, failure to change medications, failure to complete tests, failure to complete follow-up and harm). A decision was taken not to model results related to the presence or absence of a medicines reconciliation 'event' or whether that medicines reconciliation had been discussed with patients. This was because, on reflection, these data points lacked robustness in their method of data collection. I relied on the presence of documentation within the clinical record of events which may not routinely be recorded by practitioners. For example it is possible to reconcile medications without making any changes or entering a consult note. When modelling failures involving medicines changes, tests and follow-up, the modelling was based on individual actions rather than the patients affected. CQC rating was converted to a numeric scale for all analyses (1=outstanding, 2= good, 3= requires improvement). This is notwithstanding the implications of a 'requires improvement' rating which may indicate substantially different practice characteristics to both 'good' and 'outstanding' practices who have reached a certain standard.

3.10 Summary of quantitative methods

The first main aim of the study (to investigate failures in processing actions requested in hospital discharge summaries and sequelae for patients) was investigated using retrospective record review. The study design was tested by pilot studies. The study population was emergency admissions for patients aged ≥75 years, drawn from 10 general practices in three areas of England. One General Practitioner (GP) researcher reviewed the records for 30 patients at each of 10 practices (n=300) after hospital discharge to determine the rate of adherence to the actions requested in the discharge summary and to estimate the rate of associated harm from non-adherence. Modelling was used to determine which factors might be associated with failures and harm. Data were also collected on time taken to process discharge communications. The results of the quantitative part of the study are presented in chapter 5.

Chapter 4 - Qualitative methods

4.1 Introduction to the qualitative methods

This chapter describes the methods used to address main aim 2:

> To explore staff perceptions of the factors associated with failure to respond to actions requested in discharge summaries and what practices do to mitigate this.

The chapter has been constructed according to COREQ (Tong et al, 2007) and SRQR (O'Brien et al, 2014) checklists for improving the quality of qualitative research. Main aim 2 is addressed by the following objectives:

1. Exploring practice's administrative and clinical processing systems in relation to discharge summaries
2. Using the field work in objective 1 to construct practice-specific process maps
3. Using data from aim 1 (objectives 2 and 3) to produce individual practice reports
4. Discussing these reports and process maps with general practice staff in an interview setting
5. Allowing general practice staff to describe existing strategies for safety improvement and generate new strategies within the interview

Conducting this qualitative research alongside the quantitative data collection gave further insights into the variability of how discharge summaries are managed, placing in context the quantitative findings and determining strengths and weaknesses of the practices' systems for processing discharge summaries.

4.2 Methods for achieving qualitative objectives

The methods used in this study cannot be described as ethnographic because they do not involve the level or length of immersion at the practice sites which would usually be required for ethnography. A better description of the theoretical basis for the work is a mixture of observational and interviewing methods. The information flow systems of 10 practices with varying characteristics (size, location, computer system and training status) were scrutinised in detail using a case study approach. Case studies can fit within an observational methodology by providing a 'variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood' (Baxter and Jack, 2008). Using case study methodology is particularly appropriate for main aim 2 because it contains how and why questions in which the context and phenomenon boundaries are blurred (Yin, 2003). The initial analysis of practices' information flow systems was approached using observational methodologies to understand each team member's role in relation to information flow. I sat with senior practice receptionists and administrative team members while they were conducting their scanning and filing work with discharge summaries, asking questions to understand the systems in use. Staff were encouraged to describe fail-safes and potential loop-holes with their current systems. The subsequent field notes were used to map the systems of the practices using flow diagrams adapted from HFMEA techniques (Colligan et al., 2010). Semi-structured interviews with senior GPs and Practice Managers (PMs) at each of the 10 sites (n=20) were conducted to explore staff perspectives on discharge summary handling and on the process map which was presented to them prior to the interview. The aim of giving the process map to interviewees was to capture safety-netting strategies (aimed at filling information flow system loopholes) which might identify potential promising interventions.

4.2.1 Description of data collection environment

The author (who conducted all of the interviews) is a 35 year old, female academic GP with 3 years' GP experience post CCT. The author knew the

interviewees at one of the practices (not revealed to maintain practice confidentiality) having undertaken some of her GP training there 8 years previously. Another of the GPs was known to the author through previous research although they had not worked closely on any projects. The majority of practice managers (PMs) had met with the author on at least one occasion during the study; by contrast, only a minority of GPs met the author prior to the interview and then only briefly. On rare occasions other practice administrative staff were present in the room during the interviews (APM12, PM18). Interviews were all undertaken at GP practice sites; GPs were mostly interviewed in their clinical rooms and PMs in their offices.
My motivations for undertaking this work are described in the introduction (section 1.4) and stem in part from the problems identified in the author's own practice. The author was not working as a GP in any of the main study participant practices at the time of data collection. Practices were sometimes aware of the motivations for undertaking the study if this was disclosed in informal chatter but it did not form part of the official study paperwork.

4.2.2 Description of the participants

Interviewees were defined by the study protocol to be one senior GP and one senior manager from each practice. They were recruited at the initial practice visit. Ensuring two interviewees at each surgery site reduced the polarity of opinion at any one surgery. Most GPs interviewed were the research lead for their practice. Some Practice Managers (PMs) nominated their Assistant Practice Managers (APMs) to take part in the interview (practices 11,12,14 and 19).

4.2.3 Description of the data collection process

Interviewees were given a brief description of the study prior to commencing the audio-recording of the interview. Questions were asked according to a semi-structured interview guide which was approved by the research ethics committee. This guide was updated with input from the supervisory team from interview to interview (Appendix 13); this iterative process mitigated the need for pilot testing. Hand written field notes were taken during the interview. Interviewees were asked to set aside an hour for the interview. Transcripts were edited to remove reference to named members of staff and were returned to participants by email for checking.

4.2.4 Justification of the qualitative methods

This study uses elements of different epistemologies to achieve the objectives set for main aim 2. Elements of grounded theory are at work in this study but this work is not a pure grounded theory piece. Grounded theory is inductive rather than deductive and relies on the generation of data to evolve codes, concepts and finally categories (Silverman, 2016). Entirely allowing free idea generation in interviews may have fitted the study objectives but there were both time and resource constraints which made this impractical. Neither did the researcher's nor the supervisory team's expertise lie in grounded theory. Instead a thematic analysis was conducted, which follows six phases (familiarisation, coding, searching for themes, theme review, theme definition and finally report production) (Braun and Clark, 2006). I also used some principles from framework analysis but did not want my interview schedule or a-priori ideas to form the sole basis for my analysis. Framework analysis is similar to grounded theory but is more useful for specific questions posed in a pre-determined sample where there are some a-priori issues identified (Ritchie and Spencer, 1994). This type of approach is often used in mixed-methods healthcare research (Gale, 2013). Whilst reviewing recent literature from my research group (published after this study was conducted) strong structuration theory (SST) was revealed to the author (Jeffries et al, 2017). Structuration theory was originally developed to describe how structure and agency are interrelated (Giddens, 1991) and SST (Stones, 2005) has a more developed sense of the impact of time and place on social processes. SST is an intuitive way of looking at complex healthcare systems and would have been ideal for understanding the contextual background to the strategies for safety improvement content of the interviews. Elements of the internal and external structures described in the SST model (Greenhalgh and Stones, 2010) certainly occurred organically within the framework developed for this study.

The author purposefully strove to avoid using techniques such as template analysis which is the development of a coding template based on themes identified as important by the researcher which are organised into hierarchies (King, 2012). I did not feel this analysis technique was appropriate partly due to the paucity of literature related to discharge summary processing in general practice and partly because I wanted to preserve the authenticity of participants' views. A more pragmatic approach was taken which follows the principles of framework analysis and thematic analysis as described above.

4.3 Qualitative data analysis

4.3.1 Data management

Transcription was provided by Claire Poxon (who has provided high quality transcription for other departmental projects). The transcripts were read iteratively by the author whilst listening to the audio recording, following best practices for framework analysis (Gale 2013). Margin notes were added at this initial reading where particularly strong views were expressed by participants (as per the worked example provided in Gale, 2013). At the same time, errors in transcription were corrected (and staff named in the recordings were anonymised). Transcripts were uploaded to NVIVO for management whilst analyses occurred.

4.3.2 Data analysis

4.3.2.1 Framework development

Themes were identified by the author after familiarisation with the data and a framework for analysis emerged. It is important to acknowledge that all semi-structured interviews have an inherent framework but the author tried to be as open as possible to new ideas according to standard principles for interviewing (Ritchie et al., 1994). The framework was developed in an iterative process by coding a small number of specifically selected interviews at a time (four) and then reviewing coding stripes and matrix coding queries to see the balance of content before proceeding to the next batch of four interviews (according to best practice principles in Gale et al., 2013). A code book (Appendix 15) was developed and was discussed extensively with the supervisory team and with an in-house qualitative researcher (Ndeshi Salema, NS). Unfortunately resources did not permit multiple reviewers to read full interview texts so an excerpt system was used to verify the code book. The author extracted 40 stand-alone quotes which made sense in isolation from the rest of the transcript. This was done across the full range of themes and sources. The randomised excerpts were presented in advance to two reviewers (NS and Sarah Rodgers – second supervisor) along with the code book. The reviewing team met to discuss their memos on themes and their independent coding. Agreement to theme occurred across most items discussed. Exceptions were where non-GP reviewers had found difficulty with understanding the full clinical meaning of the excerpts in isolation. For example: content related to 'task' systems was coded to strategies to improve information technology because 'tasks' are almost always sent electronically in general practice. Disagreement occurred at a subtheme level on occasion, mainly where the author herself had been undecided or indeed had 'coded-on' items at two subthemes. Inter-rater reliability testing is not usually considered appropriate for qualitative data and having 27 subthemes in total would also have created too much variety to derive meaningful results. Consideration was given to where the medicines reconciliation theme fitted into the overall narrative and decided it was an essential part of the schema and did occur at the correct place in the overall description of document flow. The importance of the 'impacts of the project' sub-theme within 'strategies for safety improvement' was agreed by all.

4.3.2.2 Further analyses and reflection

The number of interviews (20) and their complexity/length warranted the use of a qualitative data package (*Nvivo)*. Data were uploaded and codes were applied to selected text manually within *Nvivo* by the author. These data were then analysed against the framework by the author in order to produce written findings (with illustrative quotes from transcripts) which were organised within sub-themes. Where there was duplicative quote data illustrating the same or very similar ideas, the quotes which were not used in the main text were summarised in a table based on a framework matrix (Appendix 14).

4.4 Data from field notes and observations

Field notes and hand-drawn process maps were used to inform the interviews, an individual practice 'Interim Report' was made available to interviewees prior to the interview (Appendix 11). The field notes were used to build up the context of the interview quotes in a case study type approach for each practice. They were also used for personal reflections. The field notes are highly confidential and cannot meaningfully be included in the thesis with the redactions needed to preserve confidentiality.

4.5 Saturation

Saturation is a complex qualitative concept which is used to indicate whether enough data have been collected in order to answer the research question. However, in describing the completeness of interview based research, saturation is particularly important. There are two types of saturation, theoretical and thematic. Theoretical saturation is defined as:

> "the phase of qualitative data analysis in which the researcher has continued sampling and analysing data until no new data appear and all concepts in the theory are well-developed." (Morse, 2004)

Traditionally the concept of 'theoretical saturation' arises in grounded theory (Green and Thorogood, 2018). A more modern idea of 'thematic saturation' has developed for other types of epistemology which implies that once the data are saturated that no new ideas will emerge (Guest, Bruce and Johnson, 2006). The study planned to achieve saturation by interviewing two professionals (one managerial and one GP) at each site. In designing the study and obtaining ethical approval the number of interviews had to be explicitly stated. Another feature of the study design was the set number of practice sites, it did not seem reasonable for practices to give up more than two hours of staff time (one hour for each interviewee) to interviewing when there was no reimbursement for taking part in the study. To have conducted more interviews at one site than at another could have unintentionally biased the study.

4.6 Summary of qualitative methods

The qualitative methods include a mixture of observational and interview techniques set in ten case study sites. Twenty semi-structured, audio-recorded interviews were conducted with general practice staff. Interviews were conducted with one practice manager and one GP at each of the 10 practices sampled purposively for the quantitative part of the study. Anonymised data from the quantitative part of the study (including harm vignettes and process maps for their practice) were presented to participants in advance of interviews to stimulate discussion. The results of the qualitative work are presented in chapter six.

Chapter 5 Quantitative results

5.1 Introduction

In a similar manner to the methods sections of the thesis, the results are split across two chapters due to the length and complexity of the data and the differences in quantitative and qualitative approaches. Chapter 5 addresses main aim 1 and describes the quantitative results aiming to determine a rate of failure to act on requests made in discharge summaries. The chapter begins with a description of the demographics of the study practices and the discharged patients. Thereafter, the results are structured according to the different types of failures identified (overall failure rates, medicines reconciliation failures, test ordering failures, follow-up failures) and finally harms. Categorical variables are presented with frequency counts and percentages.

5.2 Demographics

5.2.1 Practice characteristics

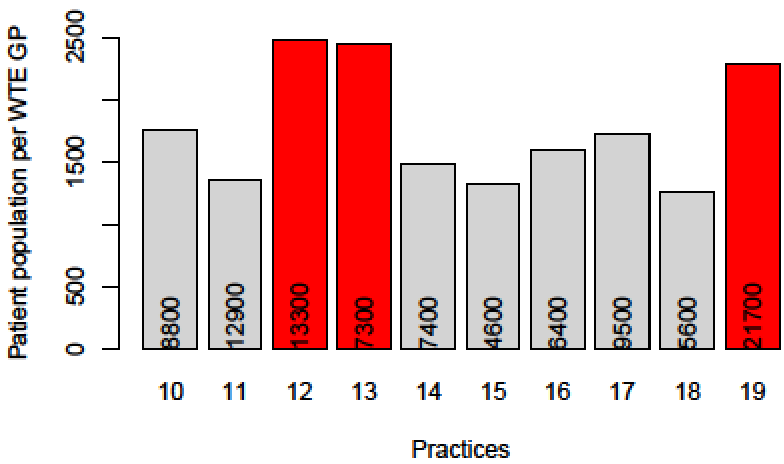
Table 6 shows the characteristics of the 10 practice sites in the study. The median practice list size was 8092 (range 4600 – 21,700) including one purposively sampled 'super-surgery', practice 19, and one 'small' surgery (defined as ≤5000 patients – half the national average list size). The list size per GP varied between 1251 and 2483 patients with a mean of 1769. Figure 4 shows the list size per Whole Time Equivalent (WTE) GP, which was considered as a proxy for workload. Data on WTE status were taken from the practice demographics form filled by practice managers on study set up.

Practice study code	Geographical location	Practice list size[a]	Percentage of patient population aged ≥75[b]	Is the practice a training practice?	Index of Multiple Deprivation [b]	Ratio WTE GPS to head of population	Clinical IT System	Percentage of total QOF score achieved [b]	CQC Rating [c]
10	Nottingham	8800	5%	Yes	39.5	1760	*Systm One*	90.3%	Outstanding
11	Nottingham	12900	6%	Yes	33.6	1355	*Systm One*	94.3%	Good
12	Nottingham	13300	10%	Yes	7	2484	*Systm One*	99.9%	Outstanding
13	Nottingham	7300	3%	Yes	43.7	2440	*Emis Web*	96%	Good
14	Nottingham	7400	6%	No	50.2	1476	*Systm One*	93.2%	Good
15	Coventry	4600	7%	Yes	44.7	1314	*Emis Web*	91.2	Requires improvement
16	Coventry	6400	6%	Yes	38.2	1600	*Systm One*	97.3	Good
17	Nottingham	9500	9%	No	23.4	1727	*Systm One*	93.9	Good
18	Manchester	5600	5%	Yes	33.4	1251	*Emis Web*	99.7	Good
19	Manchester	21700	1%	Yes	40.5	2281	*Emis Web*	98.9	Good

Table 6 – Study practice characteristics

[a] Practice list sizes rounded to nearest 100 to preserve anonymity [b] Based on 2015/16 practice profiles: https://fingertips.phe.org.uk/profile/general-practice [c] From CQC interactive map: http://www.cqc.org.uk/content/doctorsg

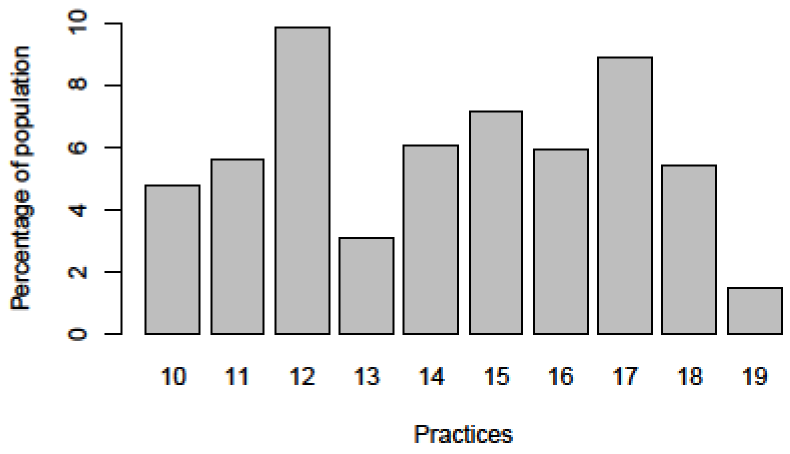
Figure 4 – Bar plot showing list size per Whole Time Equivalent (WTE) GP



Figures inside bars indicate total practice population rounded to the nearest 100. Data from practice demographics form. Bars highlighted red show practices where the patient population per GP has risen above 2000, as per red highlighting on national map of list sizes (GP Online, 2014).

Practice 12 and Practice 17 had the highest percentage of patients aged 75 and over (10% and 9% of their populations respectively). The practice with the youngest population was practice 19, only 1% of the population were aged 75 or over (Figure 5). Eight out of 10 practices had training status (practices 14 and 17 did not). The median Index of Multiple Deprivation (IMD) was 38.8 (the mean is not presented because practice 12, with an IMD of just 7 representing its unique rural location, would have skewed the data). Four practices used *EMIS Web* and six used *SystmOne*, (five out of six Nottingham practices used *SystmOne* due to local funding initiatives). All practices had a QOF score of 90% or above of the total available points, in line with the national average (table 7). Practices 10 and 12 were rated outstanding by CQC which is more than would be expected had sampling of practices been random. Study practices were more deprived than the national average (table 7).

Figure 5 – Bar plot showing proportion of list size who are aged ≥75 years



Based on 2015/16 practice profiles: https://fingertips.phe.org.uk/profile/general-practice

Table 7 – Study practices compared to national figures for England

	Mean of study practices	Mean national figure
Percentage of total available QOF score achieved	95.46	95.33
List size	9747	7820
IMD	35.42	21.7 (2007 data)

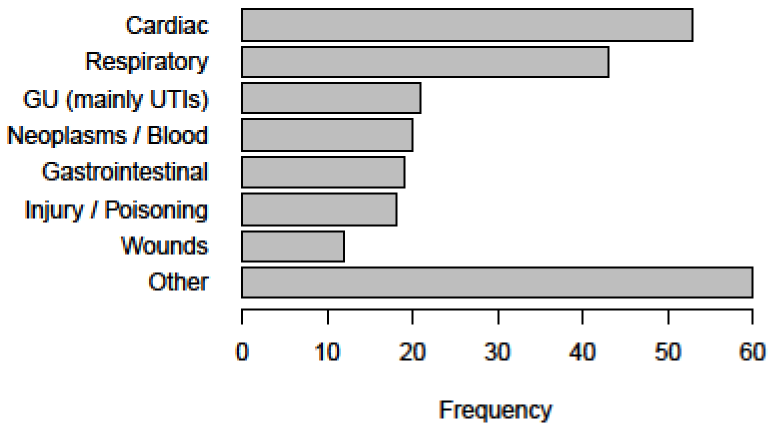
National figures available from: http://content.digital.nhs.uk and www.gov.uk/government/statistics/english-indices-of-deprivation-2015

5.2.2 Patient and admission characteristics

The mean age of the 300 sample patients was 84 years and 165 (55%) were female. 254 (85%) were admitted to medical teams and 46 (15%) to surgical ones. The mean duration of admission was 12 days (range 0-201 days, IQR 2-12 days). Admission length did not increase with increasing age. Of the admissions, 173/300 (58%) were to the Queens Medical Centre (QMC), 59/300 (20%) were to University Hospitals of Coventry and Warwickshire (UHCW) and 49/300 (16%) were to Central Manchester University Hospitals (CMUH). Classified by International Classification of Disease 10 (ICD10) chapter, the most common admission diagnoses were as follows: Cardiac

(56/300, 19%); Respiratory (51/300, 17%); Genitourinary (GU) – mostly Urinary Tract Infections (UTIs) (36/300, 12%); Abnormal clinical/laboratory findings (27/300, 9%); Gastrointestinal (24/300, 8%) and Injury /poisoning (16/300, 5%) (Figure 6).

Figure 6 – Bar plot of admission diagnoses by ICD10 chapter



Chapters II and III of the ICD 10 have been combined under the umbrella 'D' code for neoplasms and diseases of the blood

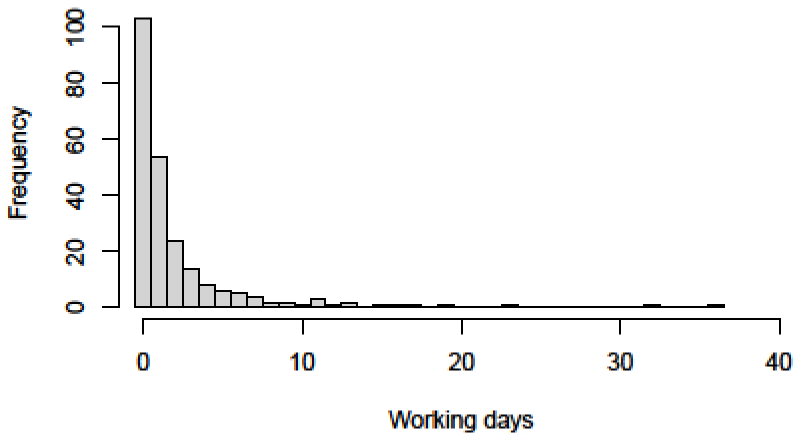
5.2.3 Follow-up data

A total of 176/300 (59%) patients were seen face to face and 115/300 (38%) patients consulted on the phone within 90 days of having been discharged. Only 9/300 (3%) patients did not have contact with a clinician. A total of 276/300 (92%) patients were reviewed by a GP. A further 15 patients were reviewed by nurses or 48 hour discharge teams.

5.2.4 Workflow data

Medians are used to describe the workflow data as means are skewed by a small number of outliers. All discharge summaries were uploaded to EDMS regardless of the route of arrival and the median time from discharge to EDMS upload was 2 days (IQR 1-4 days). The median time from scanning to transfer to a doctor was 0 days (Interquartile range: 0-0) (93% of electronic documents were handled in a single stage process on the same day). The median time from receipt of the discharge summary into a GP's electronic inbox to filing in the patient record was 1 working day (IQR 0-2 days), this is illustrated in figure 7. It has not been possible to calculate working days for part-time workers.

Figure 7 – Distribution of GP workflow times



Most discharge summaries are processed by GPs within the first few days of receipt, in rare cases very long processing times were observed.

The median time from discharge date to EDMS upload was two days (the 'receipt time estimate'). It is not possible to determine whether the delay was caused at the primary or secondary care end because the practice may not have downloaded the summary on the same day as the hospital uploaded it. This 'receipt time estimate' varies according to local processes. Times were shortest in Coventry – a median of 1 day and longest in Manchester – a median of 3.5 days (Nottingham median 2 days).

5.3 Analysis by type of failure

5.3.1 Overall failure to complete actions

Overall 246 summaries requested one or more actions and 112 of these summaries (46%, 95% CI 39-52%) had one or more failures to complete requested actions. The overall failure rate included ordering, completing and acting on test results ('failure to complete tests'), in-house actions and external referrals requested by secondary care ('failure to complete follow-up') and discrepancies in the medications reconciliation process ('failure to change medication'). 53 patients (47%) had failures to change medicines in isolation, 22 (20%) had failures to follow-up in isolation and 12 (11%) had failures to complete tests in isolation. Multiple failures occurred in 25 (22%) of the patient cases. Univariate logistic regression modelling of overall failures revealed five factors associated with increased risk with p-values <0.15 (table 8). An 'overall failure' multivariate model was constructed including; ratio of GPs to patient population, practice size, CQC rating, number of medicine changes and the discharging hospital. In the multivariate model (table 8) only increased number of medicines changes requested was significantly associated with overall failure (OR=1.14 for each additional drug, p=0.02). Practice site was included as a variable because variability in rate of failure between practices was of interest to determine whether particular practices might be targeted for interventions to help them improve. There were no significant findings with respect to this variable.

	Univariate models				Multivariate model			
	OR	lower 95% CI	upper 95% CI	p-value	OR	lower 95% CI	upper 95% CI	p-value
Practice (10 is reference)				*0.444				
Practice 11	1.10	0.34	3.60	0.875				
Practice 12	1.1	0.34	3.60	0.875				
Practice 13	1.03	0.32	3.35	0.959				
Practice 14	1.36	0.40	4.70	0.624				
Practice 15	3.64	1.04	12.78	0.044				
Practice 16	1.50	0.46	4.88	0.501				
Practice 17	1.18	0.36	3.89	0.787				
Practice 18	1.27	0.38	4.22	0.698				
Practice 19	0.75	0.23	2.49	0.639				
Admission length	1.00	0.99	1.01	0.939				
Days to GP workflow	0.03	0.03	1.14	0.253				
Receipt time estimate	1.01	0.99	1.02	0.503				
Speciality surgical	1.23	0.58	2.59	0.587				
Ratio of GPs to patient population	1.00	1.00	1.00	0.098	1.00	1.00	1.00	0.693
Practice size (small is reference)				*0.022				*0.417
Medium practice size	0.33	0.13	0.85	0.022	0.40	0.10	1.61	0.195
Large practice size	0.27	0.10	0.72	0.009	0.35	0.07	1.76	0.203
Emis Web IT system	1.11	0.67	1.85	0.685				
Training practice status	0.99	0.52	1.89	0.985				
IMD of practice	1.01	0.99	1.03	0.490				
Urban practice	1.16	0.51	2.63	0.728				
QOF score of practice	0.95	0.88	1.03	0.192				
CQC rating	1.62	0.99	2.65	0.053	0.98	0.45	2.12	0.962
Patient Age	1.03	0.98	1.07	0.257				
Patient gender male	1.40	0.84	2.33	0.191				
Number of medicines changes	1.12	1.01	1.25	0.028	1.14	1.02	1.27	0.0216
Hospital (Nottingham QMC is reference)				*0.100				*0.631
Central Manchester Hospital	0.67	0.33	1.40	0.288	0.68	0.31	1.51	0.345
University of Coventry Hospital	1.89	0.97	3.65	0.060	1.22	0.49	3.05	0.664
Other hospitals	1.30	0.49	3.48	0.601	1.30	0.47	3.58	0.616
Follow-up on phone	0.95	0.57	1.60	0.854				

Table 8 – Overall failure to complete actions – modelling table

*CQC rating was converted to a numeric scale for all analyses (1=outstanding, 2= good, 3= requires improvement) in order to model this variable ANOVA p-values marked with * are from a Likelihood ratio test, the remainder are Wald p-value*

5.3.2 Medicines reconciliation

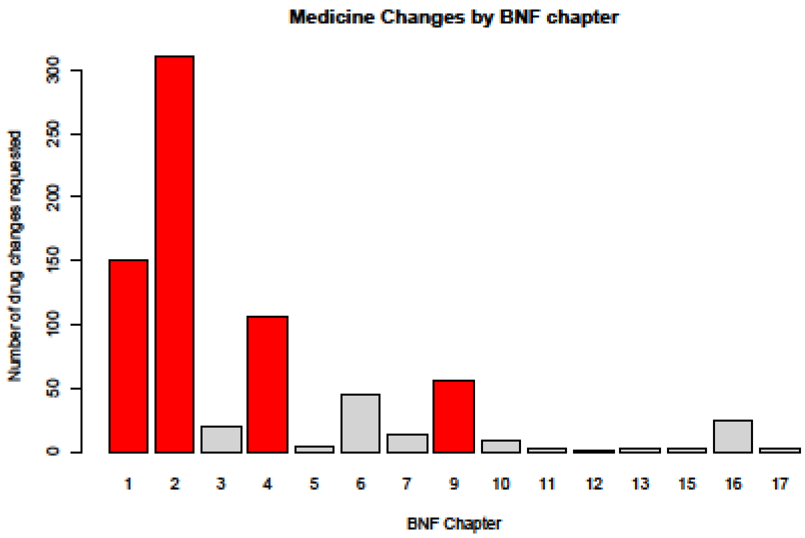
A total of 71% (214/300) of patients required medicines reconciliation (defined as the need to change one or more repeat medications, not including creams). Of these 14% (30/214) were not completed (defined as presence on the system of consultation text relating to medicines reconciliation or changes in the drugs listing). Medicines reconciliation by a GP took a mean of 4.97 working days from the patient having been discharged. The GP record reviewer (RS) judged that 91% (195/214) of medicines reconciliations required *discussion* with patients or carers in primary care. Care home patients who no longer had control over their own medicines (n=17) were excluded as it was judged that changes to the patients' repeat prescriptions alone might constitute adequate communication in these cases. Two patients who alerted their healthcare teams to medication changes in the first instance (and hence had already highlighted that they were aware of the change) were also excluded. Evidence of a contact with patients or carers in the week surrounding a change to a medication was considered sufficient for 'discussion' even if the text of that consultation did not mention the medication. Of the 195 medicines reconciliations requiring discussion 67 (34%) were not recorded as having been discussed. Failure to conduct medicines reconciliation and failure to discuss were not included in the overall failure rate, partly because the definitions were felt to be too diffuse and open to subjective interpretation by the record reviewer and partly because need for medicines reconciliation was defined in an interdependent way with failures to change medications, which had already contributed to the overall failure rate.

Medicines review status was recorded for patients who required medicines reconciliation to see if further review after the initial medicines reconciliation might pick up errors. Medicines review is different to medicines reconciliation, it is the 6 monthly or annual medications check performed on repeat items. 79% (169/214) of study patients had a subsequent medications review after discharge. It is difficult to interpret this figure as some of the patients had been discharged as recently as 3 months ago and therefore did not necessarily require medicines review yet and some did not even have a medicines review date set. A high proportion of this age group can be expected to have undergone medications review in a 6 month period due to national targets set for this age group (DHSC NSF, 2001). It was impossible to separate those patients who were overdue for medication review from those who had simply not had a medication review since discharge. For these reasons no further analysis of these data was undertaken.

4.3.3 Failure to change medications

Across the 300 patients in the sample, 750 drug changes were required. The average number of changes per patient was 2.5 (750/300) including patients who did not have any drug changes and 3.5 per patient for those patients requiring medicines reconciliation (750/214). Discontinued medicines accounted for 27% (202/750) of changes, newly started medications for 58% (435/750) and dose changes for 15% (113/750). For 81% (611/750) of these changes the discharge summary specified a reason for the change. Newly started drugs accounted for 59% (82/139) of the drugs without a reason for change specified. By BNF chapter (figure 8) the most commonly changed drugs were: chapter 2 – cardiovascular 41% (311/740); chapter 1 – gastroenterological 20% (151/750) and chapter 4 – central nervous system (CNS) 14% (107/750). A range of cardiovascular medicines were changed. Of the gastroenterological drugs changed, 61% (92/151) were laxatives. Of the CNS drugs changed, 59% 63/107 were analgesics. Chapter 9 drugs in this study were mainly iron preparations.

Figure 8 – Bar plot of requested medicine changes by BNF chapter



Four most common BNF chapters of medicine change request are highlighted in red: 1=gastroenterological, 2=cardiovascular, 4=CNS drugs, 9=Haematological drugs

Of the 750 changes requested there were 124 instances where this was not completed, (17%, 95% CI 14-19%). 75% of failures occurred with newly started medicines (93/124), 15% on dose change (18/124) and 10% (13/124) with discontinued medications. Failure to make changes was seen more often with requests for chapter 1 drugs 40% (50/124), mainly laxatives, and also with chapter 4 drugs 21% (26/124) – mainly analgesia (Appendix 16). Failure was less likely with chapter 2 drugs (cardiac) but there were still 15 failures (12% of the failures to change medicines). Failures relating to cardiac drugs were slightly more likely to be related to discontinued medicines (7/15). Six of the 15 cardiac drug failures (40%) were associated with subsequent harm and they accounted for 46% of the medicines-related harm. Instances of failures to change cardiovascular medicines can be seen in Appendix 16. Starting nutritional supplements accounted for 23 of the requested changes and there were only 7 (30%) instances where they were not prescribed as requested. It was anticipated that this would account for a higher proportion of the prescribing failures than were actually found. 12 patients were harmed by a total of 16 failures to change medicines (see harm vignettes:

1009,1024,1128,1218,1308,1322,1411,1412,1414,1521,1612 and 1613 in Appendix 17). Only three of these drugs (for three patients) were not associated with a specified reason for change by the hospital.

Risk of failure to change medicines was analysed with univariate logistic regression models, revealing nine statistically significant associations (table 9). These findings are not discussed in detail but there is one point which requires clarification. The variable "practice" had a significant effect on the risk of failure to change medicines (ANOVA p=0.043) in the univariate model but was removed from the multivariate model due to confounding with practice size and QOF score.

In the multivariate model (table 9), BNF Chapter was significant in determining the risk of failure (ANOVA p<0.001). Requests for drugs from BNF chapter 2 (cardiovascular) to be prescribed were the least likely to result in failure to change medicines. They were also the commonest drug prescribed and they were therefore used as the reference category. In this model the type of medicine change request was significantly associated with failure (ANOVA p=0.025), newly started medicines were the most risky, discontinued medicines have an OR of 0.4 and dose changes an OR of 0.8. For each day delay to uploading the discharge summary to EDMS (receipt time estimate) there was a 1% increase in failure to change medicines (p=0.003). Failure to make changes was less likely (OR=0.86, p=0.004) for each subsequent drug added to the list of changes requested to be made.

Table 9 – Failure to make medicines changes – modelling table

	Univariate models				Multivariate model			
	OR	lower 95% CI	upper 95% CI	p-value	OR	lower 95% CI	upper 95% CI	p-value
BNF chapter (2 is reference) ANOVA				*<0.001				*<0.001
BNF chapter 1 (gastrointestinal)	9.77	5.26	18.15	<0.001	8.55	4.30	16.99	<0.001
BNF chapter 3 (respiratory)	4.93	1.47	16.58	0.010	4.16	1.15	15.06	0.030
BNF chapter 4 (central nervous system)	6.66	3.38	13.12	<0.001	7.41	3.56	15.44	<0.001
BNF chapter 'other'	7.18	2.04	25.21	0.002	8.88	2.32	34.01	0.001
BNF chapter 6 (endocrine)	1.93	0.61	6.08	0.264	1.39	0.42	4.62	0.590
BNF chapter 7 (obstetric, gynae and urinary)	5.92	1.47	23.78	0.012	3.40	0.68	17.01	0.136
BNF chapter 9 (nutrition and blood)	3.29	1.32	8.18	0.010	2.06	0.77	5.52	0.150
BNF chapter 10 (musculoskeletal)	6.58	1.22	35.37	0.028	5.58	0.98	31.76	0.053
BNF chapter 16 (supplements)	8.13	2.93	22.57	<0.001	7.41	2.31	23.78	0.001
Medication change (started is reference) ANOVA				*<0.001				*0.025
Medication stopped	0.25	0.14	0.46	<0.001	0.40	0.20	0.81	0.011
Dose changed	0.70	0.40	1.21	0.201	0.81	0.41	1.61	0.553
No reason for medicines change	1.71	1.08	2.68	0.021	1.64	0.92	2.91	0.094
Practice (10 is reference) ANOVA				*0.043				
Practice 11	0.77	0.31	1.88	0.563				
Practice 12	1.18	0.47	2.93	0.722				
Practice 13	0.83	0.33	2.07	0.686				
Practice 14	1.32	0.54	3.25	0.547				
Practice 15	2.04	0.87	4.81	0.103				
Practice 16	1.29	0.53	3.18	0.574				
Practice 17	0.87	0.35	2.15	0.767				
Practice 18	0.63	0.24	1.66	0.351				

Practice 19	0.40	0.14	1.18	0.097				
Admission Length	0.99	0.98	1.00	0.011	0.99	0.98	1.00	0.150
Days to GP Workflow	1.11	0.84	1.47	0.473				
Receipt Time Estimate	1.01	1.00	1.01	0.023	1.01	1.00	1.02	0.003
Speciality Surgical	2.28	1.33	3.92	0.003	1.70	0.88	3.29	0.117
GP ratio to population	1.00	1.00	1.00	0.235				
Practice size (small is reference) ANOVA				*0.011				*0.240
Medium practice size	0.47	0.26	0.84	0.011	0.52	0.16	1.68	0.274
Large practice size	0.37	0.19	0.69	0.002	0.32	0.08	1.39	0.130
Emis Web IT system	0.85	0.57	1.26	0.415				
Training Practice status	0.90	0.56	1.43	0.648				
IMD of Practice	1.00	0.99	1.02	0.608				
Urban Practice	0.81	0.43	1.53	0.508				
QOF score of Practice	0.93	0.88	0.99	0.033	1.00	0.90	1.12	0.962
CQC rating	1.29	0.88	1.90	0.198				
Patient Age	1.01	0.98	1.05	0.411				
Patient Gender Male	0.93	0.63	1.37	0.715				
Number of medicines changes	0.85	0.78	0.92	<0.001	0.86	0.77	0.95	0.004
Hospital (Nottingham QMC is reference) ANOVA				*0.001				*0.339
Central Manchester Hospital	0.56	0.30	1.06	0.073	0.68	0.29	1.61	0.381
University Coventry Hospital	1.69	1.06	2.69	0.029	1.07	0.46	2.51	0.868
Other Hospitals	0.36	0.13	1.03	0.058	0.38	0.11	1.32	0.129
Follow-up on phone	1.21	0.81	1.80	0.361				

*CQC rating was converted to a numeric scale for all analyses (1=outstanding, 2= good, 3= requires improvement) in order to model this variable ANOVA p-values marked with * are from a Likelihood ratio test, the remainder are Wald p-values.*

5.3.4 Failure to complete tests

Four test requests (one imaging and three blood tests) were not considered by the GP reviewer to be clinically appropriate requests after reviewing the EHR. Inappropriate requests included: 'weekly FBC', cardiovascular risk profile repeat within a few weeks, a follow-up CT chest for a 95 year old and checking whether calcium levels had come up for a patient prescribed *Adcal*. These spurious requests were not included in the failure rate. The remaining tests requests were divided into laboratory (78%, 70/90), imaging (13%, 12/90) and 'other' (9%, 8/90). The majority of tests came with a time-frame (61% 55/90). In total 26% (23/90) were not fully correctly completed (95% CI 17-35%) (Appendix 18). Of the incomplete tests, 78% (18/23) were never actioned by the GP. A further seven tests were not completed within a 50% leeway of the time-frame specified in the discharge summary, and therefore were also considered to be failures. Patient factors could be identified from the EHR to be the cause of non-completion in four cases (if a GP never actioned the test in the first place patient factors were not held responsible). Results required acting upon in 18 cases, this action was performed in 16/18 cases, adding a further two instances of failure to successfully complete requested tests. There were six failures to complete tests which were associated with harm but they did not occur with any particular type of test (see case vignettes: 1103, 1308, 1314, 1425, 1522 and 1821, Appendix 17).

One of the two GP clinical IT systems represented in the study was associated with failure to complete tests. In multivariate modelling (table 10) *Emis Web* was associated with an OR of risk of failure to complete tests of 3.67 (p=0.014), this seems to be independent of geographical area as the hospital from which patients were discharged was not significant in the univariate model. There might be differences in the way tests are ordered or results are tracked between different clinical IT systems. Male patients have an OR of 2.95 in the multivariate model of failure to complete tests (p=0.042).

Table 10 – Failure to complete tests - modelling table

	Univariate modelling				Multivariate modelling			
	OR	lower 95% CI	upper 95% CI	p-value	OR	lower 95% CI	upper 95% CI	p-value
Test type (Blood test is reference) ANOVA				*0.262				
Imaging	2.62	0.73	9.44	0.141				
Other tests	2.20	0.47	10.27	0.316				
Time frame given	0.77	0.30	2.02	0.601				
Admission Length	1.01	0.99	1.04	0.363				
Receipt time estimate	0.99	0.91	1.07	0.720				
Speciality surgical	1.18	0.21	6.55	0.849				
GP ratio to population	1.00	1.00	1.00	0.952				
Emis Web IT system	2.98	1.12	7.91	0.029	3.67	1.30	10.35	0.014
Training practice status	2.64	0.70	9.92	0.151				
Practice size (small is reference) ANOVA				*0.210				
Medium practice size	0.41	0.11	1.55	0.190				
Large practice size	0.24	0.05	1.19	0.081				
IMD of practice	1.03	0.99	1.08	0.193				
Urban practice	2.98	0.35	25.25	0.316				
QOF score of Practice	0.97	0.84	1.11	0.640				
CQC rating (1=outstanding)	1.69	0.71	4.02	0.235				
Patient gender male	2.30	0.87	6.07	0.091	2.95	1.04	8.36	0.042
Number of medicines changes	0.89	0.74	1.08	0.240				
Hospital (Nottingham QMC is reference) ANOVA				*0.189				

Central Manchester Hospital	3.33	0.84	13.17	0.086				
University Coventry Hospital	2.40	0.70	8.18	0.162				
Other hospitals	0.73	0.14	3.82	0.707				
Follow-up on phone	2.06	0.76	5.57	0.154				

*CQC rating was converted to a numeric scale for all analyses (1=outstanding, 2= good, 3= requires improvement) in order to model this variable ANOVA p-values marked with * are from a Likelihood ratio test, the remainder are Wald p-values.*

5.3.5 Failure to arrange follow-up

Requests for action by the GP which were not related to prescribing or tests were collated into 'follow-up'. 76 % (134/177) of follow-up requests were for GP 'in-house' action, the remainder called for hospital outpatient referral. Of the in-house actions, 79/134 (59%) related to medications. Follow-up medications actions are requested in the text of the discharge summary, separately from the medicines reconciliation listings which are often in table format. They require additional work beyond the initial drug change. They often took the form of 'review drug X' or 'restart drug X if…'. In-house follow-up requests that were not related to medications encompassed a range of actions including checking blood pressure; chasing up hospital results; reviewing wounds and reviewing Do-Not-Resuscitate orders. In total, 47/177 (27%) of follow-up requests were not actioned (95% CI 20-33%), failure occurring more frequently if the action was an 'in-house' one 39/134 (29%) as opposed to a hospital outpatient one 8/43(19%).

There were six instances where failure to follow-up was associated with harm (see case vignettes: 1112, 1314, 1330, 1521, 1522 and 1729, Appendix 17). Three involved hospital outpatient referrals (a relatively higher proportion given that failure rates for this kind of follow-up are generally less likely to fail).

In univariate logistic regression modelling of failure to follow-up, two factors were flagged for inclusion in the multivariate model ($p<0.15$): patient gender, follow-up mode (see Table 11). In the multivariate model there were no significant factors.

Table 11 – Failure to follow-up - modelling table

	Univariate Modelling				Multivariate Modelling			
	OR	lower 95% CI	upper 95% CI	p-value	OR	lower 95% CI	upper 95% CI	p-value
Follow-up is secondary care referral	0.56	0.24	1.31	0.179				
Follow-up is medicines related	1.16	0.54	2.50	0.697				
Practice (10 is reference) ANOVA				*0.697				
Practice 11	0.47	0.10	2.34	0.359				
Practice 12	0.82	0.16	4.23	0.811				
Practice 13	0.75	0.15	3.84	0.730				
Practice 14	0.82	0.16	4.23	0.811				
Practice 15	1.27	0.30	5.31	0.747				
Practice 16	1.13	0.25	4.98	0.877				
Practice 17	0.38	0.07	2.05	0.257				
Practice 18	0.52	0.09	2.90	0.456				
Practice 19	1.61	0.31	8.32	0.572				
Admission length	0.99	0.97	1.02	0.523				
Receipt time estimate	1.00	0.99	1.01	0.498				
Speciality surgical	1.85	0.71	4.79	0.207				
GP ratio to population	1.00	1.00	1.00	0.670				
Practice size (small is reference) ANOVA				*0.521				
Medium practice size	0.58	0.23	1.47	0.248				
Large practice size	0.62	0.22	1.75	0.372				
Emis Web IT system	1.38	0.70	2.71	0.351				

Training practice status	1.64	0.67	4.05	0.283				
IMD of practice	1.02	0.99	1.05	0.277				
Urban practice	0.99	0.30	3.29	0.992				
QOF score of practice	0.99	0.89	1.10	0.865				
CQC rating	1.19	0.65	2.19	0.577				
Patient gender male	1.69	0.86	3.33	0.129	1.66	0.84	3.29	0.144
Hospital (Nottingham QMC is reference) ANOVA				*0.551				
Central Manchester Hospital	1.01	0.30	3.40	0.991				
University Coventry Hospital	1.75	0.81	3.78	0.157				
Other Hospitals	1.09	0.36	3.34	0.879				
Follow-up on phone	1.65	0.84	3.25	0.145	1.54	0.77	3.05	0.219

*CQC rating was converted to a numeric scale for all analyses (1=outstanding, 2= good, 3= requires improvement) in order to model this variable ANOVA p-values marked with * are from a Likelihood ratio test, the remainder are Wald p-values.*

5.3 Analysis of harms

5.3.1 Numerical analysis of harm

There were 23 harms and 20 patients affected by them (three patients had two harms). The harm rate per patient was 8% (20/246) and the NNH was 13 in this high risk group. The NNH was rounded up to the nearest whole number in this study in order not to over-represent the risks of failure to process discharge summaries as requested. The NNH is relatively low (i.e. more harm occurs) compared to NNH's presented in studies describing harms from interventions such as medications. Research in the field of primary care patient safety does not typically present NNH data unless an intervention is made and this makes direct comparisons difficult. The study was not powered to assess the precision of estimates of incidence of harm but some analysis was possible (table 12). Since the total number of harms was small, this presented challenges for modelling and no statistically significant associations were found.

5.3.2 Severity and preventability of harm

The author and the PhD supervisor (who is also a GP) independently rated each instance of harm against three rating scales; NES Trigger Tool (De Wet and Bowie, 2011) and WHO (Runciman et al, 2009) for severity and a preventability scale for hospital deaths (Hogan et al, 2012) adapted for use in a study from the department where I was working (Bell et al, 2017). More detail can be seen in Appendix 17. After an initial independent rating, the two raters discussed their scores and a consensus score was given for each case (these figures are used in the analysis below), except in one vignette where consensus could not be reached. The mean severity was 3 ('moderate' on both scales used). The mean preventability was 3.27 (around 50:50 'close call'). Weighted Kappas (generated in R) for inter-rater reliability are presented in table 13. The NES trigger tool shows the narrowest confidence interval (0.65-0.95) on the best Kappa (0.8). This perhaps reflects the specificity of the outcomes for patients used in the scale NES scale. The preventability scale had the most items (6) and therefore has only a moderate Kappa (0.5) with a wide confidence interval (0.1 – 0.89). A summary of the vignettes and their severity/preventability ratings can be seen in figure 9 below.

Figure 9 – Summary of harm vignettes and their severity/preventability ratings

Failure event(s)	Harm summary	Severity rating	Preventability rating
Inhaled therapies not changed and mucolytic not added	Admission with COPD exacerbation	Moderate	Probably preventable
Beta blocker dose not reduced	Poorly controlled COPD in primary care	Moderate	Possibly preventable
H.pylori test not done	Repeated admissions with dyspepsia	Moderate/ substantial	Possibly preventable
Blood sugars not checked after stopping diabetes medications	Fall possibly associated with hyperglycaemia	Moderate	Slight evidence for preventability
Folic acid not prescribed	Confusion possibly associated with low folate	Moderate	Slight evidence for preventability
Laxative not prescribed	Constipation in primary care	Mild	Strong evidence for preventability
ACEI not stopped and U+E not tested after AKI	Possibly contributed to CKD	Moderate	Probably preventable
U+E not checked on increased dose of diuretic	Worsening CKD 5 leading to dialysis	Substantial	Probably preventable
Antihypertensive not prescribed	Uncontrolled BP after dialysis and unknown end organ damage	Mild	Strong evidence for preventability
Referral to memory clinic not made	Repeated confusion with medications in primary care	Unscored	Unscored
Diuretic not increased	Admission with heart failure	Substantial	Strong evidence for preventability
Diabetes medication dose not reduced	Hallucinations possibly attributable to low sugars	Moderate	Slight evidence for preventability

Antihypertensive not commenced	BP potentially uncontrolled for 10 months, possible end organ damage	Moderate	Possibly preventable
Oral morphine not prescribed for SOB	Repeat admission with SOB	Moderate/ substantial	Slight evidence for preventability
ENT referral not made	Possible undiagnosed vasculitis	Potential/ mild	Probably preventable
Follow-up CXR not ordered after pneumonia	Death from aspiration pneumonia	Substantial/ death	Slight evidence for preventability
Aspirin not stopped after warfarin commenced	INR 11.9, vitamin K in outpatient clinic	Moderate	Strong evidence for preventability
DNAR not completed	999 ambulance and CPR	Mild	Probably preventable
PSA test not ordered so cancer status unknown	2 admissions with blocked urinary catheter (?debris)	Moderate/ substantial	slight evidence for preventability
Laxatives not prescribed after UTI	4 more UTIs in 3 months	moderate	Possibly preventable
Iron not prescribed for anaemia	SOB in primary care with severe anaemia	moderate	Probably preventable
Referral to endocrine clinic not made	Complex symptoms possibly attributable to undiagnosed hyperparathyroidism	Potential/ mild	Slight evidence for preventability
Follow-up CXR not ordered after pneumonia	Further chest infection treated in primary care	Moderate	Slight evidence for preventability

ACEI= angiotensin converting enzyme inhibitor, AKI= acute kidney injury, CKD= chronic kidney disease, CXR=chest X-Ray, DNAR = do not attempt resuscitation, ENT= ear nose and throat, INR= international normalised ratio (coagulation test), PSA= prostate specific antigen, SOB= short of breath, U+E = urea and electrolytes, UTI= urinary tract infection,

Table 12 – Harm Modelling

	OR	lower 95% CI	upper 95% CI	p-value	OR	lower 95% CI	upper 95% CI	p-value
Practice (10 is reference) ANOVA				*0.279				
Practice 11	1.17	0.18	7.79	0.868				
Practice 12	0.36	0.03	4.28	0.419				
Practice 13	1.57	0.26	9.53	0.627				
Practice 14	2.12	0.34	13.10	0.420				
Practice 15	0.82	0.10	6.40	0.848				
Practice 16	0.75	0.10	5.84	0.784				
Practice 17	0.38	0.03	4.46	0.438				
Practice 18	0.39	0.03	4.67	0.458				
Practice 19	0.00	0.00	**Inf	0.990				
Admission length	1.00	0.98	1.02	0.808				
Days to GP workflow	0.95	0.82	1.10	0.526				
Receipt time estimate	0.95	0.80	1.11	0.503				
Speciality surgical	0.73	0.16	3.29	0.678				
GP ratio to population	1.00	1.00	1.00	0.098	1.000	0.999	1.001	0.836
Practice size (small is reference) ANOVA				*0.441				
Medium practice size	1.19	0.25	5.62	0.823				
Large practice size	0.59	0.10	3.42	0.553				
Emis Web IT system	0.74	0.29	1.93	0.542				
Training Practice status	0.66	0.23	1.93	0.454				

IMD of practice	1.04	0.99	1.10	0.107	1.043	0.989	1.099	0.118
Urban practice	2.36	0.30	18.41	0.412				
QOF score of practice	0.95	0.88	1.03	0.192				
CQC rating	1.17	0.49	2.80	0.727				
Patient age	0.97	0.89	1.05	0.483				
Patient gender male	1.61	0.64	4.05	0.308				
Number of medicines changes	1.02	0.85	1.22	0.830				
Follow-up on phone	1.25	0.50	3.13	0.640				

*CQC rating was converted to a numeric scale for all analyses (1=outstanding, 2= good, 3= requires improvement) in order to model this variable ANOVA p-values marked with * are from a Likelihood ratio test, the remainder are Wald p-values.* ***Practice 19 had no harms detected*

Table 13 – Summary of harm measures and their Kappa

	Measures	Scale	Modified kappa	95% CI on modified kappa
NES Trigger Tool	Severity	1-4	0.8 (good)	0.65-0.95
WHO	Severity	1-5	0.58 (moderate)	0.28-0.88
Hogan Healey (mod)	Preventability	1-6	0.50 (moderate)	0.1 – 0.89

5.4 Summary of quantitative results

The key quantitative findings of the study are summarized here and are returned to in chapter 7. The key quantitative findings are discussed in chapter seven where the discussion follows a similar structure to the results. Findings are discussed by type of failure in order for the reader to navigate between this chapter and chapter 7.

Overall, 46% of summaries were connected with one or more failures and the majority of failures related to medications reconciliation (47%). There was a 14% increase in risk of overall failure for each additional drug changed.

There was a median time of 2 days from discharge to EDMS upload and the median time for GP processing was 1 day. For each day delay to uploading the discharge summary to EDMS (receipt time estimate) there was a 1% increase in risk of failure to change medicines (p=0.003).

The rate of failure to change medications as requested was 17% (124/750, 95% CI 14-19%). Cardiac drug failures accounted for 46% of the medicines-related harm in the study and 75% of failures to change medicines occurred with newly started medicines (93/124), newly started medicines are most likely to result in failure to prescribe as requested (ANOVA p=0.025).

Over a quarter of requested tests (23/90) were not fully correctly completed (95% CI 17-35%). *Emis Web* was associated with an OR of risk of failure to complete tests of 3.67 (p=0.014) and male patients were associated with an OR of failure to complete tests of 2.95 (p=0.042). Over a quarter of follow-up requests (47/177) were not actioned (95% CI 20-33%).

The harm rate per patient was 8% (20/246) and the mean severity score for harms was 3 ('moderate' on both scales used). The mean preventability score for harms was 3.27 (around 50:50 'close call').

Chapter 6 - Qualitative results

In this chapter I address main aim 2; determining what general practice staff think are the reasons for failure to act on requests made in discharge summaries. I do so by meeting the following objectives:

1. Exploring practice's administrative and clinical processing systems in relation to discharge summaries
2. Using the field work in objective 1 to construct practice-specific process maps
3. Using data from aim 1 (objectives 2 and 3) to produce individual practice reports
4. Discussing these reports and process maps with general practice staff in an interview setting
5. Allowing general practice staff to describe existing strategies for safety improvement and generate new strategies within the interview

6.1 Interview and participant demographics

Interviews took place between the 15/6/16 and 25/5/17 (table 14). All 20 planned interviews were conducted and no participants dropped out. The mean (standard deviation) age of practice managers (PMs) was 53 years (10.87) and they each had on average 16 years' experience in PM roles. The mean age (standard deviation) of GPs was 44 years (8.95) and they each had on average 15 years' experience as a qualified GP. Eight of the 10 PMs, and five of the 10 GPs were female. The mean (SD) recording time was 42 minutes (8.87). GPs had a slightly longer mean recording time (45 mins) than practice managers (39 mins).

The interviews in this study were complex and ranged over a spectrum of patient safety topics in primary care. The weight of coded material is appropriate to this complexity. Between 70 and 90 excerpts were coded from each interview, approximately 1600 coded items in total. Analysing these data represented a substantial workload in this mixed methods PhD and therefore requires sufficient space in this thesis in order to meet the research question. A justification of why the ‘secondary care factors’ theme (which have might be seen to have lower relevance to the original research question) is included is given in the theme specific results.

Table 14 – Interviewee demographics

Participant code	Age (in years)	Sex (M/F)	UK graduate (GP)	Graduation Date of GP	Years as qualified GP	Years in current profession (PM)	Date interviewed	Interview duration (mins)
GP10	56	M	Yes	1984	25	NA	24/05/2017	54
GP11	38	F	No	2000	6	NA	22/11/2016	42
GP12	38	M	Yes	2004	6	NA	11/01/2017	39
GP13	38	F	Yes	2003	8	NA	16/11/2016	39
GP14	52	M	Yes	1988	24	NA	08/12/2016	62
GP15	38	M	No	2000	9	NA	10/05/2017	53
GP16	39	F	Yes	2004	9	NA	01/03/2017	33
GP17	49	F	Yes	1991	22	NA	25/01/2017	29
GP18	36	F	Yes	2006	5	NA	09/03/2017	48
GP19	60	M	Yes	1982	25	NA	19/04/2017	48
PM10	61	F	NA	NA	NA	23	22/6/2016	36
APM11	28	F	NA	NA	NA	1	22/11/2016	34
APM12	59	F	NA	NA	NA	20	11/01/2017	38
PM13	50	F	NA	NA	NA	25	16/11/2016	30
APM14	55	F	NA	NA	NA	37	08/12/2016	43
PM15	67	F	NA	NA	NA	15	10/05/2017	54
PM16	53	M	NA	NA	NA	2	01/03/2017	43
PM17	61	F	NA	NA	NA	9	25/01/2017	37
PM18	52	F	NA	NA	NA	8	09/03/2017	39
APM19	45	M	NA	NA	NA	22	19/04/2017	35

PM = Practice Manager, APM = Assistant Practice Manager, GP =General Practitioner

6.2 Introduction to the qualitative themes

The qualitative findings are presented in a particular order, following the journey of the discharge summary. From creation in the hospital, through GP administrative systems and clinical processing, where errors and harm might occur, and ending with strategies for improving the safety of discharge summary processing. This flow of themes aims to give a sense of structure to the analyses.

Creation of the discharge summary document is discussed first. Discharge summaries are written in secondary care but the interview content pertaining to this process consists entirely of the views of primary care staff. It is highly relevant to primary care and also has importance to secondary care. Processing of the document is discussed second, including features of administrative systems and GPs personal strategies for processing. Medications reconciliation is then discussed in detail. Harm and error follow next as the logical consequence of what happens when things go wrong in processing the document. Lastly strategies for improving safety are discussed, including those which have already been introduced in the study practices and those which have come directly from the study.

Five **main themes** were identified, their sub-themes are detailed here:

1. **Secondary care factors**: 'ideal' discharge summary, delegation, safety of transfer and NHS pressures.
2. **Safety features of processing systems**: continuity of care, team-working, protocols/procedures, training, staff numbers and workflow targets.
3. **Medicines reconciliation**: communication with patients, medicine/patient related factors, pharmacy intervention and prescribing roles.

4. **Error and harm as a result of failure to process discharge summaries**: causes of error/harm, time/workload pressures, communication about error/harm and harm severity/preventability.
5. **Strategies for safety improvement**: administrative, IT and prescribing systems, significant event analyses, the unplanned admission scheme and direct impacts of the study.

As with all semi-structured interview data, some themes were anticipated based on the interview schedule. This was the case for themes 2-5 although I did identify a number of sub-themes within these themes which had not been anticipated (see individual sub-theme sections). Theme 1, secondary care factors, was not part of the interview schedule.

6.3 Secondary care factors

Secondary care factors is a theme covering factors outside the control of primary care, it emerged de-novo during the interviews. Originally the interview structure had been intended to focus only on primary care issues but it was clear that interviewees wanted to talk about problems originating in the hospital, especially in relation to delegation and that these issues were important to them as a cause of error in primary care. This theme has three sub-themes which are discussed in detail: ideal discharge summary; delegation between primary and secondary care and safety of information transfer.

6.3.1 The ideal discharge summary

General practice staff have seldom been involved in the design of the discharge summary itself which is traditionally seen as the preserve of the hospital. They do, however have much to say about the structure and content of the 'ideal discharge summary'. The quantity of coded content in this theme is fairly static across the time course of the interviews. GPs comment with much greater frequency than PMs (GPs contributed 74% of coded excerpts). Indeed all 10 GPs had comments to make in this theme.

6.3.1.1 General structure of the discharge summary

The current structure of the discharge letter was mostly criticised. Only one interviewee (PM10) praised the structure of the discharge letter as "very complete" in the Nottingham area. GPs were especially critical with respect to items which were 'hidden' or obtuse:

> Depending on how they're written there should be a GP action point at the bottom… that would be the best place to put things, not in the 'this is what happened', big paragraph at the front. [GP17]
>
> I know it is on the discharge but could they actually make it a bit clearer on the discharge that, you know, this has got to be done by the GP? [PM15]

Standardisation of the discharge summary was a recurring idea and this practice manager sums up the main issues:

> I suppose a standardised format would be really good, one format so that you were always looking in the same place, and if it could be highlighted if there had been a change in medication, i.e. the drugs aren't the same as they went in on if new drugs have been started, that would be useful. [PM13]

One GP, who had been extensively involved in research, explains his frustrations with the pace of change towards providing better discharge summaries and in general with the lack of ongoing support for management of patients post hospitalisation:

> I remember reviewing a report from the Kings Fund and they were looking at stuff in the 60's and there was guidance about what you should count as a good discharge summary…and it is so variable, it is just bizarre isn't it?....... I get a bit angry about that because the hospital gives instructions… but what they don't ever do is give a management plan, it is like you know or we will review them in 6 months' time and I am thinking well actually I need a bit more than that and very rarely do I find a comprehensive management plan. [GP19]

Another GP alluded to IT which could be used to sort some of the problems. She seemed to doubt what in reality would be a relatively easy computer design change:

> The ideal system would be where everything is nicely integrated so we all have the same… it looks the same and you can match things in the to the same record and it is all… so we're working from the same hymn sheet so then you get one thing that looks this way and it is incompatible with our thing that looks this way, and if it all looks the same and was interfaced properly that would be great, that would be totally the ideal wouldn't it? But that would be a little bit pie in the sky. [GP13]

Training issues at the hospital end were identified by two GPs, one of whom who also came up with a solution of using a GP to train foundation doctors in the hospital setting on how to write better discharge summaries:

> I think that is the problem because it depends, discharge summaries are as good as who makes it right? .... So in my experience when I was a house officer…there wasn't any discharge summary training at that time, so you know how to do a discharge, you just go and do it yes? And actually it is a very important piece of information. [GP15]

6.3.1.2 The medications 'box'

Comments were frequently made about the design and use of the medications part of the discharge summary (the medications 'box') by GPs. They had conflicting views on the use of codes to identify what type of changes had been made to the medications. They acknowledged they were helpful but seemed unable to trust them. The design of this part of the discharge summary varied widely between the 3 geographical areas, the most systematised approach was used in Nottingham (GPs10-14 and GP17). In discharge summaries from University Hospitals Nottingham, drugs are assigned a code (N=New, A=dose Altered). Despite these positive design changes (which only one interviewee praised), GPs still described difficulties with the knowing whether drugs were intentionally stopped:

> Sometimes the discharge summaries have you know… 'these have been stopped', which is really helpful and sometimes they are just missing and you think well did they stop omeprazole for a reason or have they just left it off because they were in with a heart problem and they weren't that bothered about omeprazole. [GP10]

And were uncertain as to whether to trust the coding system:

> I think the discharge summaries also because they have changed and having the thing in the medication where there was something new or added or changed, that was quite helpful, certainly people can then pick it up from there but you have a degree or scepticism to make sure you have checked everything else as well because they can get it wrong sometimes. [GP11]

One GP's comment in relation to the drug coding system suggested that GPs may be treating the discharge summary document as an advisory, implying that it is for them, as the GP, to decide on what is in the long-term best interests for patient:

> I don't go much by them, I have a look at them because they often find there is quite a lot of error with respect to that actually. Yes and it depends who was doing discharge summaries so some discharge summaries will have all of their previous medications plus the new medication, sometimes you will get a discharge summary with just the medication that they have started or they have tampered with which isn't really a summary then is it? [GP12]

This comes up again with respect to delegation of work into primary care (section 6.3.2). GPs also cited requests for particular drugs as being more likely for them to treat as advisory, for example statins for elderly patients (see section 6.5.3).

Respondents in Coventry and Manchester identified greater problems with the medications box, especially because the handwritten notes frequently added by pharmacists were un-readable once scanned. The observations of the researcher in the field notes taken while collecting quantitative data also comment on the poor quality of the design of the medications box in the Coventry area. Field notes also cover the variable design of the summaries coming out of the different Manchester hospitals which caused confusion when collecting the quantitative data (for instance the instruction “more GP” of which is the local meaning is *a medication to be continued*):

> Sometimes the discharge letter tells you new tablets go to on or medication but it doesn’t sort of say stop other ones that they might already be on…..sometimes I know that the girls have said it doesn’t actually say 'continue' or 'stop'……Sometimes you can’t read them, if they are written they are absolutely horrendous. [PM15, Coventry]

> I don’t think they are that reliable sometimes you know I know some people will put that, new medication, ‘please check response and titrate up dose’ something like that you know? So they will have that there but not always, not always and so they just put the list there sometimes you know?....I think that then you have to scan a code in for yes it is new medication and they probably don’t bother with that sometimes. [GP19, Manchester]

Two GPs independently brought up the idea of alphabetisation of medications listings (this was not a prompt on the interview schedule):

> It should be alphabetical yes? It should come alphabetically it should be on the record alphabetically as simple as it is, because it would minimise so many errors, sorry but you know. [GP15]

6.3.2 Delegation between secondary and primary care

Coding to this theme definitely increased in frequency across the time course of the interviews (reflecting perhaps, the author’s adaptations to the interview schedule, particularly after speaking to GP11). Again all GPs commented, contributing 72% of the material but GPs11 and 14 obviously felt particularly strongly about this issue. The four practice managers who did comment were of older average age (58 years). Comments were quite impassioned on this topic and it was the experience of the interviewer that respondents were often difficult to steer away from the area which had less to do with the primary aim of the data collection than other topics. Some respondents were begrudgingly accepting of the workload handed down from secondary care:

> Two people who do loads of actions for us but you know that you have always got to do loads of stuff, that is the renal physicians and the falls team OK so there is always like five actions every time they write to you but at least you know that and you know there is a section that

> says GP action, OK and so you go oh god another one of these, OK let's do all of their actions for them. [GP10]

Some GPs expressed frustration with the speed of follow-up required by secondary care which they didn't feel was realistic or safe:

> Often they want the U's and E's done in a week so actually within in a week is… the only problem with that is if they need dom (*iciliary)* bloods at home you can't get them in a week but then I would like the hospital to realise that and they could request them themselves and give them a form would be quite useful. [GP16]

Several interviewees felt that they or colleagues should be more active about rebutting work which did not originate in primary care:

> I think with the referrals, people do pick them up. I think again if they feel it is in the patient's interest let me do this, there are a lot of them that think it is going to take me lesser time to do it, I might as well get it done with them than fight the battle, but I keep on telling them that if you don't raise it you're never going to put an end to it. [GP11]

Two practice managers cited cost as the reason why this delegation might be happening:

> They are very quick to throw it to primary care without even understanding what costings we have in our budgets to actually do some of the things they request us to do and I think that is where some of the problems lie. [PM18]

Some GPs described instances where they felt they had to disagree with actions requested of them:

> I don't always accept what is said in the discharge summary, I mean sometimes they will put you know I would say for example they put an elderly person on Statin, I will take it off I will say no I am not going to do that, I don't agree with it…..when I saw your report I thought to myself I am not going to take it as the given that the hospital is right all of the time you know? I do have the view it is my decision and I will do it and I am actually very cynical of hospitals. [GP19]

Other GPs took a more accepting approach, citing reasons why the GP might be best placed to undertake the follow-up work required after discharge:

> What goes through my mind is bouncing it through a GP seems like an additional process to get things mired in really, but perhaps I know why it is there and perhaps there is the argument that we hold more information and we don't… you know reduce duplication and we get

> more background perhaps from it coming from a GP, and it is a hard balance that one but at the moment it is our responsibility to do that work so I think yes we should do the work yes. [GP13]

6.3.2.1 Test result delegation (chasing results)

Discussion of test results was an area of interest for GPs, who again were often keen to talk at length on the issue. The British Medical Association (BMA) recently clarified the responsibilities for its GP members, making it explicitly clear that responsibility for test result handling lies with doctor who orders the test (and that asking GPs to chase hospital results contravenes NPSA and ionising radiation regulations (BMA online, 2018). It is clear from the responses at interview and from the field notes taken during the quantitative data collection process that GPs are still being asked to chase results. One of the two GPs with the strongest views on delegation was keen to reiterate the BMA guidance:

> Because they know we can access hospital pathology result, they assume then that we should do it…….BMA guidance now is very clear, it is the hospitals responsibility, your test, your result, your responsibility. [GP14]

Some interviewees were just frustrated about being asked to do other's work but were resigned to undertaking it because there was no other practical recourse:

> That doesn't sit very well at all if they are doing the tests, shouldn't they be following it up? If they do pass it on we are stuck with it aren't we? Whether we like it or not so…if we don't have the result then it is a task for the secretaries can you chase up this result, it is not work we should have to do really is it? You wouldn't have any choice would you? Unless you write back to the hospital and said no you do it, it is your test, you are the one responsible but you know which takes the most time, it is going to come back to you anyway isn't it at some point? [PM19]

Other GPs were more accepting about their role in ongoing management of the patient:

> When I go to different meetings they said whoever starts the test it becomes their responsibility. But if you look at it hospital is a huge setting yes? And who is actually responsible it comes out to the GP. So I am a bit erm… although as long as there is a clear communication

> from the secondary care, I think it is the doctor who is looking after the patient more it is their responsibility. [GP15]

6.3.2.2 Discussion of medications changes with patients

Discussion of medications changes with patients was part of the interview schedule (and is discussed in more detail in section 6.5.1), however respondents repeatedly raised the theme of responsibility in connection with these discussions of hospital initiated medications. Respondents felt that responsibility for discussion was at least shared and should not lie solely at the door of primary care:

> Every medication has got side effects so you would hope that the pharmacists in the hospital had done some of that work on discharge, that does happen, so I am told and used to when I worked there so they are given certain information at that stage as well. [GP18]

Sometimes discussion of medicines was felt to be entirely the responsibility of the hospital, both PM and GP at surgery 17 did not accept responsibility for discussing newly started medications and this practice manager highlighted a potential communication problem*:*

> Definitely if they have changed their medication they definitely should tell the patient yes….That would be my assumption, if the hospital has assumed we will tell them then that is a problem. [PM15]

Interviewees use the words “hope” or “assume” expressing some feelings of uncertainty about the safety of reliance on the hospital to discuss medications changes, one respondent was more overt in his worries:

> Where is the responsibility of the person making the change? I.e. the hospital, they surely must have some responsibility, they are the ones actually making the change, why do I have to explain what they have done?.......so I suppose you take it on trust that when they have been talking to the patient on discharge they have gone through the medication with them but I suppose have they? I don’t know. [GP14]

6.3.2.3 Delegation as a cause of error and harm

GPs came back to the issue of delegation when discussing error and harm. As this principally relates to secondary care it is discussed here rather than in the section on causes of error and harm. GP14 cites the hospital as the possible originator of the problem in the harm vignettes discussed during the interview (Appendix 17, vignettes 1421 and 1425). Delegation of referrals back into secondary care was also blamed as the cause of error by two GPs who talked about this when presented with harm vignettes (1414 and 1729) relating to failed referrals drawn from their own practices' quantitative data.

6.3.3 Safety of information transfer

The specific context of the study must be mentioned here in order to interpret the comments made by interviewees. The majority of interviews were conducted at a time when the hospital IT download systems entered a brief period of chaos (winter 2016/17). Later interviews were conducted around the time of the NHS cyber hack (May 2017). Problems had been encountered by some practices with delayed receipt of letters from shared business services. Interviewees had conflicting views on the speed with which discharge summaries were delivered:

> I think we get most of them now, I think they are quite good at sending them through but not always in a timely manner. [PM12]

This practice manager cited the unplanned admission scheme as a positive factor in improving speed of information transfer, hospitals are now mandated to supply information in a more timely manner for these 'high risk' patients:

> Through primary care standards we were charged with avoiding unplanned admissions and then reviewing the discharge summaries as they have come in so that actually ensured that the hospitals had to be more swift in their response to us. [PM18]

Interviewees were equivocal on the reliability of information transfer and were unsure how frequently information transfer fell down. Some interviewees were sure that they did not receive discharge summaries for all of their patients:

> I do know experiences where we haven't received the discharge letter and the doctors have sort of been stuck really because they have no other information so I think they are very important. [PM11]
>
> I think it is something we haven't audited but there are times when we don't get them. [PM13]

This interviewee makes the point that failure of information transfer is hard to capture and study, practices cannot be expected to know when they have not received a discharge summary:

> They have got a lot better over the years. I remember doing a project numerous years ago on how few discharges we actually received, whereas now we do seem to receive an awful lot so on the other hand I suppose it is the unknown unknowns, we don't have a process for identifying the fact that we haven't got one. [PM10]

Interviewees were generally in favour of the benefits of electronic systems to safely capture discharge summaries. Failures in the interoperability of IT was a major theme given the climate at the time of the interviews. Inter-operability of IT is the ability of computer systems to exchange information. This interviewee expresses some of the problems that persist when local/temporal 'gremlins' have been eradicated:

> To send stuff to us is the third system, is a different system and it doesn't integrate in to our notes automatically, it has to be downloaded, managed and posted so I can see how there are steps where errors could be made… if there was a better way of hospital and communities clinical systems talking to each other, that would help. [GP14]

6.4 Safety features of discharge summary processing systems

This theme covers the safety of the processes to which a discharge summary is subject once in primary care. When the discharge summary arrives at a practice it is processed by administrative and then clinical teams who deal with different aspects of the discharge summary at different practices. As part of the original semi-structured interview schedule interviewees were asked in detail about their process maps in order to highlight areas of document processing that were thought to be safe or more 'risky'. Where practices were operating systems that they had developed to solve local problems these are discussed in the 'strategies for safety improvement' theme. Interviewees were also asked to comment on the workflow times presented to them on the practice interim reports (Appendix 11). Little was known from the literature about what practices might conceive as important features of their processing systems. As part of the semi-structured guide interviewees were asked about protocols/procedures and training but a number of other sub-themes emerged de-novo during the interviews: continuity of care, team working/individuals within teams and staff numbers.

6.4.1 Continuity of care

Eight of the 10 GP respondents introduced this topic area within the interviews. It is clear that interviewees feel continuity is important, nobody expressed views to the contrary. Practice managers also discussed the role of continuity with respect to their process maps – particularly where their systems were set up to divert mail to the referring or 'usual' GP:

> That doctor who is looking at the mail, may not be the patient's GP … we have a system whereby we send it back to reception with the word 'notes' and they look on the notes to see who the patients routine GP is and if possible send it to them on the basis that they may know the patient better than anyone else. [GP14]

The practice manager at the smallest surgery site in the study was able to demonstrate a unique level of continuity of care from an administrative perspective:

> There are a fair few discharges but you know we do sort of know who they are about because of being small…..we obviously know the patients and know a bit about them so you know we might try again to contact them or if they appear in the surgery, we are aware we have been trying to contact them…You know they sort of relate to us quite well so they are sort of in and out and chatting so it is quite good from that respect. [PM15]

By contrast the manager of the largest practice discussed the steps they had taken to try to mitigate the lack of continuity with a larger business model:

> It is something which a bigger practice finds a lot more difficult because if you don't deliberately set out to achieve continuity it just simply won't happen because patients often don't value it in the way that we would. [PM19]

Practice managers described difficulties with getting the document to the correct clinician but obviously felt the effort was required for better patient care:

> Oh it is a pain, it is an absolute pain you know because…really it should go back to the person that referred them… now that we have got so many GPs working part time it is an absolute nightmare… I am sure that takes up an enormous amount of time… it feels such a trivial… well it is not trivial because it should go back to the person that referred them, but you know sometimes trying to unpick all of that is an onerous task. [PM17]

GPs seemed to see continuity of care as 'ownership' of patients and were able to offer an enhanced service for patients they saw as being under their care particularly when the patient was part of the unplanned admission scheme (section 6.7.4):

> I just kind of see the names, if I recognise them it makes it so much easier…… I would give them a call, especially if knew them or whoever had been looking after them, I would say we need to call this person because they have developed cancer or whatever. [GP16]

This GP describes how he undertakes more detailed reading of the discharge summary for particular 'known patients':

> If it is somebody that I don't know, I might then just look for an… whether an action needs to be taken and not really read the detail, if it is somebody I know, you know that I admitted or I am involved in their care I will read the discharge summary right the way through. [GP10]

The GP alludes to this being due to professional curiosity and pride but there may be other factors at play here such as a feeling of enhanced responsibility for some patients, indeed this is half expressed by another GP who describes the feeling as "nice":

> Sometimes it is nice because if you know the patient and you haven't had the discharge summary it is sometimes nice just to have a once over and go oh they did have that, or they were diagnosed with that. [GP16]

GPs also talked about assuming responsibility of care for patients where there was no obvious continuity pattern, they saw this as part of their professional duty:

> If it is not mine I will then forward it to the right doctor and won't do anything else, but if it is nobody's, nobody has sort of taken charge of that admission then I would just read it and deal with it. [GP17]

GPs were concerned about the potential for continuity of care to fall down during leave periods, this GP worries about her 'case management' patients who are part of the unplanned admissions scheme:

> You can have potential pit falls like if I am on holiday and if one of my patients because as I say we have got… we say it is case management patient but if it goes to another GP and if it is not quite clicked because you know your case management patient, if it is not quite clicked that this is a case management patient to other GP then they may not send it forward. [GP 11]

6.4.2 Team working

Interviewees favoured team working as a safer way to process discharge summaries. Individuals with specific skills were highly valued. The overriding tone of comments relating to teams and individuals within teams was positive. It is interesting to note that interviewees only said negative things about individuals within teams with respect to IT skills (though always in an anonymised context). Both practice managers and GPs talked about team work from an administrative perspective and were generally in praise of their team:

> I think because we all really communicate well as a team, I think it helps the process running quite smoothly to be honest, I think that is really important, the key factor. [PM14]

GPs also worked in collaborative ways with other GPs which allowed them to comment on their working with each other in a positive light. Practice 15 had a global document inbox and their GP spoke about individual clinicians pulling their weight in processing documents. In contrast to GP11, who was quoted on continuity of care, this younger GP felt secure in the practice systems to allow other GP colleagues to pick up work while she was away:

> The ones that need something doing, do generally get picked up so to be honest it isn't something that I spend a lot of time worrying about, I know that somebody else is always here and always responsible. [GP13]

Clinicians at practice 18 had a daily meeting about discharge summaries where they dispensed work between themselves:

> It is done collaboratively it is not… it is not "you will do this". [GP18]

Practice managers were most concerned with skill mix of their administrative staff with respect to expertise within roles:

> I think it is good that we have particular people so that they do it regularly so they are the most competent at that job, and that means that we make less mistakes, obviously they are still made but less because they know their job well. [PM11]

The approach to managing skill mix was varied. Scanning and medicines management seemed to be considered particularly highly skilled areas. Practice manager 19, working at scale, explained the difficulties of balancing expertise within the admin team with making sure he could fill holes left by staff absence:

> They like to have their own area and know what they are responsible for and be able to get the credit for it when it goes well I think. That is my impression. I think they prefer it……we do try and have arrangements for cross cover so some people who should know how to do all the different tasks in the office. [PM19]

An alternative viewpoint was expressed by practice managers of more average sized surgeries who wanted to prevent monotony for their staff and protect them from burn out in public facing roles:

> I think it is good that people swap over and do something different but also I think you know half a morning on reception can be enough and equally people uploading mail it can be enough for them so I think it is quite a good thing to you know protect them as receptionists really from. I think it is just a good thing, we have always done it, we have always swapped over. [PM14]

6.4.3 Protocols and procedures

Part of the semi-structured interview guide was designed to allow interviewees (particularly practice managers) to expand on their protocols and procedures for document handling. Not all of the practices had written policies on document handling and only six managers were able to comment.

Four practices voluntarily shared their mail handling policies with the author (practices 10, 11, 14 and 17). Most practices were pleased with the protocols they had in place:

> We rarely have mistakes made so I think we do have a very tight process. [PM11]

Practice 10 (who may have been rated CQC outstanding for this reason) had spent time working on flowchart representations of their protocols and their practice manager was interested in the process map generated for the study because it resembled their own attempts to picture the process:

> I like visual representations because they are easier to follow if people are in a hurry…..it took a lot of time to produce all of those flowcharts that we have. [PM10]

Practice 19 relied heavily on systematisation backed up by protocols in order to cope with working at scale. Doubt was expressed as to whether people internalised and followed protocols even at those surgeries who had spent the most time on preparing them:

> Reading a protocol isn't the same as knowing how to do it, the two things aren't the same. Some people are better at that than others you know we get them to read things and then getting them doing it, other people need a lot of time and training and showing how to do it. [PM19]

Protocols on delay times to shredding of paper information were discussed in the interviews because of the inclusion of this part of the document journey on the process map. The variability of practice protocols in relation to this was interesting and is best summed up by PM18:

> Each practice seems to do it a bit differently, I think it is fair to say that in the main three months is a good length of time to ensure that you know things are seemingly dealt with within that time frame… NHS England changed the rules on length of time of keeping the documentation so it is one of those, you go with what is best practice really. [PM 18]

Indeed the UK government did issue guidance on this subject which makes it clear that, as long as scanned data quality is checked, originals can be destroyed immediately (DHSC, 2011). The median time practices kept paper copies was one month (range 0-6 months).

6.4.4 Training

Questions on training of administrative staff were part of the original interview schedule. All the practice managers interviewed had views on training with respect to the safety of their administrative systems. Very few GPs expressed views (when this topic was touched on with GPs they seemed to see it as outside their responsibility). Two GPs did comment about specific training innovations and these as discussed in the strategies for safety improvement theme. Interviewees mainly described an 'in-house' approach to training, using senior staff to train their new or junior receptionists, practice manager 19 summed up the issues:

> They kind of do training on the job…….It has got to be hasn't it? It is all in house systems, even if people know how to use EMIS they want to know how we use EMIS and other systems that we have…at the moment it is probably a bit hit and miss that, it relies very much on the person who is doing the training knowing what they are doing but we do have an induction check list. [PM19]

Just one practice had experienced more formal training courses and these were as part of a local Clinical Commissioning Group (CCG) initiative to train up receptionists:

> My senior receptionist has been on a… I suppose for want of a better word, a *Docman* higher level course, so in terms of assisting reception staff to minimise GP involvement with document handling, and she has trained the other staff on those processes that is a constant revisit. [PM16]

6.4.5 Staff numbers

When discussing some of the ideal ways in which administrative systems might be organised, the sub-theme of staff numbers was relevant for practice managers. Ideal world situations such as having protected scanning time for dedicated staff at dedicated desks were clearly a challenge for smaller practices:

> Our staffing numbers normally mean that the two things *(scanning and telephone answering)* go along at the same time unfortunately. [PM16]

Medium sized practices like 13 and 14 were working on increasing their scanning time and had a little more capacity. They were therefore more open to re-organisation of their systems:

> If we have got three people then there is no reason why, yes, we couldn't just have somebody doing it upstairs. [PM14]

The largest practices (11, 12 and 19) were already using their greater staffing capacities to prioritise and protect scanning activity:

> We are a large practice so we are able to separate our responsibilities so we have a front of house, our reception team and we have the back office stuff which our admin team… each has a team leader and now a deputy team leader and they are responsible for making sure the process in those teams are working correctly. [PM19]

6.4.6 Workflow timeframe

Prior to the interview, interviewees were presented with their practice's time for doctors to workflow discharge summaries and a study average so far for comparison. Administrative workflow times were not presented in the practice reports as the median time to processing was zero days. After amendments to the interview schedule, which occurred after the third interview, all interviewees were asked about timeframes for administrative staff and clinical staff to workflow discharge summaries. Practices 13, 14, 16 and 18 had protocols which stated that their GPs handled all discharge summaries on the day of arrival. Four out of the 10 surgeries in the study were therefore meant to be working within the NES target of two days (HIS Ihub (a)) to process a summary, by definition of their protocols. GP 18 describes her motivations for working with an on-the-day system for discharge summaries:

> Ideally that patient is going to need medication within seven days most of the time, erm they are potentially going to need an appointment or a follow up or blood test so there are things that are needed within a week but you are just saving problems if you're

> letting it go that long so ideally you deal with something when it comes in is my feeling otherwise you're just saving it up for later when actually that patient may have been readmitted potentially. [GP18]

The remaining GPs, working in more traditional systems, were negative about workflow time targets (specifically the NES target of two working days), "it is difficult to achieve I think" [GP17] and generally felt that longer times would be acceptable. Concern is expressed by this GP who worries that a creating a compulsory target might create a perverse incentive:

> Two days seems not unreasonable, the clinically relevant stuff yes…I think that is a reasonable target, I would hate for it to be imposed on us here because I hate targets like that, I think it is just setting you up to game a system somehow. [GP14]

Three of the four other GPs who came up with their own target decided on one week, citing supplies of medication given by the hospital as a reason why delay to that duration is acceptable:

> I think 3 days is pretty good, I would have thought a week would be reasonable. [GP10]

GPs cited part-time working problems as a major barrier to meeting the NES target and also expressed doubt as to whether it was appropriate:

> It depends on your working pattern because we receive letters throughout the week, that is what we have decided to do here so it totally depends on when the letter arrives in the office… if I have received a letter on a Monday in to my inbox but I don't come to work until Wednesday, Thursday, Friday so if I was just totally snowed under on the Wednesday I might not get to that until Thursday or Friday… I don't worry about the length of time to be honest, it doesn't overly stress me out. [GP13]

Practice managers were accepting of the delay in GPs processing documents, again citing part-time working and other clinical demands as the cause of delay (PM19 particularly accepted delay as it allowed the surgery to offer greater continuity). They were much more reluctant to settle on a time target for GPs to process documents and this could be for a number of reasons, the most obvious of which is because it is outside their work role. A unique perspective on processing time was provided by PM18 who puts herself in the patient's shoes:

> Personally as a patient I would like to think [*the summary would be work-flowed*] within 72 hours of receiving it. [PM18]

Practice 16 was an outlier with respect to processing times (section 5.2.4) and their practice manager addressed this head-on in the interview:

> I don't know that it causes any major difficulties for us, that is perhaps a little bit complacent but the matter is not brought to my attention by the doctors to say you know these documents are too long, we're not getting to them, and we don't seem to get that reaction from patients either…I am not aware that it is creating any clinical challenges for us. [PM16]

6.5 Medicines reconciliation

Questions about medicines reconciliation were a key part of the interview schedule in order to place the quantitative data on accuracy of medicines reconciliation in context. Clinicians were particularly interested in talking about medicines reconciliation as they were responsible for conducting it at most surgery sites, therefore the weight of quoted material in this theme lies with GPs. This theme contains five sub-themes: communication with patients about medicines reconciliation; medicines related factors; patient vulnerability factors; prescribing responsibilities / roles and the pharmacists' role in medicines reconciliation.

6.5.1 Communication with patients about medicines reconciliation

One of the aims of the interview process was to establish how and why GPs chose to communicate with patients about medicines reconciliation. The bulk of the material on this theme is contained in this subtheme mainly because this formed part of the semi-structured interview schedule (relating directly to the quantitative data collection point on communication of medicines reconciliation to patients/carers). Beliefs regarding the requirement to discuss medicines reconciliation with patients were varied and polarised. All interviewees had been reminded about the vulnerable population chosen for this study at the outset of the interview. Many of the interviewees felt it was unnecessary to discuss routine medicines reconciliation (including, on this sub-subtheme, frequent contributions from practice managers):

> Would you not assume that the hospital has told the patient their medications have changed?...I wouldn't contact them and tell them because that would be a waste of time. [PM19]

Respondents mostly asserted that the hospital should take responsibility for the discussion if they have initiated the change in medications (see section 6.3.2.2). Most of the quotes in relation to this delegation of responsibility contain the word 'hope' which is underlined to highlight just how frequently it occurs:

> Well I would have hoped that the hospital would have done it, that you know they are instigating all medicines but they are explaining what they are for and how they are going to work…it would take them I suppose coming in and saying I am confused about my meds. You would sort of presume that it has been done wouldn't you? [PM17]
>
> You are kind of hoping that the hospital have said "we are changing your medication, this is what is it going to be". [GP10]

The following GP expresses strong and similar views but does bring up a problem with this method for dealing with medicines reconciliation; the problem of patients not knowing that they need to start taking a particular drug which is added to the repeat medication listing (see underlined text):

> If they have been started in hospital I don't really see the need because you would have hoped that they would have been told in hospital, you would put it on their repeat and hope that they knew it was all… that they just need to keep asking for it…I don't need to spend half an hour doing four phone calls to tell someone they have started on an ACE and it means that if they're sick they should stop it blah, blah, blah. [GP16]

When specifically asked about this problem the GPs' mainstay for dealing with this type of issue would be to get the receptionist to call the patient to let them know. Although many GPs clearly believed in, and practised, not discussing medicines reconciliation, some were able to spontaneously identify and express some of the problems with this approach:

> We may just make the change without telling the patient on the basis that we are just adjusting the medication that hopefully the hospital staff have told them about, hopefully… you don't get a statement on the discharge thing, letter to say to the patient we have informed them of this change, so I suppose you take it on trust that when they have been talking to the patient on discharge they have gone through the medication with them but I suppose have they? I don't know. [GP14]

There were some insights into why GPs did not feel contacting patients about medicines reconciliation is a practicable option (see GP16 quote above where time pressure and indeed seeing medicines reconciliation as a waste of time seems to be a major issue). Practice 12 had actively tried to streamline workload by not contacting patients about routine medicines reconciliation, this quote also addresses issues with documentation of medicines reconciliation (see section 6.6.3):

> I am not sure that we would record all of the discussions, I am not sure that we would have them discussions actually with each patient, I don't… I think that would be an extra bit of work that I would have to kind of look in to you know is it needed really yes?… this is probably a personal view that actually and to remain resilient and be able to do everything within your working day is that you have to give some responsibility back to the patient haven't you? [GP12]

In the middle ground a few interviewees thought there was *some* need to discuss medicines reconciliation with patients directly. For example, practice 13 has an administrative staff member who calls vulnerable patients after discharge and their GP describes the "ideal-world" situation of a GP discussing medicines reconciliation with each patient:

> I think ideally that would be great, it would be really good, that is an additional work load and the getting the timing right, that would be tricky…it is a definite positive if it was feasible to do it… for a lot of people it probably would either be a reassurance or flag up if they are aware of what the change has been from hospital. [GP 13]

The GP mentions a number of barriers to discussing medicines reconciliation including workload and timing of the appointment. This GP felt that reviewing each discharged patient, while desirable, would be impossible due to lack of resources:

> I don't think in the primary care we have got those many resources where you contact the patient after every discharge… it is possible if there are resources, but in current climate it is I would say impossible. [GP15]

A smaller group of interviewees in the study clearly felt that communication of medicines reconciliation is essential. Practice 18 routinely review all their discharged patients on the day of discharge summary receipt; here their GP explains how this process happens:

> So when we phone them up we will ask them what happened in hospital and part of that might be about medications so have they an understanding of why they were in? What happened and what medications are they on so we ask those questions and quite often they won't be able to always give us those answers, we won't necessarily go through every individual medication with each individual. I think it depends on perhaps the, you know patient themselves… I guess from working in lots of different places there are lots and lots of patients who are never seen post discharge, their medications will just be changed based on the basis of the discharge summary but no communication has happened I mean that in itself is a potentially harmful strategy. [GP18]

GP18 was able to describe later in the interview how this system for calling all patients had come about as a result of a patient of theirs who had experienced harm as a result of incomplete medicines reconciliation at discharge. This GP felt strongly that where the GP disagreed with the changes requested on a discharge summary that this should be communicated to patients:

> You have to involve the patient in that discussion, I think that is important so yes you may have justified it clinically but you have not communicated that justification with the patient and I think that responsibility does lie with the GP… for a recommendation to have come out of the hospital and then you have made a clinical justification not to do it but that should be communicated with the patient yes, it needs to have a discussion with them because patients have to be involved in the decision making, having been very mindful of the fact that initial discussion may not have taken place in the hospital… I mean how many patients would actually know what new medication they had been added on in hospital? Limited isn't it? [GP11]

Indeed she specifically cites how unlikely it is for the patient to have been made aware by the hospital which is directly at odds with the prevailing hope given at the beginning of this section.

Patient responsibility in initiating communication about medicines reconciliation was not part of the interview schedule but came de novo from the data. GP 14 recurrently mentioned the issue of patient responsibility and obviously has some internal conflicts about shared responsibility for medicines reconciliation. He cited time and workload factors and resistance and ambivalence from patients about medications review:

> I think it should be a collaboration of both parties… you're less likely to miss something if you're both engaged and involved in it.. I think we do a lot of things without telling patients to be honest, on the basis that we adjudge them not to be a… not to be so significant…yes in an ideal world you talk to your patients about everything but we just don't have the time. [GP14]

GPs frequently commented on the patient's own responsibility to initiate a consultation when the medicines reconciliation involved only 'minor' indication medications such as laxatives and analgesia. This quote cites analgesia as a specific medication which might be expected to be more within the patient's control (see 6.5.2):

> If someone is not calling me to asking for a painkillers then I think they are not in pain, although you would argue you are assuming it but actually you know if someone is in pain they need to shout up loud. [GP15]

GP12 felt he knew some of his patients well enough to assign them responsibility for initiating medicines reconciliation on more 'minor' indication medications:

> Sometimes what I will tend to do is not put it on because it is a laxative if I know the patient in particular I think, well they will contact me if there is a problem, which they do around here. [GP12]

6.5.2 Medicines related factors

Features of the medicines and ways in which they were prescribed emerged de novo as an important reason for possible error. Polypharmacy and multiple changes were frequently commented on and the following practice manager summed up the problem with her expression for patients taking more than 26 drugs (where each drug is assigned a letter on the EHR):

> I mean it is phenomenal when you're dealing with repeat prescribing, some of them are over the alphabet. [PM13]

'Minor' indication medications like laxatives and analgesia were felt to be less crucial, many interviewees raised this without prompting, particularly when lists of medication failures from the quantitative data were read out during the interview:

> Regarding a medication that isn't you know life or death or threatening etc. in that respect so sometimes I make that conscious decision actually I am not going to contact the patient and I am not going to put it on to their repeat medication. [GP 10]

Some GPs volunteered what they felt were the riskiest types of drugs to re-conciliate: immuno-suppressants, medications which require monitoring and anticoagulants. Dose changes were felt to be among the riskiest types of change by this GP who also commented on special circumstances when she would contact patients:

> If it is something more complex, particularly if it is like a funny way of giving a drug so if they have been started on enoxaparin or something a bit different then that would be when I would contact the patient or if there is a time period to it or something like that, I would probably give them a phone call and say we need to give you this, how many do you need or whatever it is. [GP13]

Some drugs requested to be started by hospital teams were felt to contravene local area or practice prescribing decisions: alendronate, nutritional supplements, *Gaviscon* preparations, vitamin D and paracetamol for example. One GP describes his personal dislike of statin medication for elderly patients and confirms that he does not document in cases where he has made a clinical decision not to initiate the medication as requested:

> I genuinely don't put elderly on statins you know when they come in I just… I don't even put a note on it because I just feel that the evidence base is there that they shouldn't be on it necessarily and you know I just don't do it, if it is a new drug that they have started I am just saying no. [GP19]

6.5.3 Patient vulnerability factors

Frail older patients with medical complexity were often cited as a particular 'at risk' group by interviewees. Although this finding must be tempered by the fact that all interviewees were aware this was the chosen patient group in this study. This risk factor applies to all types of error and harm but was mainly brought up by clinicians discussing medicines reconciliation. This GP sums up some of the problems with prioritising such a group:

> They are a priority but they are also really complex and there is loads of them and you need a lot of time to get that right. [GP10]

Interviewees felt that the majority of patients aged 75 or over were likely to be already on 'care plans' and were therefore much more likely to be reviewed after discharge. There was some support for the cut off age of this vulnerable group to be extended down to 65 due to co-morbidities causing earlier frailty. Practice manager 15 was the only interviewee to cite elderly patients living alone as particularly vulnerable. Patients with mental health problems and confusion were generally felt to be at risk. GP13 was able to describe two further 'at risk' groups: patients who do not speak English as a first language and patients with medication in blister packs who are therefore less likely to be aware of what they are taking. Blister pack patients were also cited by GP14 who, along with his practice manager also cited socio-economic deprivation as a vulnerability factor. Practice 12 was the only rural practice and interestingly their practice manager describes their patients as "quite clued-up around here" in relation to medicines changes, perhaps reflecting socio-economic affluence. She felt therefore that practice-initiated communication with patients about medicines reconciliation was less essential.

6.5.4 Prescribing responsibilities and roles

As part of the original interview schedule this concept grew and enlarged in the interviews as they progressed, due in part to the strong opinions often expressed. Practice 12 were particularly influential to the interviewer, with respect to investigating role diversity, as they had been heavily involved in the national receptionists training scheme. At the majority of practices only doctors can perform medicines reconciliation and many interviewees had strong feelings that this should be the case; ownership of this process is nicely summed up by this GP:

> We really do hold the medicine side well within what the doctors do. [GP13]

The prevailing view of practice managers was that medicines reconciliation was out-with the role of practice receptionists, citing, among other reasons: lack of indemnity cover, not wanting to put their staff under undue pressure and duplication of work:

> It is an awful risk isn't it? Putting new medication on? You have no idea what these things are for or… you know any dangers about dosage or you know no it is absolutely a no, no...we decided doctors put it on, because… if they have got to check it, they may as well do it. [PM17]

Another practice manager describes hearing of medicines reconciliation done by administrative staff at another surgery as a "horror-story" feeling shocked that other practices could operate so differently, she did tell me that her strong views might be influenced by her pharmacist mother:

> Their system was the admin people enter the medication and then workload to the doctor for them to authorise and I was just a little bit shocked that that was their process in the first place. [PM13]

Using trained reception staff as alternative personnel to do medicines reconciliation was mostly greeted with caution by those who did accept such an idea:

> It is a tricky one actually if you look at very deep down then you know they (*administrative staff*) are not medically trained, you know would they know what errors can… or what consequences could be…that shouldn't be expected from an admin person with no experience but if a streamlined educational programme is you know framed for them, if there is a short course or module which they can have, just looking at the medication point of view, maybe it is something which they can develop as a role. [GP15]

As part of an efficiencies scheme, practice 12 already used trained admin staff to reconcile medicines, although some reluctance had still to be overcome on the part of their reception staff:

> What we keep telling the girls, because some of them were reluctant to make changes, is that the final responsibility lies with the GP so you know nothing gets filed until we sign it off so if there is any medication errors we should be double checking… but there is always the safety net that actually… so what happens is there is an audit trail isn't there? And it is always signed off by a clinician. [GP12]

Adequate training for receptionists seemed to be a prerequisite to acceptance of such a change in role. In general there was greater acceptance of using more specialised administrative staff, such as prescription clerks, to perform medicines reconciliation. Practice 16 already allow a specially trained prescription clerk to do medicines reconciliation on behalf of the doctors, both their GP and their PM cite this individual as the reason why the practice had one of the lowest rates of missed medicines reconciliation in the study, though still express caution with relying on this role alone:

> I often go and look on our system and see if there is any differences, discrepancies between them and look at the ones that *[name of prescriptions clerk]* has added and check that they are the correct ones that want to be prescribed… I just wonder whether we are perhaps as diligent when she is off possibly we're not so some of the gaps maybe then when she is not here. [GP16]

Practice 15 had similarly competent prescription clerks and their PM could see medicines reconciliation as a likely extension of their role:

> The prescription clerks I think would be good if they were willing to and got the training to actually deal with it … because they take it upon themselves to actually do the role. [PM15]

However, there was obviously some internal tension at the practice regarding this extension of administrative roles. Indeed prescriptions clerks had been given the responsibility for double-checking medicines reconciliation around a year prior to the date of the study but had later handed it back and instituted a handwritten log book with GPs replies to prescription queries. Practice 18 worked collaboratively with their prescription clerks – if a medication had been missed by a GP doing medicines reconciliation the script desk returned it to them. Clerks could also add medications and send on to the GP for authorisation. Practice 17 were strong proponents of clinicians remaining in charge of medicines reconciliation, but despite this they had a unique level of intervention from their assistant practice manager who double-checked medicines reconciliations done by doctors:

> Our assistant practice manager double checks that we have done it, we have done the process… I presume she has a lists of discharges and after a week checks they have been done or I don't quite know how she does it but she does do it or sends us a task occasionally and says do you want double check that has been done and it is often… if it has not been done straight away it is because someone has been away and hasn't got the letter on time. [GP17]

There were some internal tension felt by the practice manager over this system:

> They don't like that but it was an absolutely crucial thing to do… they get grumpy about having to do it, about getting tasks. [PM17]

Unfortunately it was not possible to establish in the interviews the motivation for setting up this system as interviewees had forgotten the reasons for instigation in the passing years.

6.5.5 Pharmacists' roles in medicines reconciliation

As part of the original interview schedule, interviewees were asked about the role of the pharmacist in medicines reconciliation. Interviewees were generally positive about having a pharmacist in practice to do medicines reconciliation:

> We wish that we had a clinical pharmacist on board and who would be able to do it because I think we could do far better in our medication reviews, we don't do as well as we would hope to do of these I think and that is probably just again one because of lack of time, because medication review I think requires you to actually concentrate and look at it and make sure you have reconciled it, you have optimised it, so it takes time. [GP11]

Unfortunately most interviewees cited lack of funding as a major barrier:

> It would be a very useful role but it would cost the same as having another doctor and another doctor would probably be more useful. [GP10]

As part of the *Clinical Pharmacists in General Practice* scheme (NHS England GP Forward View (a)), some funding was available (see 7.3.3), this practice manager explains why their small practice decided not to bid for funding, citing the main barrier as lack of capacity for training:

> I understand that there aren't that many pharmacists with the skills to do it, it depends how much investment that we have to put in and I don't mean financially, I mean time wise about training, whether we have got the capacity to do that but potentially, potentially it could be really good. [PM13]

Practice 12, however, had found funding for extending the pharmacist's role as part of their efficiency scheme and were planning to scan discharge summaries to clinical pharmacists:

> We're actually starting an initiative now, we have a clinical pharmacist one session a day and that is actually going to be her role actually, the discharge medicines reconciliations, to see if we can change this. [GP12]

6.6 Error and harm as a result of failure to process discharge summaries

Causes of error and harm (the bulk of the material relating to time/workload pressures) form the focus of this section. Harm severity/preventability and documentation errors are also considered. Error is used synonymously with failure for the purposes of this chapter as there is no established literature on medical 'failures'. In general, interviewees found it difficult to recall instances of error/harm and also found it difficult to discuss harm vignettes without access to the clinical notes of the patient.

6.6.1 Causes of error and harm

This is a large subtheme. All the interviews contain content coded at this node and around 200 references were made to this topic. The bulk of the material related to time and workload pressures so this is discussed as a major sub sub-theme. The data are presented here using human factors models as a structure. The report of causes of error and harm moves outward from the people at the centre of the error (patient and practitioner), through the immediate workplace and on to wider systems.

Reason’s Accident Causation model (Reason, 2000) is considered an important model in patient safety but it is harder to apply to my data. In Reason’s model latent failures lie dormant within the system until an unsafe act occurs which aligns the holes in the slices of the Swiss-cheese model allowing an error to occur (Reason, 1990). Latent failures include: organizational factors, inadequate supervision and preconditions (e.g. fatigue). The healthcare staff interviewed in this study were not experts on theories of human error and were therefore unlikely to be familiar with concepts such as active and latent failures while responding to open questions in a semi-structured interview. The WHO conceptual framework for the international classification of patient safety (WHO, 2009) has been considered as a reporting framework for the qualitative data in this study. There are ten headings within the model and 48 concepts which are designed to be used to fully describe and analyse an individual patient safety incident in order to look toward prevention strategies. The complexity of this model makes it difficult to apply to the interview data at hand which relates to the systems in the practices rather than individual incidents. The causes of error/harm are sometimes mentioned in the same breath as possible solutions - and where quotes are inseparable they are discussed in the following theme on strategies for safety improvement.

Due to the problem of participants’ failure to recall instances of error/harm related to discharge summaries in early interviews, a number of changes were made to the interview schedule (Appendix 13). The initial construction of the interview schedule was also difficult because the causes of error and harm are diverse (and there are multiple taxonomies of error in primary care) (Makeham et al, 2002, 2007 and 2008, Jacobs et al, 2007, Rubin et al 2003, Elder, 2004). It was difficult to design a list of prompts in semi-structured interview schedule given the length and complexity of these taxonomies. Clinical harm vignettes drawn from harms detected in the quantitative data were used to stimulate discussion from the fourth interview onwards. The vignettes were complicated, largely due to the medical complexity of the patients, and substantial interview time was needed to help participants understand them. When participants commented specifically about case vignettes the quotes have been stored with related vignettes in Appendix 17 as without the vignette these quotes lose meaning.

6.6.1.1 Patient responsibility

This study focussed on a particularly vulnerable set of elderly patients who may have multi-morbidity or confusion. The context of the discussions therefore was expected not to hold the patient responsible for error (though see section 6.5.1). There were, however, some wider comments relating to patient responsibility and the way general practice is set up:

> I think we have developed a very paternalistic approach and we have systems in place we have got you know text reminding systems and stuff we can send patients to make it easier for us to do that, but ultimately whose fault is it if a patient doesn't come for a blood test? The trouble is the system probably says it is ours because we knew they should have one and they didn't remind them and I think that is not necessarily fair. [GP14]

Practice managers talked about the difficulties of following up patients and the lengths to which practices should go:

> We do try and contact patients we write to them if we have not been able to contact them to ensure that they are aware that they need a blood test, please make an appointment with our health care assistant or an assistant practitioner, but then what do you do after the week's gone? How do you keep…… because you have got 6000 patients on your list? [PM18]

Practice manager 19 was keen to point out that they had taken extra steps to reduce the responsibility placed on patients as they had recognised that their demographic was particularly susceptible to error due to language barriers.

6.6.1.2 Practitioner responsibility

Interviewees recurrently referred to 'human nature' as the cause for the majority of errors of omission found during this study. 'Human nature' can be defined as: "the set of properties that humans tend to possess as a result of the evolution of their species" (Machery, 2008). It is not a term used in formal error models and it is not the same as ‘human factors’ which is an established science drawing on physical sciences such as physiology and biomechanics. The WHO define human factors as “the study of all the factors that make it easier to do the work in the right way.” These GPs sums up the problem as they see it:

> The mind doesn’t make a conscious effort to double check, that is human nature I guess. [GP15]
>
> “it happens because it is just a visual check isn’t it?” [GP13]
>
> “I suspect it is not fool proof, human error whatever” [GP14]

This practice manager talks about human nature with respect to workload pressures:

> “it is human, you know you’re faced with a pile of documents, you are in a hurry it is… they know but it is just difficult to… it is difficult on a day we are all human aren’t we?” [PM17]

Some interviewees could not be persuaded to think beyond this as a cause in itself but others were able to expand – thinking of human and system factors which contribute to error. Human nature encompasses some of the classical reasons for human error (slips and lapses for example). Slips and lapses are often mentioned by interviewees (who are not experts in formal error terminology) under the description ‘omission’ or ‘oversight’:

> You have got to be a little bit paranoid about checking back… I think it is much more likely that I’ve if it was me that looked at the letter, that I just didn’t notice that it was… I was going too fast and I didn’t realise that that was what they were asking us to do… An omission yes. [GP10]

Distraction as an element of slips and lapses was described. This is highly inter-related with time and workload pressures in the working environment:

> It is not an ideal world and things do… either get missed or I am going to do that in a minute and then something else happens and the minute you know you sort of forget about what you were going to deal with because something else has cropped up. [PM15]

GPs described lack of checking due to over-familiarity with the work and with patients as a cause of slips and lapses:

> We become a bit snow blind that we sort of read of oh yes somebody in with an infection exacerbated their COPD and blah, blah, blah PS they were in acute renal failure please check their U's and E's again. [GP14]

This is at odds with the over-arching views expressed on the importance of continuity of care in general practice (section 6.4.1). Personal diligence levels were ascribed to 'human' nature by this practice manager:

> Because we're all you know you log on and you have got like 130 to go through, some people may not be as careful as others and that is human. [APM12]

However others were not so accepting of the differences between individuals. One GP had very strong opinions on individual clinicians' diligence levels based on his own audit work, attributing failures to "laziness":

> This is an ongoing issue with all practices because all clinicians don't work the same and this is the problem we have that people don't stick to the protocol do they?... well I have looked at similar work for each clinician and it is the clinician…so it is user dependant…when we have audited in house that is what we were finding…that is an ongoing issue that is difficult to address actually…they are not using the system are they? They are not looking at the discharge summary and reconciliating and actually you know it is not rocket science for a clinician to do it, it needs to be done… they put it down to you know the workload but actually we're relatively protected here. [GP12]

Field notes taken during this part of the interview showed his most extreme facial expressions here implied frustration with colleagues. When challenged as to some of the reasons for these differences between individuals he was able to give some mitigating reasons why he perceived some individuals might perform less well than others:

> Some people have a much higher capacity than others, some people are a lot more… you know a lot quicker and patients and a lot… you know the type of patients we get varies as well doesn't it on that you know as individuals so yes it is going to have a factor. [GP12]

Another interviewee expressed views on individuals performing 'poorly', though as can be seen he includes himself among them:

> I am the worst person to be given that responsibility to deal with discharge summary during my busy surgery…I am talking from my personal experience, there might be if not more 10 to 20 percent of people like me.... Oversights -You know that is individuals isn't it? You know you're doing it then… whether you have to look at it as a performance issue, whether it is happening in a pattern, whether it is something... personality you know there are a whole load of things and I think that is where the practice, policies and procedures needs to be robust so that they do certain things, should be picked up and dealt with… Yes so the practice does use the tasks and that bit but again it comes down to individuals who have seen the discharge summary you know who have made sure that they have communicated. [GP15]

He talks about how safe systems might mitigate against the oversight of an individual practitioner but still believes that individuals are largely responsible for the documents that they read and process. Occasionally criticism or blame of individuals was laid at the door of one group (trainees):

> We have trainees who come and go so you know every 6 or 12 months they might leave and they might not remember to pass on the tasks, in fact I think one of the examples that you had was from an F2 (*trainee)*. [GP18]

GP19 could also remember an instance where a trainee had failed to ascribe an allergy status in a discharge summary and this lead to them instituting a new training scheme for trainees to assist them with processing discharge summaries.

6.6.1.3 The workplace environment as a cause of error

Lack of time was anticipated to be a major factor in the cause of error in light of the current prevailing climate in general practice. The majority of surgeries (seven) did not have a specific daily admin time allocated to GPs and therefore GPs spoke of the demands of trying to fit reading letters on Electronic Document Management Systems into what was already a very full day, "It is the squeezed in-between time" [GP13], taking advantage of patients who did not attend appointments or breaks between surgery and visits. One GP spoke about the importance of "protected-time" which she defined as occurring after surgery (i.e. outside working hours):

> Just making sure that you get enough time, protected time to read the letters properly which you know is what I do, I try and do them separately and not do them in-between anything else…at the end of the day which is not the best time because obviously you're tired but it is a time to do it. [GP17]

We can see that this GP considers it normal to work outside surgery hours but can see how fatigue might start to affect decision making at this time. Interviewees talked about using time at home to catch up with viewing mail including discharge summaries, it was interesting that these quotes fell in pairs (with staff at two particular practices, 10 and 14, echoing each-others thoughts):

> Some of them will just come in on their days off and do the mail as well, you know because they feel that they can't catch up with it during the surgery times. [PM14]

> I come in half an hour before surgery opens and do stuff like that, I come… I have a laptop that has access to the medical record which I take home so nine o'clock at night, 10 o'clock at night I do it. [GP14]

Some practices try to preserve a half day of admin time for full-time GPs once a week but this leaves part-time GPs struggling to find a space for admin, unless like practice 11 the organisation has taken steps to mitigate this:

> We employed two part time salaried GPs recently and it was factored in to their rota admin time, so yes as far as I am aware it has always been part of our employment. [PM11]

Interestingly the GP from the same practice sees a different side:

> They tend to do sometimes at home as well so that we notice that, especially with some of the part timers. [GP11]

A different perspective was offered by GPs working in practices with particular schemes in place to protect admin time:

> Yes it is plumbed in to your day so I will do it as I go along often, so I have got none now, yes or at lunchtime basically yes but yes the whole process now takes me about half an hour for my discharge summaries… which is manageable…actually we're relatively protected here…you know everybody feels they are working hard but actually our working day is very, very manageable but I look at a lot of other practices etc. and you know we're one of the lucky ones. [GP12]

Practices 18 and 19 have gone further with the concept of protected time for GP processing of discharge summaries by creating space in the appointment book (see strategies for safety improvement section):

> I just think some of it is the way we work really because we have good administrative support, because we have got more dedicated time for these things and so on so it is not an issue. [GP19]
>
> It is quantifiable isn't it? You can see how there is 5 discharge summaries, there is 4 of us you know it is 2 and one each for everybody else and you have got a visit so you're not going to do anyone so it is a way of us being able to quantify the workload and manage it appropriately within the team. [GP18]

Many of these interviews had an overriding theme or tone of over-work with GPs describing increasing workload volume and work spilling out into other life areas, this part-time GP describes a near burn-out situation from which he has remedied himself:

> Some days you open your mail box and it is you know you haven't looked at it for a couple of days, and there is 75 letters, and sometimes you get that inertia of going above a certain number and you think, oh, what the hell I am not going to bother today, I just haven't got the enthusiasm to look at all of that mail. I have stopped doing that because I recognise that I used to do it and what I do is I say I don't care if it is 75, set myself a goal of to knock 25 off the list you know and you know in the next half an hour and you have actually achieved something. [GP10]

Similar acceptance in the 'real world' general practice situation is expressed by this GP of the same age group and also of part-time working status:

> I used to love trying to clear my inbox but I just accepted I am never going to do it so I… we have sort of a warning system where we have to clear them within so many days so I get those done and the rest can wait until the next tranche you know. [GP19]

The main competing work strand seems to be face to face appointments:

> No we don't have protected time so we haven't got any time to protect because the demand is such that we need to be seeing patients. [GP14]

One practice manager talked about the challenges of trying to reduce admin workload for GPs who were afraid to relinquish clinical control of paperwork:

> I mean we have said to them like, the out of hours, I know that some practices don't send those to the doctor unless there is an action on it that they need to see but our doctors they are quite thorough and they want to see all of those so it is very difficult to reduce the work load when they kind of want to see everything you know? [PM14]

6.6.1.4 The task itself (within the workplace environment)

Interviewees considered the nature of the requested action itself as a cause of error. For example, time distant requests were considered more likely to fail to be completed by this practice manager:

> I think maybe the ones that maybe fall through the net are…like please recheck BP in two months or something. [APM12]

The reasons for this individual's views are likely to be complex and possibly relate to the practice's set up and systems. At the other end of the scale this GP believes that unrealistically 'urgent' requests for tests may also be more likely to fail to be completed (among other 'secondary care factors' section 6.3):

> I should imagine it is the ones just within a week or I don't know maybe where they are written on their discharge letter, not highlighted enough would be a problem, I don't know. [GP17]

GPs were particularly frustrated with requests to follow-up hospital results (see section 6.3.2) but thought perhaps this itself was a cause of error:

> Maybe just the process in itself is so tedious because you have to go into *(hospital IT system)* and then wait, and how do you know when the result is already there or not? [GP11]

Task complexity is an obvious reason for error. The more steps in a task the greater the likelihood of failure according to Failure Modes Effects Analysis. There are particularly prevalent conditions for this in primary care where ambulant patients confer a greater risk. This GP alludes to shared patient/practitioner responsibility exacerbating these conditions:

> I think the thing is it all gets a bit lost in the ether and something else happens and they forget and it could well have been our fault that we didn't prescribe or do something but it is kind of lost amongst lots of other things. [GP16]

6.6.1.5 Poor equipment design in the workplace - IT issues

Although often promised as solutions or defences to medical error, deficient IT systems have been shown to be the cause of workplace error (Schedlbauer et al, 2009). Particular issues were identified with disconnection between the main clinical IT system and the EDMS were identified by participants:

> It is sometimes difficult on a, you know, electronic format that you're flitting between screens trying to see what is going on and you sometimes will miss stuff. [GP14]

The way in which practitioners interface with EDMS was highlighted:

> When you're on *Docman* and you're looking at discharges you have to come out of *Docman*, go in to the medical record, deal with it, go back in to *Docman*, I wonder if that is an element?... I don't know, you know, if they leave it until the end and then it doesn't get dealt with? [PM15]

This GP expressed difficulties with the ability of clinical IT to document medicines reconciliation information and describes an 'ideal system':

> I think sometimes there is an inability to capture that type of information on the system at all or lack or time or you know lots of different factors so you know ideally it should be 100% of these are being re-conciliated but it is maybe improving the system to say you know, 'medicines reviewed, these are the actions' or you know a one word… so you have acknowledged it as something you have looked at. [GP18]

On talking about a return to a paper-based system (which had occurred at practice 13 and 16), GP16 described the motivations behind the change. It was also acknowledged in the interview that a number of the errors detected in the quantitative sample at practice 16 occurred at the time when the system was in flux between paper and electronic systems:

> The worry about *Docman* and the way we have had previously, not currently, is it sits in doctors' folders and it doesn't get actioned, and if they are then away for a week or two weeks or three weeks, so we feel much better and you don't know also because we're part time you don't know who is here or not here. And so I think that is why we have gone for the paper version. [GP16]

Another concern with EDMS is the possibility of scanning error:

> Sometimes there has to be care taken that when they are downloading or even when scanning sometimes if you have got the front page of one patient and the second page maybe of somebody else, and you know what system do we have in place to make sure that both the pages, page one and two belong to the same… because I have seen that, that it belongs to different patients. [GP11]

Indeed sporadic instances of failure to correctly scan documents were seen at a number of study practices.

6.6.1.6 Organisational factors as a cause for error

Organisational systems form an important part of Reason's Accident Causation Model particularly as the source of latent failure. The semi-structured interview schedule asked questions around practice protocols and systems but interviewees, by and large, found it very difficult to openly criticise these during the interview (with the exception of practice manager 19 – see below). Some of the interviewees discussed elements relevant to safety culture (without consciously realising they were doing so). At the smallest practice in the study the PM describes a feature of a possibly immature safety culture:

> I think you just trust that the doctor, because they have looked at it, has done all of the necessary things. [PM15]

As further evidence of immaturity of safety culture some interviewees discussed the role of luck in mitigation of error. This interviewee is discussing a failure found at the practice where a combination of warfarin and NSAID was prescribed on the discharge summary but fortunately that patient failed to have any medicines reconciliation performed and therefore the 'failure' actually prevented harm to a patient:

> It was just that you know we didn't intervene, we got lucky yes and that is what happens, that is what happens so general practice that you look back sometimes and you think god I was lucky there. [GP12]

This practice manager comments on one of their practice's SEAs which she described as coming to light through "luck", although one could see this as a form of checking or diligence:

> I think someone was just looking through tasks and they just happened to notice that they were sat there and they had been sat there for a while and they hadn't been actioned, I think it was just lucky that someone had just gone through the tasks. [PM11]

Potential loopholes could be seen at some practices with more emergent safety cultures:

> So unless somebody has highlighted that at the point of when that discharge summary came in to your system, the chances are it may not get picked up again so that is our only actual check on the system that's there, is at the point of entry unless the patient raises it to say that you know I was told that I would have this test. [GP11]

At the largest practice, where systems were highly automated and safety culture seemed to be quite fully developed, their practice manager candidly explained some of the reasons why they had had systems failures in the past and how difficult it had been to detect them:

> We have had a few cases where processes have gone a bit wrong, usually to do with changeover of staff and where we have had a changeover of team leaders as well as staff at the same time, that was particularly when we had a problem…We do have a system for blood tests which is a diary entry that is put on the system which should have free text that says what needs to be done and how often. And then all of those every month are printed and given out to the GP's to check if the patient still needs it. So it comes to them actually and it actually wasn't working very well… this is the one I was telling you about, we have had a couple of cases were the system has fallen down and that was a particular one, that was the biggest…New team leader and the member of staff who had done it for years and then there was a misunderstanding and it was as simple as that…when that works, it works very well of course when it goes wrong you might not necessarily know it has gone wrong for a while. [PM19]

6.6.2 The standard of documentation

One of the main difficulties with collecting the quantitative data by retrospective record review is the standard of documentation, even when the full free-text record is reviewed. The author's interest in this subtheme grew as the study progressed (although it did not form part of the original interview schedule). The standard of documentation is clearly relevant to safety and is recognised in models of human error (Reason J, 1990). GPs expressed the unlikelihood of documenting decision making in the processing of a discharge summary unless disagreeing with a requested action:

> It is even more important to document something where you disagree with the clinical decision. [GP10]

One GP appeared to express guilt about not documenting everything that might be important:

> INT: Yes, how likely would you be to document your thinking about that?
> RES: Probably not as likely as I should be. *[Laughs]* [GP17]

GP19 expressed frustration with having use documentation to 'cover himself' against hospital decision making:

> I thought to myself; well alright I should record everything, but again you know if you believe that it shouldn't be done then why should you have to say all of the time just because someone in hospital has said it you know? So I mean I do, do it myself but I am just trying to think you know just because the hospital says it, therefore we have to justify it when we know the patient well enough. [GP19]

Practice managers were less likely to be document clinical decision making themselves but spoke of the possibility of entering the discharge summary as a clinical consultation event in the facing record:

> If it forces the GP hand *(to document more decision making)*, no problem as far as I am concerned. [PM16]

6.7 Strategies for safety improvement

During the interviews and field work a number of strategies for safety improvement came to light. Some of these are specific to the practices who had designed them and some are part of broader local or national initiatives to provide safer care transitions. Practice-specific schemes were found in both the smallest and the largest practices (particularly practices 18 and 19). The field work process of sitting with admin staff was highly instructive for informing the collection of strategies for safety improvement information as the data gleaned here described the practices' document handling systems. These data were used to create flow-charts and inform the subsequent recorded interviews. Qualitative data on wider local and national innovations were not part of the original interview schedule but grew out of increasing awareness of the interviewer after interviewees discussed some of these schemes de novo in early interviews (e.g. the national receptionist training scheme and the Unplanned Admissions Scheme, UAS). Safety improvement strategies were collected partly to understand the maturity of practices' safety culture but also because these strategies could be the building blocks for a future intervention to improve discharge summary processing.

The content in this large theme begins with strategies for administrative processing of discharge summaries followed by strategies designed to assist clinical processing (mainly IT) and finally ends with national strategies which (UAS and SEA). Lastly - impacts directly from the study were chosen to be discussed separately (purely for clarity) rather than combining them into the document flow narrative.

6.7.1 Changes to administrative systems as a strategy for safety improvement

Interviewees were asked how, as a result of past experiences, administrative systems for handling discharge summaries had been changed either to improve safety or efficiency. Every interviewee had a comment to make in relation to this subtheme, and this was in many cases stimulated by discussion over the practice's process maps. Every practice in the study was operating different mail handling systems (with a variety of ways of dispensing summaries to clinicians) which were not of particular interest in terms of patient safety so the discussion here turns to more clinical strategies. Practices 12, 18 and 19 were particularly innovative and their strategies are described below in case study based approach within the narrative.

6.7.1.1 Changing responsibility

The concept of administrative staff handling the 'clinical' aspects of discharge summaries provoked different opinions. Some interviewees were unable to accept that non-clinicians could process a discharge summary, and indeed at all but one practice (12), the discharge summaries were reviewed by clinicians:

> I think that wouldn't be appropriate really… because I think they are not clinically trained and they might interpret what is on the summary, not as a doctor would so I think that would be a bit… risky I think [PM15]
>
> Important things like discharge letters should be scanned to the GP [GP17]

GP 14, while he could see the utility of changing the workflow approach, was cautious about discharge summaries in particular:

> There are erm efficiencies and savings to be made by looking at our processes and streamlining some of the things that maybe admin can actually take autonomy over. Some of the documents that come in to us and it never needs to come to us because we rubber stamp it and that creates work for us where you know we are already very busy… unfortunately I still think there needs to be clinical input to discharge summaries [GP14]

His attitude could be seen to be changing within the interview and towards the end of the interview when asked about ideas for change he cites interventions that might change workflow:

> To me it sounds like it is the key comes to reading, having an effective strategy to read the discharge summaries and identify the action points and deciding as a team who is best placed to do that. [GP14]

At two practices GPs felt it was within their receptionists' scope to take over processing discharge summaries:

> If the system works I don't see why not, it is just you know if there is enough instructions in the letter then admin can be taught you know how to do that. [GP10]
>
> That is easily doable you know maybe you know that part of when the discharge summary comes with an action, a GP action and if it is something which they can do they should and then just inform erm or do a patient note for the clinician just informing them that they have dealt with it [GP15]

Practice manager 17 was enthusiastic about the idea as an interesting extension to the administrative role of her staff but expressed some frustration that it was not already happening:

> I would have hoped that the girls would do that automatically but they don't and they haven't been told to do it and they presume the doctor wants to do it and they don't want to do it but that is how it… it slows things down… it is going to become an integral part of their job, they have got no excuse not to take part in it, they have got to do it. [PM17]

Practice manager 11 was less enthusiastic and cited some caveats to this role extension:

> I think that would need protected time as well so I don't think I would mind it if they could dedicate their full attention to it but definitely not as a side line, as they are answering the phones and on reception. [PM11]

Practice 19 had considered developing the administrative role but had currently rejected it as potentially adding to clinician workload:

> We have also toyed with this idea of having a group of staff who might read discharge letters and do things like that you know? So you know of the medication seems different, go to the GP and they will change that… I think it would make it harder actually, I don't buy this you see, I have done a sort of I come round in a circle so I started by believing all of this could be palmed off and actually I think what we have done is we have created extra work for ourselves [GP19]

Practice 12 had been closely involved with the national training scheme for receptionists (NHS England website). Their practice manager and GP speak about the 'narrative' that receptionists write in the facing record when they upload a discharge summary which includes a summary of the admission and the actions needed to be taken:

> It is easy when you're looking at the notes if you can see like you know 'nil of note was discussed' or you know 'patient needs an echo, arrange' you know things like that would help, would help everybody you know a practice nurse would look at that and think right everything is sorted out with that and you know they will be going and having an echo soon so I think it is very good, it seems to work." [APM12]

> What happens is there is often patients that we never see but we are still their GP, yes? The narrative will go in to their notes…everything should be under the *new journal* and it should be coded as such so it just makes it easier to follow… so even if you have not seen the patient and they have been under the care of a specialist or the hospital team you can tell exactly the kind of flow of what has been happening. [GP12]

GP12 had had success implementing the principles of extended receptionist roles in four different practices. The in-house training process for their receptionists, he described as rather laborious, is detailed below:

> what we did was actually ask them to give us the physical letters…and then what we did was had two highlighter pens each and we would read the letter so still obviously we still read the whole letter but we would read the letters at the time and in green we would highlight what we felt needed Read coding and in yellow we would what we want as a narrative. [GP12]

Practice 11 encouraged a similar 'narrative' but this was provided by the doctor reviewing the summary and done in a less standardised way:

> We also when we get our discharge summary you put in a bit of… you might have noticed we do put a bit of a summary there that is that which can vary, again it is very individual thing to do as to how much you put in [GP11]

6.7.1.2 Prioritising the discharge summary

Three interviewees suggested an idea de novo; giving greater priority to the discharge summary over other correspondence. All three suggest slightly different ways to go about this. Firstly through priority for physical scanning:

> They [*discharge summaries*] should get priority for scanning above outpatient letters so they should go to the top of the pile, so maybe they should have a separate pile then and then do those first, that might be a good idea. [GP17]

A prioritisation system involving preferential scanning of discharge summaries was, coincidentally, recently instituted at the author's own surgery as a result of the pilot work undertaken for this study. Highlighting the discharge summaries in the electronic document management system is another way to prioritise doctors' attention:

> One thing that there isn't is priority markers in the mail, it is not something that I have thought about really, but actually those discharge summaries are quite important. [GP10]

Directing discharge summaries into an on-call work-stream is another possibility (as was already occurring at practices 13, 14, 16 and 18):

> I think that if at all we would put steps in place to do that, that would be ideal maybe separate the normal *Docman* work flow of letters to the discharge summaries, is a possibility, that it comes in a different inbox and you know maybe and on call doctor can deal with it on the same day. [GP15]

Interviewees at practice 18 were encouraged to talk about their unique system which involved a clinician reviewing all discharged patients by phone on the day of discharge summary receipt, they talk about their different reasons for instigating this service:

> On a Friday night is when patients realise that they have been discharged from hospital and they haven't been given enough medication and therefore as you're trying to lock up they are inundated with phone calls and concerns by patients and relatives that they haven't got enough medication, so to try and obviate that, this process was then put in place. [PM18]

> The reason it came about was we acknowledge it is a time of high risk for patients in terms of safety, errors [GP18]

Their practice manager describes in detail how the system works, including the physical space within the appointment book that the discharges occupy:

> Invariably it is telephone call, so they are about 10 minutes but they are actually numbered so the patient doesn't actually get a text message to say they have got an appointment but it is just so that it is for the doctor to actually see what they need to be doing and who they need to be contacting… then the doctor can go back to it depending on whether then they have got meetings or whatever it is on the system and they can go through it as they need to. [PM18]

When asked to consider if the practice would ever use receptionists to undertake a similar function (as was happening in some of the Nottingham practices taking part in a local discharge incentive scheme) she was somewhat negative that this would work well in reality:

> You really need to ensure that that staff has had really appropriate training in handling that because if you're phoning up to say 'hey how are you, have you got enough medication and did your procedure go well?' the patient is going to actually wonder 'well why are you phoning me when you're not a clinician…' you need to advertise it to the patients that this could be the case you would be contacted by a non-clinician to review your discharge summary. [PM18]

One clinician was vocal in opposition to having appointment time booked out for dealing with discharge summaries:

> I think that is a waste of resources where you need to deal with discharge summary in that time slot. [GP15]

6.7.1.3 Continuity of care

At practice 19 a simple innovation for improving continuity of care at scale was in place. At this large practice individual GPs (most of whom are part-time) advertise their working days to patients directly on slips that are given out to patients at the end of an appointment or by a variety of other means such as leaflets, posters and the practice website. The practice operate a 'doctor-first' system in phone triaging and have found this to be a good way of ensuring continuity:

> The 'usual doctor system' is the biggest way that we have done that so at least we get some continuity of responsibility and continuity of correspondence if nothing else, we try and encourage the patients to see the same clinician for follow up care … that actually encourages continuity I think because if you phone on the morning of the day the doctor you want to speak to is in you will get an appointment with that doctor to speak to them and they manage their own face to face appointments so they will know whether they need to see you or not, so I think that works quite well but it does all very much depend on the patient seeking that continuity although our staff have been trained to try and encourage it as much as possible. We have done objective stuff to show that we have good continuity now whether that is a help or not… [PM19]

The author was impressed by this simple system and has subsequently instituted it in her own practice which is similarly large and operating a 'doctor-first' triage system.

6.7.2 Information Technology as a strategy for safety improvement

The majority of interviewees wanted to talk about IT as a strategy for safety improvement. Both negative and positive experiences of information technology use in relation to discharge summary processing were described. There is a preponderance of quotes from GPs, perhaps because they are the ones performing the tasks associated with the discharge summary and perhaps because the scanning/filing end of the process is already highly automated. Interviewees talk about IT solutions to prescribing and diary/task functionality within their clinical systems. One of the most commonly mentioned simple IT features was the need for two computer screens for cross-matching at medicines reconciliation, though with the fear that the consulting room would look like “mission control” [GP14]. One surgery (11) had developed an innovation called ‘PatNav’ – an electronically searchable list which tells staff how to arrange all tests. The author asked about potential strategies for improvement which had come to light during earlier interviews (in an iterative fashion). Strategies which were discussed included; task systems, templates for discharge summary processing, coding actions, inter-operability of IT (the ability of computer systems to exchange information) and medicines reconciliation technology.

6.7.2.1 Tasks

Electronic ‘tasks’ are often used to send work related to actions in the discharge summary to others members of staff at a practice. PM10 described a Failure Modes Effect Analysis approach to changing the ‘task’ system at the surgery, one of the changes made was assigning a specific member of the administrative team to deal with tasks related to hospital letters including discharge summaries:

> A while ago we changed the way we did tasks, we had a ‘task’ task group if you like with you know a receptionist, a doctor, and admin person, looking at the way we do it now and whether we could do it any better and then presenting it at the next PLT. [PM10]

Interestingly, when asked to think of changes she could make to reduce missed tests and follow-up, this GP also comes up with the idea of an individual with responsibility for tasks:

> I think maybe we could flag them somehow so that, obviously [name of Secretary] gets a million tasks a day, all different, so maybe they could be flagged, urgent blood test and go to one specific person or their deputy when they are away maybe? I think that would help, one person could take ownership of you know that. [GP17]

Practice 18 have, as a direct result one of the harms detected in this study, created an innovative 'task group' for each of their nursing homes – having identified these patients as particularly vulnerable:

> One of our doctors who is keen on IT has created an owner essentially for tasks for every resident at [*name of nursing home*] so we have created a user and in that way we can keep track of all tasks for those patients for the future so we have trainees who come and go so you know every 6 or 12 months they might leave and they might not remember to pass on the tasks… we would have an admin person who oversees it and everyone who is looking after those patients at [*name of nursing home]* so me you know the [*trainees*]will be able to see what is sort of coming, what is needed as well as the admin to be able to control those tasks so that works for a population of 50 patients or 40 patients or whatever and it is quite a good way of capturing those ongoing needs. [GP18]

6.7.2.2 Coding actions

If the correct codes are inserted into clinical IT systems they can be used to track future clinical actions which are needed for a patient. Practice 19 were operating an advanced system for tracking actions coded by clinicians which was unique in the study and was not found in the literature. This system is particularly pertinent to discharge summaries which often result in multiple actions which could be coded by the GP (e.g. 'arrange blood test', 'arrange visit'):

> GPs can, with one press of a key, get a list of available protocols in *EMIS Web*, if they have configured their list they just then double click, the ones they have got the right patient selected then it adds a code to that patient's record so they will get a list of protocols and one of them will be for example, making a routine appointment face to face with the GP. And that adds a code to the record and then <u>the next day</u>

> <u>the admin team run a search for those codes and print the letters and out they go</u>. [PM19]

Almost all of the practices in the study described use of a less automated version of this system relying on the 'recall' function of their clinical IT system. The systems associated with the recalls varied by surgery (ranging from practice 17, where the administrative team check regularly and send diary entries back to doctors, to practice 11 where items are entered personally by doctors who must then follow them up on their own). These recalls are a standard operating feature of most clinical IT systems and rely on the adoption of regular checking systems like the one described at practice 17. Interviewees described these systems with pride:

> Other practices I had worked in I hadn't seen anything like it and I thought it was you know a good thing to do. [PM17]

Practice 17 seems to have evolved their system the most, even developing 'waiting lists' for in-house procedures often requested in discharge summaries:

> If people need an ABPM [*ambulatory blood pressure monitor*] or a cardio memo which is often requested for on discharge letters, we have got waiting lists for that and we can add them to that waiting list and everybody can see the waiting list and where they are… it is electronic, it is on the little tab at the top where the little buttons are, hover over it and it tells you where the patient is on the list. [GP17]

During the interview process it became clear that GP11 was thinking about evolving the recall system at the surgery to be more like the model described in the much later interview at practice 19:

> Whether we create a separate kind of action from discharge summary kind of recall and then you can do a… that is a potential something to kind of look at yes and then we can just run a search on that to see if it has been completed yes, that is possibly something to take back. [GP11]

6.7.2.3 Templates

During the quantitative data collection phase it became apparent to the author that some of the problems with lack of documentation surrounding discharge summaries might be resolved with a template, although there is a general problem with paucity of evidence for using templates. This GP came up with the idea of a template independently:

> I guess attached to the discharge summary you could probably create a protocol you know there is a tick box that says I have looked at all of the medications I am happy with the medications as they stand or you know something that reflects this is the change we have made and sometimes it is obvious but I guess just having that as a… you know we could probably create a template for our discharge summaries but the way it is at the moment we don't have that, we do it a little but more informally but that type of system would collate some of that extra information. [GP18]

Others responded to direct questioning about the usefulness of a template with some GPs welcoming the idea:

> A sort of template… discharge summary template is an interesting…there are ways and means of doing that, the *SystmOne* templates or *SystemOne* automatic consultations that you can add and you can adjust so if it makes you check what you're doing then maybe that… that would be a better aide memoir. [GP14]

And others highlighting potential problems with templates in general:

> Sometimes templates just make up more work because you have got to get up the template and it depends how good they are at you know saving time or not. I don't know, I have a feeling that using techniques to raise the priority and importance of changes in medication on discharge would be a better way although of course any template that saves time makes it easier to contribute. [GP10]

6.7.2.4 Medicines reconciliation technology

GPs frequently mentioned printing out discharge summaries to manually tick off medications and avoid the need to hop between IT systems. A future intervention that remove the need for this process is electronic medicines reconciliation. As of yet, British general practice has not widely adopted any software with this purpose and as such this was not included on the interview schedule. This technology does exist in the US but non-experts would not be aware of this. Here one GP here describes a prototype idea for such a system:

> I mean I don't know how a computer would do this but it could say that you know 'reconciliation'… if a discharge summary is put in, that there is some kind of system that says you must reconcile… there are some different medications, reconciliation must be done, before you

> go any further… anything that make it easier because it is a very time consuming thing to do. [GP10]

Another GP describes a desire for such an intervention:

> If there was some way of not having to visually check two different systems, two different things that look different or if there was some way of flagging up a difference, particularly a dose difference because I think they are the things that we probably are going to miss, that if there was some way of really flagging that that would be the thing I think that would be most helpful in terms of that and it might well have prevented that one if there was a… an obvious "this is the difference" whether it is colour or what. [GP13]

6.7.2.5 Interoperability of information technology

Many interviewees touched on interoperability as an 'ideal' but there are only a few regional examples in England where GP staff have access to hospital records and vice versa (e.g. the Salford Integrated Record). Here a Manchester GP described herself as "lucky" to have worked in these type of systems:

> As the GP when I was working out in the community, I had access to those notes too so I could snoop and say right …Well what have the hospital done? And then I could actually input on to the notes "look I don't think you should start the patient on this, I have tried it before, they had this reaction, X, Y, Z" and not only could I add my piece but I could… when they come out I could see why certain changes had been made. [GP18]

She felt that collaborative information sharing was vital:

> You will see that there is a lot of information sharing that helps prevent admission in the first place or there is less risk of things going wrong in terms of medications or because there is a full explanation of why someone has done something and that is two ways… so it isn't the hospitals saying that we know everything, there is that ability for it to be a complete… or shared correspondence. [GP18]

This Nottingham GP describes some of the pitfalls of the hospital having partial access to GP IT systems where they cannot see crucial information in the free-text:

> Things are maybe a bit more transparent now because they have access to *SystmOne* in the hospital so they can probably see the most up to date medication there so that is a help but you just have to be a

> bit careful that you know I had made that change yes two weeks ago that they needed to go on something twice a day and my plan actually was after two weeks I was going to reduce it and because they can't see the free text sometimes. (GP11)

6.7.3 The Unplanned Admissions Scheme (UAS)

This specific enhanced service was not part of the original interview schedule but it was a common part of the practices' process maps and both GPs and practice managers mentioned it frequently, especially when the study population was explained by the researcher during the interview. It was not the purpose of this study to provide validation for the UAS which was a national Direct Enhanced Service which ran from 2015 to 2017 introduced primarily with the aim of reducing readmissions for vulnerable patients (with an implicit cost saving agenda). The UAS is of interest where it intersects with changes practices made to systems in order to provide enhanced services for vulnerable elderly patients who have been discharged. At practice 19, discharged patients from the UAS are booked into appointment book slots by the reception team:

> It just becomes another appointment in effect yes…you will read the discharge letter and you will make sure that, you know, whatever happens has been done… I think it is good because it forces you to ring them so I think that is important… it might be in the evening after surgery or it might be but it is there and it gets done and it becomes a reminder. [GP19]

Practice 12 operated a similar prioritisation within the appointment book for UAS patients and as can be seen from the quote below they continue to operate in this way despite the scheme having been dissolved:

> do you know I can't remember now if it is still ongoing, I know it is something we still do but whether it is an ongoing paid LES or DES then I don't know…we just do it as a matter of course now. [APM12]

Their GP, however, was sceptical that this was a wise investment of time:

> It is very time consuming, that is a massive negative actually for very little reward, I don't feel when I am phoning these patients up. It is just a bit of a courtesy call and I don't actually feel that I am making any real intervention, it makes me look at the discharge summary a bit more carefully and that is about it. [GP12]

One GP takes the DES requirement further and analyses the contacts made with 'case management patients' (equivalent to UAS patients):

> I tend to do audit as well to see that these case management patient discharge summaries, to see have we contacted them or not so I tend to do that once in three months so it is searched and then I take it back to our meetings and say please do this and this. [GP11]

Discussing the UAS provoked comment on which patients should be reviewed after discharge:

> Not everybody probably requires contact certainly depending on the letter but maybe beyond a certain age group it might be useful actually… you can't paint everybody with the same brush so sometimes when it comes down just as bureaucracy then just because if it has to be done for everybody you then… OK then it sometimes becomes a tick box exercise. [GP11]

Finances, as with any intervention, were considered key, this GP makes the important point that finances are often not directed to where the workload lies:

> The money does not follow the increase in work load with the general practice. And you know you're not using the money to line your pockets, we're using it to develop systems to improve the standard of care so I definitely think it (*unplanned admission schemes*) should be prioritised to finance yes. [GP10]

6.7.4 Significant Event Analyses (SEA)

Respondents cited SEA as the method of choice for exploring the harm vignettes presented in the interviews, often feeling unable to comment further on a vignette without going through an SEA process. SEA was also an interview schedule prompt when asking staff about response to error and harm. The purpose of this question was not to validate SEA methods (which have been extensively studied previously) but to highlight any particular instances where SEA had been used to explore problems with discharge summaries. Practice 18 had made major changes to the way they handled discharge summaries as a result of SEA:

> There was an audit done on a number of discharge summaries and lots of things were found that we probably weren't doing it appropriately

> enough… it was kind of an SEA and then a systems approach to how can we do this better? [GP18]

Practice 11 described an SEA which had taken place into their 'task' systems at the surgery. A redundant task group was still in use by community providers, who did not have inside knowledge of the surgery systems. Their requests for action were not subsequently picked up:

> We ended up just deleting that group and we know that the other groups are monitored so there will be no error and we also discussed the fact that if we do create groups in the future, we have to think about how it would look to somebody else. [PM11]

6.7.5 Direct impacts of the study

In this study practices were presented with quality improvement reports directly related to their practices. I was also able to make changes for individual patients' care in relation to errors uncovered in the course of the retrospective review. In the interview discussion took place as to some of the changes made to practices as a result of the study. There will undoubtedly be some Hawthorne effect in the responses given at interview (observation of behaviour will result in temporary safety improvements). The author is also aware that interviewees would be under societal pressure to conform to positive opinions of a project when being interviewed by the lead researcher. Notwithstanding these considerations, overall interviewees were very positive about the importance and relevance of the topic:

> It is such a valuable piece of work to do, I was really excited when you said this is what it is about because you can see the big potential for error and harm and then there is a big potential for change I think as well. [GP13]

And the study's potential to help practices make change:

> It has been interesting to take part in it and it is a very useful study because you know I don't recall anybody ever looking at anything like that before so I think it is… and we're really pleased to take part because it has brought all of this to the fore… well immediate patient safety changes. [PM17]

In-house discussion of the results of the study was considered relevant and desirable:

> I think the results are extremely interesting and should stimulate a lot of discussion at the next partners meeting. [PM10]

There were usually a number of outcomes for individual patients at each surgery as a result of tasks sent during the quantitative data collection phase. GPs in particular reflected on the changes they would make to their personal strategies for reading discharge summaries as a result of involvement in the study, citing the need for increased vigilance and caution:

> It is just… a reminder just to not to just glance, to read [GP16]

6.8 Reflexivity

Self-reflection is an important part of the qualitative research process which allows the researcher to be more effective and impartial in their analyses (Cxpartners, 2015). The author was able to follow a cycle of inter-interview reflexivity based on cumulative experiences. Some of the main influences are described below.

The author was aware throughout the interview process of the effect of her experiences and exposure as a GP on the content and tone of the discussions. From a personal perspective it became easier to be relaxed in interviews once this had been fully accepted rather than fighting the 'GP inside'. Field notes indicate how interviewer perceived tension (particularly with practice managers) migrated to an asset across the course of the interviews. Field notes also indicate that relaxation was also occurring for the interviewees within the interviews. Many of the interviewees started with closed or defensive body postures and expressed anxiety about the interview content prior to switching on the recording device. This is probably a natural response to discussing medical error and also to a report on your practice which you might feel you have to defend. Most in-interview notes show these postures and defences softening substantially as rapport developed and the author came to feel that this was largely due to her 'insider' status. The author acknowledges that she intrinsically found the discussion of clinical vignettes and clinical processes to be the most interesting elements of the interviews and that these were naturally more satisfying to discuss with other GPs.

The interviewer’s personal values and politics sometimes clashed with opinions expressed by interviewees but hopefully the interviewer was able to conceal these reactions internally. Examples include when GP12 spoke about ‘laziness’ in his colleagues or when GP14 spoke about socio-economic deprivation in relation to intelligence of patients. Although the author felt uncomfortable at these moments she was able to offer non-verbal support for interviewees to expand on their thinking.

GPs are taught that ethnicity, gender and age should have no bearing on how they react to their patients; it is very hard to switch this off learnt behaviour in order to analyse how these factors affected the interviewer personally – indeed rarely could the author bring herself to acknowledge these issues, in writing, in the field notes, without feeling guilty. Initially the author felt intimidated by more senior (older) interviewees but this effect wore off during the course of the interviews. Perhaps female gender softened the interviewer approach to a sensitive and possibly confrontational topic.

6.9 Summary of qualitative results

In addressing main aim 2 (explore staff perceptions of the factors associated with failure to respond to actions requested in discharge summaries and what practices do to mitigate this) the research objectives have been met. Ten practice site systems were explored by observational techniques in order to create individualised process maps for discharge summary handling (objectives 1 and 2). These process maps were successfully combined with individualised quantitative data to make practice reports which were used in the interviews to generate discussion (objectives 3 and 4). Five themes emerged on analysis of the interview data all of which are concordant with main aim 2. The fifth theme (strategies for safety improvement) correlates directly with objective 5 by capturing existing and potential safety improvement ideas. The findings are discussed in chapter seven which follows the theme and subtheme structure presented in this chapter to allow the reader to navigate between chapters.

Chapter 7 - Discussion

7.1 Introduction to the discussion

At the outset of this work there had been no previous attempts to estimate rates of error in processing discharge summaries in general practice. Little was known about how discharge documentation is handled in primary care or about the factors associated with error in processing discharge summaries. This chapter describes how the study has met its two main aims, firstly to investigate failures in processing actions requested in hospital discharge summaries and sequelae for patients and secondly to explore what general practice staff think are the factors associated with failure to respond to actions requested in discharge summaries. In doing so all the research objectives have been achieved. This discussion is broadly divided into two parts which meet the two main aims, aim 1 (quantitative) and aim 2 (qualitative). The range of findings could not sensibly be discussed and compared to existing literature without this initial division, as the themes coming out of the qualitative work do not entirely map to the quantitative data collected.

Aim 1 was addressed by achieving the following objectives, which are followed by a *summary of related results*:

1. Estimate quantitatively the rate of failures in processing actions requested in discharge summaries. *46% of summaries result in one or more failures to take action as requested. Failure to arrange tests and follow-up is more common than failure to prescribe medications.*

2. Determine which factors are associated with failure to process actions requested in discharge summaries. *Male gender of patients, type of clinical IT system and delay to uploading the discharge summary are associated with failure to act as requested.*
3. Estimate quantitatively the rate of harm ensuing from failures to process actions requested in discharge summaries. *8% of patients are harmed by failures to act as requested.*
4. Grade the severity and preventability of harms ensuing from failures in order to determine the effect on patients. *On average harms are of moderate severity and preventability is on average a 'close call' or 50:50.*

In 7.2 I discuss the main quantitative findings in relation to overall failure rates, workflow times, medication reconciliation failures, failure to arrange tests and follow-up and finally resultant harms.

Aim 2 was addressed by achieving the following objectives, which are followed by a *summary of related results linked back to the quantitative data*:

1. Exploring practice's administrative and clinical processing systems in relation to discharge summaries. *Systems are diverse in fine detail but share over-arching safety principles.*
2. Using the field work in objective 1 to construct practice-specific process maps. *Process maps highlighted problems in processing at the minority of practices which might explain some, but not all, of the failures seen in the quantitative data.*
3. Using data from aim 1 (objectives 2 and 3) to produce individual practice reports. *Interviews were informed by the quantitative data.*
4. Discussing these reports and process maps with general practice staff in an interview setting. *Discussion naturally flowed to the reasons why the failures seen in the quantitative data might occur.*
5. Allowing general practice staff to describe existing strategies for safety improvement and generate new strategies within the

interview. *Novel strategies were recorded which address some, but not all, of the failures seen in the quantitative data.*

In 7.3 I discuss the five main themes and their subthemes which arose from the qualitative data. The discussion draws together the separate methodological strands by referencing the quantitative results where relevant in the qualitative discussion to describe potential practice and policy change. The chapter concludes by addressing the limitations of this study and sets the agenda for future research.

7.2 Discussion of quantitative results by type of failure

The quantitative data addressed aim 1, which was to estimate quantitatively the rate of failures in processing actions requested in hospital discharge summaries and to determine factors associated with these failures. The data are best discussed according to failure type and thus correspond to the results structure presented in chapter 5. Key findings are presented as bullet points and then discussed.

7.2.1 Overall failure rate

- Overall failure rate of 46% of summaries.
- Majority of failures relate to medications reconciliation (47%).

I have succeeded in estimating a rate for failure to complete actions requested on discharge summaries. Almost half of discharge summaries requiring actions, for this group of vulnerable elderly patients, have one or more failures to complete requests. The overall failure rate of 46% does indeed seem high considering the methodological considerations which were made to allow for situations where clinicians disagreed with actions requested in the discharge summary. There are, however, some important caveats to be taken into consideration with the overall failure rate. Firstly this rate is a composite of a number of different types of failure, any one of which causes the entire summary to fall into the 'overall failure' category. Secondly, around half the summaries 'failed' due to medication discrepancies, which did include 'minor' indication medication failures such as laxatives and analgesia.

- 14% increase in risk of overall failure for each additional drug changed.

I have presented a unique finding that the number of requested medicines changes was significantly associated with risk of overall failure with a 14% increase in risk of failure for each additional drug changed (P=0.02). Increased numbers of medicines has previously been proven to be associated with medicines reconciliation error in hospital (Belda-Rustarazo et al, 2015). Importantly no clear association emerged between duration of hospital stay and risk of failures from the modelling undertaken so there was no evidence to suggest that longer admissions place the patient at any greater risk of error in relation to the processing of discharge summaries.

As this study is the first to estimate failure rates in discharge summary processing in general practice it is difficult to compare my findings directly with other primary care error estimates. Failure rates in this study are higher than the estimated 1-2% error rate in general practice consultations (Health Foundation, 2011 (1)) and higher than the 1-24 in 100 consultations rate of incidents suggested by Panesar et al (2015). It is possible that my rate is higher due to the high-risk care transition episode in an elderly population deliberately chosen for study and the method by which data were collected. The vast majority of this vulnerable elderly population is consulting regularly in general practice; only 3% of the sample were not reviewed within three months of discharge. The majority of these consultations were not specifically for post-discharge review; due to the medical complexity of the cohort many were consulting for other health problems which had developed in the intervening time. Despite, or perhaps because of these additional consultations, the failures and harms detected in this study were not uncovered in the course of normal clinical work. Caring for elderly patients can be complex and more difficult than caring for other age groups (Adams et al, 2002). Exploration of this complexity is warranted to understand what factors are involved. For example, it may be that frequent entries made in elderly patients' clinical records mask the requests made by secondary care in discharge summaries.

7.2.2 Workflow timeframes

- Median time of 2 days from discharge to EDMS upload.
- Median time for GP processing 1 day.

I have presented unique findings on the speed with which general practice deals with discharge summaries. Discharge summaries arrive and are uploaded to GP systems in a time efficient manner (taking a median of just two days from discharge). GPs process discharge summaries in a median of just one day. These efficiencies were surprising to the author who anticipated much longer general practice clinical processing times based on her own experiences in practice. GPs are processing well within the NES target of 2 working days (HIS Ihub (a)), despite my qualitative data which showed that GPs thought this would be hard to achieve (see section 7.3.2). My results indicate that hospitals are sending electronic summaries in a timely fashion. Most of the literature from the scoping review described in chapter two which related to discharge summaries' timeliness (e.g. Kripalani et al. 2007) was from the US is now less relevant to the UK. It has largely been superseded by the advent of electronic summary dissemination. UK secondary care services were mandated to institute electronic discharge summaries in October 2015 (NHS Digital, online). The focus of US healthcare quality leaders is now on 'toolkits' for hospital discharge rather than targets for timeliness (JCAHO, 2018 and AHRQ, 2017). The benefit of electronic summaries has already been demonstrated in the main Nottingham hospitals (Mehta et al, 2017). Introducing electronic summaries improved concordance with mandatory components as described by the Royal College of Physicians checklist (RCP, 2011) by 14%. In addition 15% more summaries were sent to primary care within the first 24 hours of discharge when an electronic format was used.

7.2.3 Rate of failure to change medicines

- The rate of failure to change medications as requested was 17% (124/750, 95% CI 14-19%). This is not as frequent as the rate of failure to arrange tests or follow-up (see 7.2.4 and 7.2.5)
- 81% (611/750) of requested medicines changes specify a reason for the change on the summary itself.

Hospital initiated requests for medication changes were frequent among this population of older patients (750 items changed for 214 patients). Failures to make changes to medications were found less frequently (17% of patients) than in previous research. In a Canadian study of unintentional medication discrepancies after medications reconciliation by an inter-professional team, 39% of patients still had one or more errors (Shiu et al 2016). In the discharge subset of the PRACtICe study, 43% of summaries were associated with one or more failures (Avery et al, 2012 (b)). There are methodological differences between my study and the PRACtICe study (which included only 37 discharge summaries, 14 of which were from Nottingham and did not consider GP comments documented in the free-text of consultations) which might account for the difference in rates. In addition the PRACtICe study was conducted in 2011, prior to substantial changes made to the Nottingham area discharge summary format. In their study only 8% of newly prescribed drugs were clearly indicated on the discharge summary, whereas now, it would be expected that all new items would attract an 'N' (for New) code. This perhaps shows that some of the progress made in discharge summary design is having an effect on how well GPs action medication changes made by hospitals. It is encouraging that secondary care documentation of indication for medicines changes was present for 81% of medicines in my data. One Swiss study went further and provided a one line evidence summary to explain medication changes; compliance by GPs with instructions in the discharge summary improved by 11% (Kunz et al, 2007).

- 6/15 cardiac drug failures (40%) were associated with subsequent harm and they accounted for 46% of the medicines-related harm in the study.

Just under half of failures to change medications (61/124, 49%) related to medications for 'minor' indications such as laxatives simple analgesics and alginates. The other half of failures to prescribe as requested (63/124, 51%) occurred across a spectrum of drugs (see Appendix 16). Cardiovascular medications were the most likely to be prescribed as requested but when they were not prescribed as requested this often resulted in harm (6/15, 40%). Failures which occurred in relation to drugs for 'major' indications (including chapter 2 of the BNF – cardiovascular drugs) were more likely to be related to discontinuation – perhaps suggesting that omissions or oversights are more important driving factors here. As 40% of these cardiac drug failures related to subsequent harm it is possible that here is a potential target for an intervention and that this intervention might be aimed at trying to prevent omissions (even simply highlighting these higher risk medications might help).

- Newly started medications account for 58% of requested medicines changes (435/750).
- 75% of failures to change medicines occurred with newly started medicines (93/124), newly started medicines are most likely to result in failure to prescribe as requested (ANOVA p=0.025).

75% of failures to change medicines in this study were associated with newly prescribed repeat drugs (although new drugs encompassed only 58% of requests), echoing findings from the discharge subset of the PRACtICe study (Avery et al, 2012 (b)). The relatively higher risk of failure for new drugs to be prescribed in primary care may be due to GPs disagreeing with secondary care providers as to the importance and/or relevance of drugs for 'minor' indications and so may reflect failure to document this disagreement rather than error. These issues were also highlighted by the GPs who were interviewed for the study (see section 7.3.3).

- For each day delay to uploading the discharge summary to EDMS (receipt time estimate) there was a 1% increase in risk of failure to change medicines (p=0.003).

Delay to processing the discharge summary was significantly associated with increased risk of failure to prescribe as requested (1% increased risk with each passing day can add up when a summary is significantly delayed). It is therefore important that surgeries are processing discharge summaries in a timely fashion (see section 7.2.2). Unfortunately it is impossible to separate the true increased risk of error here from the increasing likelihood that some medicines changes will be less likely to be relevant as time from discharge increases. Lack of documentation of clinical reasoning might become the driving reason for discrepancies.

7.2.4 Failure to complete requested tests

- 26% of requested tests (23/90) were not fully correctly completed (95% CI 17-35%).

Around a quarter of test requests were not correctly completed in general practice. In comparison with a small US study looking at failure to arrange tests on discharge, my failure rates are lower (26% versus 36%) (Moore et al, 2007) and this may be because the discharge summaries reach GPs more quickly or because of IT advances made in the intervening decade. Claims data from the defence organisations show that failure to arrange tests and failure to follow-up results often figure in successful claims (MPS, 2018). In the vast majority of cases (18/23, 78%), tests were not completed correctly because they were never actioned by the person reading and acting on the discharge summary; relatively few failed because they did not meet time targets set by the hospital. If clinicians are, in these instances, deciding that they feel a test is not indicated then they are certainly not documenting their decision (had they done so the instance would not have counted as a 'failure' in this study). Medico-legally it may be indefensible to leave these decisions undocumented. GPs appeared to be reliable at following up on test results that required action (there were only two instances in the sample where this process failed) and this is contrary to what might have been hypothesised from claims data evidence. Failure to complete tests was implicated in detected harms but not nearly so frequently as failure to reconcile medications was.

- *Emis Web* was associated with an OR of risk of failure to complete tests of 3.67 (p=0.014).

There was a statistically significant association between *EMIS Web* as an operating system and failure to complete tests; practices using *EMIS Web* were around three and a half times more likely to fail to complete tests. The reasons for this are unknown but warrant exploration. One possible explanation is that *EMIS* practices in this study might have not have been using *Integrated Clinical* Environment (ICE). *Sunquest ICE* is commercially available software which allows practitioners to order pathology tests in direct communication with the hospital laboratory which will process them (*Sunquest ICE* Website). *SystmOne* possibly has different/simpler test ordering processes to *EMIS Web.* Care must also be taken not to over-interpret this result because of the small sample size. It is possible that the finding reflects a type one error as a result of testing multiple variables and so further investigation is needed of this issue in order to explore if there is a clinically significant difference between IT systems.

- Male patients were associated with an OR of failure to complete tests of 2.95 (p=0.042).

Another statistically significant result was the association of male gender in patients with failure to complete tests – almost a three-fold increased risk. In four cases, patient responsibility was identified as the main reason tests were not completed but two of these patients were female so this does not explain the risk for male patients. The reasons for male patients being subject to more failures in discharge summary processing are unknown but as over 90% of these patients are reviewed face to face in the 90 days following discharge it is possible that there is some difference in the outcomes for male patients from these consultations rather than from the processing of the discharge summary itself. Similar gender disparities, where male patients receive lower quality of care, have been shown in US ambulant populations (Asch et al. 2006). To the author's knowledge no similar disparity has previously been demonstrated in the field of patient safety.

7.2.5 Failure to complete requested follow-up

- 27% of follow-up requests (47/177) were not actioned (95% CI 20-33%).

In common with failure to complete tests, a similar proportion of requested follow-ups are not completed (roughly a quarter). There is some indication that hospital outpatient referral was more likely to be completed than in-house follow-up, however, where the referral process fell down, the patient was more likely to suffer harm as a result. The number of failures to follow-up was only half that of the number of failures to complete tests and was too small to reveal significance in modelling. The main finding of importance here is that both failure to arrange follow-up and failure to arrange tests are more frequent than failures to change medications. Failure to order tests or to follow-up were implicated in 10/20 (50%) of the harm vignettes (see Appendix 17). The processes required for tests and follow-up are different from those required for medications reconciliation. The actions are more complex (forms to be filled, appointments to be arranged etc.) and involve a range of staff in the primary care system, not just the GP who is reviewing the discharge summary. Often elements of this work are delegated to other members of the team via electronic task systems (section 6.7.2.1).). It is possible that GPs are more likely to disagree with test and follow-up requests but if this is the case then GPs are not routinely recording their disagreement or their conversations with patients about it.

7.2.6 Harm resulting from failures

- The harm rate per patient was 8% (20/246).

The estimated rate of harm ensuing from failures in the processing of discharge summaries was 8% in this study. A previous trigger tool retrospective review of primary care records found a harm rate of 7% (Eggleton and Dovey, 2014). Hospital admission was one of the triggers in the Eggleton study but the population was different to that in my study and it is therefore difficult to draw direct comparisons.

- Mean severity score for harms was 3 (‘moderate’ on both scales used).

Further analysis of the harms detected in my work, using a dual reviewer scoring system, revealed that the most common severity classification was ‘moderate’ on both internationally accepted harm scores used and Kappas were ‘moderate to good’. Studies of harm in secondary care show that around a third of patients encountering adverse events suffer ‘moderate’ or worse harm (Vincent, Neale and Woloshynowych, 2001) but this is very difficult to compare directly to primary care. It might be expected, from the nature of the less critically ill patients encountered in primary care, that severity of harm here would be lower. Indeed analysis of discharge related reports to the NRLS, using the WHO severity scale I also used, revealed only 13% of harms were of ‘moderate severity’ and 64% were of ‘low’ severity (Williams et al, 2015). The lower severity compared with my cases is perhaps accounted for by the population in the NRLS study (all ages) and the methodological differences between error reporting and retrospective record review. Retrospective record review is from a random sample whereas error reports are not random and this means that error rates cannot be calculated from error reports. Record review is undertaken by a researcher according to a protocol who grades harms according to an established scale. Error reports are influenced by the perceptions and experiences of the clinicians who generate them and are often of too poor a quality to permit full analysis.

- Mean preventability score for harms was 3.27 (around 50:50 ‘close call’).

Preventability of harm was found to be more difficult to determine. The vignettes scored around three on both mean and median averages which equates to ‘close-call’ i.e. uncertain if the event was preventable. In the hospital related harm analysis quoted above, half of harms were judged to be preventable by normal clinical care (Vincent, Neale and Woloshynowych, 2001). Inter-rater reliability Kappas, were ‘moderate’ for preventability scoring, not as convincing as those for the severity scoring.

7.3 Discussion of qualitative results by theme

The qualitative section of this study (main aim 2 – to explore qualitatively what general practice staff think are the factors associated with failure to respond to actions requested in discharge summaries and what practices do to mitigate this), used in-depth semi-structured interviews. Interviewees were encouraged to discuss barriers and solutions to successful processing of discharge summaries. This section begins with discussion of the key qualitative findings by theme including comparison with existing literature. Five main qualitative themes emerged (section 6.1) and they are used again here to provide a structure for the discussion. The analysis of qualitative data has allowed the author to explore emerging themes in relation to the handling of discharge summaries in primary care and relate this back to the quantitative findings. This section closes with a discussion of reflexivity in the qualitative part of the study.

7.3.1 Secondary care factors

As presented in detail in the results (section 6.3) interviewees clearly wanted to discuss the origins of the discharge summary to place in context the requests made of them in primary care. This material has been included in the thesis because healthcare staff feel the quality of the discharge summary which arrives to them affects their subsequent ability to process it. There is much historical literature reflecting problems with the standard of discharge communications but IT may be changing the situation (see section 7.2.2). These changes were discussed by interviewees but there was still strong feeling that discharge summary communication had scope for improvement. Standardisation of structure was sought with emphasis on clarity and the need for a 'GP action' box. These findings echo those of GPs in Oxfordshire who were consulted on discharge summary design (Healthwatch, 2015). In the UK the Royal College of Physicians has developed audit criteria for documentation standards in discharge summaries (RCP, 2011) but these stop short of an agreed format and focus on an exhaustive listing of components rather than instruction about clarity of design. The Scottish Intercollegiate Guidelines discharge document details the contents of an ‘ideal’ discharge summary (SIGN, 2012) and did involve GPs in its creation but does not include a ‘GP action’ box.

7.3.1.1 IT issues

One of the main solutions suggested by my interviewees was harmonisation of IT systems between primary and secondary care. A qualitative study of both primary and secondary care provider’s opinions on the facilitators to discharge communication in the US found shared IT systems between settings to be essential and this was the norm for the Carolina healthcare system in which the study was set (Jones et al, 2015). Speed and reliability of discharge summary transfer from secondary care remained an issue for my interviewees. IT inter-operability issues were frequently blamed for slow and inefficient transfer of electronic documents. These findings may, however, relate to issues with the electronic download system in the Nottingham area at the time the interviews were conducted. Quantitative data on workflow which showed very efficient transfer times (section 5.2.4), were collected from a time period approximately 1 year prior to the interviews taking place. The new NHS standard contract, which came into effect in spring 2017, may help to resolve some of these issues as it stipulates that an electronic discharge summary must be sent to the GP within 24 hours of discharge (NHS England, Key Messages, 2017). It mandates ‘standardised clinical headings’ but stops short of specifying what these might be. In an open letter to CCGs the government recognised how difficult it might be for trusts to implement these IT changes (NHS England, 2017).

7.3.1.2 Training

Another key strategy for improvement suggested by my interviewees was improved training for the junior doctors compiling the summaries. In 2014 a third of junior doctors responding to a survey on discharge summary communication (albeit at one hospital) felt they had inadequate training in summary writing (Yemm et al, 2014). Unfortunately, induction training regarding discharge summaries in hospitals is highly variable; only the minority of trainees get GP input into this process (as described at practice 11). Some trainees get experience of handling summaries in primary care (as described at practice 19) but this is by no means uniform.

7.3.1.3 Documentation of medications changes

Accurate documentation of medications changes remains a particular issue despite longstanding guidance (CQC, 2009). It is encouraging that in 81% of medicines changes requested in discharge summaries in my quantitative data set had a reason for the change documented by secondary care. Within my qualitative findings there was very little acknowledgement that progress had been made by the Nottingham hospitals with respect to clarification systems for medications changes (in which codes are applied to medications: N=new etc.). These codes were considered useful but were not completely trusted by interviewees who still felt they needed to check whether the codes had been correctly assigned and whether medicines information was 'hidden' in the free-text of the summary. Considering the rate of failure to change medications found in this study (17%) it is likely that GPs are not checking this information with regularity. However, there were clear regional differences in the study with GPs in Manchester and Coventry expressing greater frustration with respect to understanding medication changes requested of them. This is reflected by recent published audit work from Oxfordshire hospitals which found that around two thirds of discharge medication changes are still inadequately recorded (Cresswell et al, 2015). Alphabetisation of the drug listing on the summary was suggested by my interviewees and to the author's knowledge this simple idea has not been previously studied.

7.3.1.4 Delegation issues

Interviewees had strong views on delegation of work from secondary to primary care, expressing frustration and/or grudging acceptance (see Appendix 17 for where this relates to instances of harm). Similar views were described by primary care doctors in a focus group study of discharge communication in the US (Jones et al, 2015). Delegation of test ordering and result follow-up was believed by my interviewees to be a source of error. A UK study crossing the boundary of secondary and primary care highlighted the transfer of the burden of care to patients and primary care that test result chasing entailed (Waring et al, 2014). The practice of asking primary care colleagues to chase the results of tests ordered in secondary care clearly continues despite guidance that secondary care should not delegate chasing test results (NHS England, 2016). The new NHS standard contract (2017-19) now mandates hospital clinicians to follow up their own test results and also tries to prevent them from requesting additional tests related to a care episode (NHS England GP forward view (b)).

7.3.2 Safety features of discharge summary processing

As presented in detail in the results (section 6.4) there are numerous elements of safe processing systems for discharge summaries. Systems are diverse – I saw different systems in operation across my study practice sites. Size of practice is likely to be the key to many of the systems adopted, especially when managing skill mix and staff numbers. It is not appropriate therefore to extrapolate an ‘ideal’ system which practices can aspire to. It is, however, possible that elements of ‘best practice’ systems encountered in this study could be used to build indicators of safe systems (see section 7.3.5).

7.3.2.1 Continuity of care

Continuity of care following hospital discharge was regarded as essential by many interviewees and was an integral part of their practice systems. In practice this means getting the discharge summary back to the clinician who originally referred the patient to hospital, or back to their ‘usual’ GP. This reflects the survey evidence base for the perceived importance of continuity in general practice (BMA GP Survey, 2015). In a very recent systematic review of continuity of care, 18/22 studies showed greater continuity was associated with lower mortality (Gray et al, 2018). Recent evidence suggests that continuity of care for older patients in primary care also reduces admission rates for conditions which can be managed in primary care (Barker et al, 2017). Continuity at larger practices and in those operating less traditional business models is a particular challenge. Practice 19's simple innovation of promoting the working days of multiple part-time clinicians directly to patients (see section 6.7.1.3) in order to allow patients to take the lead in continuity was instituted in the author's own large surgery as a result of undertaking this study.

7.3.2.2 Protocols in primary care

Protocols were used to guide administrative staff through document processing in the majority of study practices (six out of 10) and were extensively employed in two of those practices. Interviewees were well able to recognise the difficulties with ensuring that staff work according to protocols and also acknowledged that protocols cannot replace face to face training. In-house training was considered mandatory for administrative staff taking on document management roles. The 'knowledge transfer' between administrative staff in general practice is also described as 'training' in previous qualitative work with receptionists (Swinglehurst et al, 2015). Out-sourcing of training (especially at a higher level, i.e. for one senior receptionist) is just beginning to have an impact on practices. The national training scheme for receptionists may change this situation as evidenced by case studies in the south of England (NHS England GP Forward View website (e)). Funding has now been put in place specifically to train receptionists to read, code and process clinical documents but the uptake and impacts of this scheme are, as yet, unknown.

7.3.2.3 Workflow targets

Scottish workflow targets for doctors to process discharge summaries within two working days were met with some scepticism by staff at the six surgeries who were not working to protocols which required processing by GPs on the day of arrival. These targets were considered difficult to achieve by staff at these surgeries and a week was felt a more reasonable time. However, the quantitative results show that study practices were already achieving this time target. The sample of highly motivated, research practices who volunteered to take part in this study may not be representative of the wider national situation. It is unlikely that as many as 40% of practices are fully processing discharge summaries on the day of receipt. Although I was able to demonstrate a statistically significant connection between the chance of prescribing failures and delayed receipt of the discharge summary, more work is needed to determine whether patients come to harm from delay to processing of discharge summaries. Also, before targets can be produced for general practice we also need to be sure that there are no unintended consequences of aiming for speed over accuracy of processing or continuity of care. My interviewees suggested two ways to prioritise the discharge summary above other administrative work. Separating out paper copy discharge summaries, including those which come from geographically distant areas in the UK, in the paper scanning pile for priority scanning would be simple to institute for those summaries which do not come down the electronic link (this has been successful in the author's own practice). Flagging priority of 'urgent' documents within the Electronic Document Management System is another option - allowing clinicians to workflow these documents first if they so choose.

7.3.3 Medicines reconciliation

As presented in detail in the results (section 6.5.1) staff views on the need to discuss medicines reconciliation with patients and/or carers are varied. There were strong feelings that changes initiated by hospitals should be discussed by secondary care staff at the point of discharge and yet clearly GPs did not feel they could robustly rely on the hospital to do this. The frequency of recurrence of the word 'hope' in relation to delegations of responsibility for discussing changes to patients' medications was perhaps indicative that the interviewees did not truly believe that this process was occurring reliably at the hospital end. Attempts in The Netherlands to impose medication reconciliation bundles on hospitals (which included a requirement to discuss directly with patients) met with poor uptake (Van Sluisveld et al, 2012).

Similar problems have been found in the US in response to the Joint Commission's Patient Safety Goal No. 8 surrounding improvement of medicines reconciliation processes; one of the key problems identified is the lack of metrics to study success of medicines reconciliation processes (Greenwald et al, 2010). Despite conducting a thorough literature review, studies about discussions with patients and carers at discharge could not be found. There was some resistance to the idea that *discussion* of medicines reconciliation with patients and carers is warranted; certainly it was not universally considered to be a mandatory part of post-discharge care, despite clear NICE guidance to the contrary (Medicines Optimisation Standard, 2015). In my quantitative data I was able to show that 34% of medicines reconciliations did not have a documented record of discussion with patients or carers. A recent special working party report on responsibility for prescribing at the interface of primary and secondary care did not make specific recommendations about the requirement to discuss medicines reconciliation with patients who fall outside 'shared care' agreements (NHS forward view website (d)). My interviewees considered lack of primary care resources (time and financial) a major barrier to discussing medicines reconciliation with patients. A small number of interviewees felt strongly that discussion of medicines reconciliation with patients was an important enough strategy to reduce error that they were able to demonstrate how they had adapted their practice to include it.

7.3.3.1 Patient factors in medicines reconciliation

Patient responsibility was considered an important factor in initiating medicines reconciliation, particularly for medications for 'minor' indications such as laxatives and analgesics. The author remains concerned that there are patient vulnerability factors (Payne et al, 2013 and Stitt et al, 2011) which might introduce disparities in care should this method alone be relied upon. Indeed NICE guidance specifically singles out older adults and patients with long term conditions or polypharmacy as ideally needing primary care follow-up after discharge (NICE MOS, 2015). A US study of patients aged 65 and over

(Hansen et al, 2011) found a 2% increase in readmission risk for each additional medication present upon discharge (adjusting for morbidity). Almost all of the patient population in this study were seen in the 90 days after discharge, perhaps reflecting their frailty and likelihood of having a 'care plan' but often these consults revolved around other medical issues unrelated to the admission. The quantitative data demonstrate that, despite follow-up, many of the study population are not having accurate medicines reconciliation and many medicines changes are not discussed with patients. 'Minor' indication medications are hard to define but there was certainly a reticence of GPs to reconcile and discuss some low risk prescribing and indeed far less acceptance that instances of failure to prescribe these drugs constituted an error. This is one of the reasons why I have used the term 'failure' throughout this thesis rather than 'error'. There are a number of less pejorative terms that could have been used e.g. 'uncompleted requests' 'actions which were not carried out' etc. These syntax present problems when combined with the type of failure. In order to present a readable report and contain data within tables a one word term was considered preferable. GPs have knowledge and experience of therapeutics which allow them to determine which drugs deserve more of their attention but it is quite possible that their agenda is not the same as the patient who is taking the drugs. Within my interview data there is some evidence that GPs see medications listed in the discharge summary as a guide rather than a directive. As experienced practitioners who know their patients well, this stance is understandable and allows GPs to act in their patients' best interests. Unfortunately there remains a small proportion of failures to change 'major' medications (such as cardiovascular drugs) that cannot be explained by these decisions based on knowledge of patients. My interviewees mostly ascribed these failures to errors of omission (see quotes relating to harm vignettes in Appendix 17).

7.3.3.2 Roles in medicines reconciliation

Changing roles in general practice prescribing stimulated lively discussion and provoked strong views against delegation of prescribing responsibility to non-clinicians. Reticence on the part of the administrative team was frequently cited alongside safety and medico-legal concerns. Some practices were supportive of the involvement of prescribing clerks in the medicines reconciliation process, provided a trusted individual with a high level of training was in place. Pharmacists were clearly welcomed by my interviewees as a resource in the medicines reconciliation process and there is some evidence of their effectiveness. A small Scottish study in which discharges were copied to practice pharmacists showed improvement of around 30% in the medicines reconciliation process (Gray et al, 2008). A Cochrane review concluded that outpatient pharmacists working in extended roles can bring more general improvements for patient care; what remains unclear is how they compare to standard services provided by traditional primary care clinicians (Nakansah et al., 2010). We do have better quality evidence that pharmacists in general practice make a difference in cardiovascular disease risk factor outcomes (Santschi et al, 2011). Further evidence for the role of pharmacists in general practice is likely to come from the roll out of the General Practice Forward View (NHS England GP forward view website (a)). Unfortunately there are some concerns with the current funding model (in which practices are liable for up to 80% of salary costs for any pharmacists they do take on) (Avery, 2017). Funding was a major barrier for my interviewees and this may impact on uptake of the scheme.

7.3.4 Error and harm as a result of failure to process discharge summaries

As presented in detail in the qualitative results (section 6.6.1) interviewees were encouraged to think of reasons why the processing of discharge summaries discharge summaries in general practice might fail. Although they did not use formal error classification terminology or models (Reason J, 1990) they demonstrated thinking across a broad spectrum as described in existing taxonomies, mapping particularly closely to level one of the TAPS taxonomy

(Makeham et al, 2008). My interviewees are not error experts but they did describe a mixture of active and latent failures. They shied away from talking about the individual's role in error (with the exception of one clear divergent view – GP12). There is a widely established view that patient safety should not be a punitive field (Leape, 1997) and interviewees may be picking up on that concept from their own experiences of error reporting in practice, combined with societal pressure not to single out individuals. In his 2018 question and answer session, Jeremy Hunt attested that the majority of medication errors related to system failures rather than poor individual practice and he emphasised the need for the NHS to move away from blame cultures toward a learning culture to take account of this (The plan to reduce medication errors, 2018). His comments were informed by a Department of Health commissioned report (Medication Errors Short Life Working Group, 2018). There was some acknowledgement by my interviewees that specific practitioners or groups of practitioners (i.e. trainees) might be more likely to be responsible for an error. This might lead to educational resources produced as a result of this work targeted at trainees, particularly new GP registrars handling discharge summaries for the first time in practice. Similar interventions were seen in the drive to reduce prescribing errors among trainees which lead to the instigation of the Prescribing Safety Assessment (British Pharmacological Society, 2016).

7.3.4.1 'Human nature' as a cause of error

The view of many of the interviewees was that 'human nature', as a reason for error, is unavoidable. This shows a degree of fatalism which is not in line with established thinking on medical error. Perhaps these views represent pressures within the healthcare system or other latent failures. Alternatively my interviewees may be experiencing 'learnt helplessness' as an unconscious strategy to maintain the status quo within their organisation, thereby reducing stress levels (Moss et al, 2000). Perhaps these views merely reflect, again, that my interviewees are not experts in error. Although Reason argues that strategies to improve systems to prevent latent failures are essential, he also accepts that individuals do make errors, and that strategies can be developed to prevent those individuals making errors (Reason, 2000). There are various ways in which individuals might be helped to improve their processing of discharge summaries without resorting to blame tactics but this subject was outside the interview schedule and was not touched on de-novo by participants.

7.3.4.2 Time and workload pressures

Many GPs are still working in systems where there is no time set aside for the handling of clinical administrative tasks and this appeared to be a particular issue for part-time GPs. This was seen as the norm at the majority of study practices and the level of tolerance for working under these conditions was high. The national survey of GP attitudes in 2015 found 'paperwork' to be the 4th most likely job stressor, with 85% of GPs reporting stress in this area (Policy Research Unit in Commissioning, 2015). Cultural norms and lack of time in general practice may make it exceedingly difficult to promote interventions which prioritise dedicated time for paperwork and as my interviewees demonstrate, they would not wish to hand-over control of discharge summaries for fear of missing out on important clinical information. There is a national agenda to give receptionists greater responsibility for processing clinical documents in general practice (see section 7.3.2). Practice 12 was the only practice in the study who had actively involved receptionists in processing discharge summaries. Otherwise practice staff in my study think the more traditional model of handling discharge summaries is the safer model. An alternative strategy was already in place at two study practices (see section 6.7.1.2) whereby the appointment book was used as a dedicated space for GPs to deal with discharges summaries i.e. a consultation slot was booked out for a GP to process the summary and contact the patient if necessary. Despite the worry my GP interviewees expressed in relation to completing their workload in a timely fashion due to excessive workload, my quantitative data showed that processing times for discharge summaries are very quick.

7.3.4.3 Complex systems

The complexity of systems in primary care certainly contribute to error and this is acknowledged in error classification systems such as the Primary care patient safety classification system (PISA) (Carson-Stevens et al, 2015). Discharge summaries are complicated documents often with numerous requested actions and certainly require all six steps of the 'information flow model' for general practice (figure 1, Crowe, Tully and Cantrill, 2009). This study represents one of the first attempts to understand how discharge summaries fit into primary care systems. Primary care staff need to navigate a number of their own, and often, secondary care provider's IT systems in order to complete actions requested in discharge summaries. Combine this with ambulant patients who may be difficult to contact for a host of reasons, and the potential for error rises. These ideas run through many of the quotes in the qualitative data – particularly those relating to the harm vignettes (see Appendix 17). These factors might explain why the rates of failure for requested tests and follow-up are worse than those for requested medications changes (see section 7.2.5). There are a number of examples in this study where practices have developed their own solutions to the problems of systems complexity (see section 6.7).

7.3.4.4 IT as a cause of error

Electronic Document Management Systems have been a very practical solution to the quantity of information from external sources which arrives in general practice. It is clear, from my interviewees' comments, that they have created some intrinsic problems in relation to how clinicians process discharge summaries. Some of my interviewees described how they had returned to paper-based solutions, either individual GPs printing summaries for medicines reconciliation or whole practices who had moved back to a paper system (e.g practices 13 and 16). This is possibly an indication that current document management software is not fit for purpose in relation to managing discharge summaries. Interviewees described problems with hopping between systems or screen views particularly when performing medications reconciliation, or using two monitors. The small UK evidence base has been focussed on potential improvements to the clinical record systems themselves (Avery et al, 2007) and not on the Electronic Document Management System. Further study is needed to uncover the specific needs that primary care clinicians have of their document management systems in order to develop features which would help process discharge summaries. Interviewees were keen to point out that the current clinical record systems (e.g. *EMIS Web, SystmOne*) do not favour accurate or complete documentation of the medicines reconciliation process and this is perhaps why 14% of medications reconciliations in my quantitative data were not documented anywhere in the clinical record. There is a prompt in the clinical record system to give a reason why drugs are stopped but not why they are started and there is no 'place' the medical record to organise thinking about medicines reconciliation as an 'event'. There is scope for a computer intervention which assists practitioners in performing computer based medicines reconciliation. IT systems for medicines reconciliation do exist in the US (Schnipper et al, 2011) but adaptation to the UK would need careful consideration and input from stakeholders. My interviewees felt there was scope for improvement of electronic task based systems at a practice level, some practices had already undertaken this work and others engaged with it as a result of the study. Further research is needed to understand if tasks in electronic document management systems were synchronised with those in clinical record systems this would result in fewer errors. The integration of EDMS software into clinical record systems is perhaps one reason why I found the rate of failures to action tests to be lower in *SystmOne* practices (see section 7.2.4). In order to reduce burden on individuals dealing sending tasks, IT could be used to make tasks systems more automated. This had already been achieved without an IT intervention at practice 19 where actions taken on summaries are Read coded and then searched on a daily basis and at practice 17 where the diary functionality of the clinical record system is used to keep track of tasks.

7.3.4.5 Safety culture in relation to error

Safety culture is an important determinant of the maturity of the safety systems within a practice (Kirk et al, 2007). A less mature safety culture is linked to organisational factors as a cause of error. My interviewees found organisational factors some of the hardest components of the error model to discuss (section 6.6.1.6). They were almost entirely supportive of their own practice systems, even though they sometimes had a poor understanding of those systems. It is therefore difficult to make conclusions from the interview data with respect to system-level causes of error. The field work conducted during the investigation of the practices' systems was far more enlightening than the interview process in this respect but it is highly specific to the practices involved in the study and therefore confidential. Having worked in the study practices and investigated their systems to create the process maps the author was able to make subjective assessments that some practices had more mature safety cultures. For example practice 19 were able to demonstrate advanced administrative processes which had been subject to SEA in order to make improvements. Any judgement of safety culture made here is the subjective view of the researcher and not a rating according to any accepted scale of safety culture, another reason why this is not presented as a research finding. Unfortunately, due to methodological constraints, it was not possible to link this qualitative assessment to lower rates of failure and harm in the processing of discharge summaries. Although there was not a significant difference between practices, practice 19 had the lowest rate of overall failure and was the only practice with zero harms. Linking improved safety culture to improved patient outcomes is challenging as highlighted in The Health Foundation's report on the impact of measuring safety culture (Health foundation, 2011 (2)).

7.3.4.6 Documentation issues

Interviewees were encouraged to comment on documentation of decision making with respect to discharge summaries (see section 6.6.3). The failure rates determined in this study inherently reflect the accuracy of documentation because failures were determined by retrospective record review. Discussion of documentation standards was adopted into the interview schedule as the study progressed because participants were clearly keen to talk about how this influenced failure rates. Quality of documentation can be expected to vary on a day to day basis depending on workload pressures, by individual diligence levels and by internal practice standards. We know that documentation standards have improved for conditions included on the QOF (Gillam, Siriwardena and Steel, 2012) but there is a lack of evidence base for quality of documentation in primary care regarding discharge summaries. There is no expectation to document clinical thinking regarding received communication in the same way that there is when a consultation occurs. Some of my interviewees thought that there might be potential to improve documentation (and thereby possibly improve future care for the patient) by "forcing the hand" [PM16] of primary care clinicians or administrative staff to make a text entry when reviewing a discharge summary. Even creating an opportunity for the person processing the document to write a summary in a consultation note in the facing record at the time the document is reviewed could lead to an expectation that this is the norm.   This could be also be achieved with a template. For example, in the PRIORITIZE study 113 London GPs ranked a standardised medicines reconciliation templates as a high priority solution for improving medication safety in primary care (Car et al, 2016). Careful design of such interventions should ensure that they are not another hurdle or box ticking exercise for GPs.

7.3.5 Strategies for safety improvement

As presented in the results (section 6.7) interviewees identified a range of strategies to help ensure the safe and effective processing of information from discharge summaries in their own practices. Three main processing systems strategies were described; changing responsibility for document processing, prioritising discharge summaries and continuity of care. Five IT main strategies were discussed; electronic tasks, coding of actions, templates, medicines reconciliation tools and intra-operability of IT. These strategies have already been discussed where they fall naturally into the flow of the discussion text as the solutions to the problems described. There were two stand-alone strategies for safety improvement which did come out of the data but were not a specific focus of the interview schedule (the Unplanned Admissions Scheme and Significant Event Analysis), these are discussed below. This section also discusses direct impacts of the study (which are, in themselves, strategies for safety improvement).

The data relating to strategies for safety improvement in this study have been collected on a case-study basis by asking individual practices to comment on in-house policies and procedures. As identified in the interviews, practices in the study were employing safety systems that they felt they had 'invented' in-house to address particular local problems. Many of the concepts were duplicated across the small sample of practices in the study highlighting the reinvention of the wheel aspect of the current business model of general practice in the UK. In future these innovations could form part of a databank of knowledge such as that proposed by the RCGP 'bright ideas' scheme (RCGP, BIS website). The NHS Specialist Pharmacy service has been tasked with creating a similar repository specifically for good practices with medications (Medication errors short life working group, 2018). It is important that this information bank is developed to contain primary care relevant content.

7.3.5.1 The Unplanned Admissions Scheme

The unplanned admissions scheme (UAS) (see section 6.7.3) is an example of where a targeted intervention can help a specific group of vulnerable patients (NHS England, UAS, 2014). The UAS provided incentive payments to practices who worked to reduce avoidable unplanned admissions for vulnerable patients with complex health needs. Strategies for avoiding admissions included: enhanced access to telephone review by clinicians, improving the coordination of care at discharge and practice management of individuals on the 'at risk' register. Many of the study population in my study also met the criteria for inclusion in the UAS and practice staff often mentioned this during the field work phase. At interview, my interviewees described strategies for safety improvement which overlapped with the UAS aims. Although the scheme has ended, some of the long lasting effects on practices' systems and behaviours can be seen to be contributing to systems to increase safety at discharge for the elderly patients at the study practices. It is possible that some of the learning from this scheme could be applied to help target future interventions at vulnerable groups.

7.3.5.2 Significant Event Analyses

Interviewees cited Significant Event Analysis (SEA) (see section 6.7.4) as the favoured strategy for investigating error and some illuminating examples were given. However, the instances where interviewees could recall relevant SEAs in sufficient detail to present within this thesis were sparse. This highlights the potential for a system such as the NRLS to capture practices' SEAs in an anonymised format at the time they are performed and use their learning to help others. As reporting from primary care is traditionally much lower than from secondary care (Barron et al, 2009) it is possible that mandatory or incentivised reporting could be introduced. This would need careful consideration to ensure no perverse incentives could be identified. NHS Hackney required their practices to report at least four medication related patient safety incidents in a month period as part of the annual QIPP (Quality Innovation, Productivity and Prevention) payment. They achieved substantially more returns than stipulated and highlighted CPD benefits and evidence for CQC inspections as possible benefits (NICE online, 2018). There is a body of theoretical evidence which suggests mandatory reporting is detrimental to the quality of medical error reports (Cohen, 2000). Other safety critical industries have always encouraged voluntary reporting but this misses out on the opportunity to analyse near-miss events that are not reported (Barach, 2000).

7.3.5.3 Direct impacts from the study

There were a small number of direct impacts for the patients, staff and practices involved in the study, not least of which were the attitudinal changes evident in interviewees who had experienced the study processes or received the interim reports. The potential impact of the study was originally part of the interview schedule but this topic was more difficult to discuss than anticipated for a number of reasons. As interviews were mostly conducted within days or weeks after the quantitative data collection very little time was allowed for practices to absorb information from the study or think of ideas. Frequently interviewees had not read the preparatory material, including the process map (and they were very frank about this). Often interviewees had not been on site during the quantitative data collection so the tasks relating to patients had been sent to someone else. Considering the current study was intended to be epidemiological in nature these do not represent methodological concerns.

7.4 Strengths and limitations

This mixed methods study has brought together in-depth retrospective record review with semi-structured interviewing of primary care staff in three geographic areas. Useful information was gained from the interview process which clearly places the quantitative results in context. In this section I discuss the strengths and limitations of the separate methodological strands of the study. A general limitation is the possibility that there is a higher level of motivation to improve patient safety in the practices who volunteered for this study than in practices more generally across England.

7.4.1 Strengths and limitations of the quantitative work

A strength of this work is that record reviewing was completed by one qualified GP (RS) working to the same standard across all practices and records, and not relying on coded information alone. As I became more experienced with data extraction from the medical record as the study progressed I became more time efficient. My clinical experience, which guided judgement of failures and harms, did not change which gives the work consistency. Having one record reviewer is also a limitation of the work because it relies on the clinical knowledge and experience of that one reviewer to detect error and harm. This is a limitation dictated in part by the

PhD budget and in part by the requirement for work to be demonstrably the author's own. Another strength is that detected harms were graded according to internationally accepted scales by two GPs working independently. A limitation was the lack of a second record reviewer and the initial detection of harms was limited to the record reviewer's ability (as a qualified GP) to recognise instances within the record. It was not possible to determine causality with this study design – merely association. As with any rates found from retrospective record review, the data are affected by which elements of the clinical decision making process are actually documented (and this is particularly relevant to the more minor medication changes). It is also important to acknowledge the freedom of GPs to independently decide on the management of their patients and that the term 'failures' is used here purely to describe an uncompleted action and is not used pejoratively to describe poor care. There may be clinical instances where the GP feels a course of action suggested in a discharge summary is inappropriate and in an ideal world they would document their thinking. A limitation of logistic regression modelling is the assumption that individual patients are drawn at random and while this is true within a single surgery site it is not true across the pooled sample. I did not collect quantitative data on continuity of care.

7.4.2 Strengths and limitations of the qualitative work and mixed methods

A strength of this work is that the interviewees were of a variety of ages and gender despite the purposive sampling method which was based on practice characteristics. Another strength is that all planned interviews took place and all were of sufficient duration to explore the issues. Interviewees were not offered any financial incentive to take part in the interviews. A GP interviewing GPs and practice managers has potential for researcher bias (Chenail, 2011) but also opens doors that may be closed to non-specialist interviewers. Awareness of this problem from the outset of the study was the main mitigating factor and I consider being a GP interviewer is a strength of the work. The perception of the interviewer was that staff were able to talk candidly about the potentially taboo topic of error and harm to a fellow clinician. The interviewer's knowledge and experience meant that she understood responses given about the inner workings of GP practice systems. This inside knowledge became apparent when reviewing data with non-clinicians who were for example puzzled why 'tasks' had been coded in IT strategies for safety improvement (they simply did not understand that 'tasks' are electronic). Clinical vignettes could be explained in lay language with ease to practice managers without the need for scripting. As the study progressed my expertise as an interviewer increased and I was informed by the information I had gathered from previous interviews. I would see this as a strength rather than a limitation because constant comparison is more important that consistency with qualitative work.

The advantages of using qualitative techniques within a mixed methods study have already been described in section 3.3.2 (triangulation, completeness and illustration of the quantitative results). Additional strengths were identified after completing the interviews. Embedding the qualitative work within the wider study allowed the interviewer to develop relationships with some of the interviewees (mainly practice managers) over a short period of time. This certainly helped the interviewer build a perception of rapport. The mixed methods approach also allowed for more field observations, particularly in the observational stage sitting with administrative staff. This helped the interviewer to feel familiar with the practice's systems and at ease in the interviews. Some limitations of mixed methodology became apparent after conducting the interviews. Practice staff were not experts in error and struggled to comment in depth on its causes. Clinical staff were not always aware of administrative systems within their own practice and vice versa. Interviewees struggled to comment on harm vignettes without knowing cases in depth.

7.4.2.1 Saturation

My culturally cohesive sample of senior practice staff with knowledge and experience of the topic of interest was a good starting point for achieving saturation (Morse, 1995), particularly as none of the participants dropped out. The occurrence de-novo of theme 1 (secondary care factors) and several de-novo subthemes, after a thorough literature review are indicative of saturation; as is the presence of divergent views in my data. Theoretical saturation allowed a theory to emerge as described in section 4.3.2. Coding saturation (Hennink, Kaiser, Marconi, 2016) was demonstrated in my data using *Nvivo* queries, no new subtheme codes appeared after the eleventh out of the 12 interviews. The author is confident that thematic saturation has been achieved with respect to themes 2-4 (which were the most defined in the interview schedule). This is evidenced by the length of the interviews, the depth to which concepts were discussed and the presence of a range of views on each topic given by experts. This demonstrates the principles that define 'information power' (Malterud, Siersma and Guassora, 2016):

> "the more information the sample holds the lower the number of participants needed."

This type of 'saturation testing' confirms the idea that saturation cannot be tested with a numerical quantity of interviews. Thematic saturation has likely been achieved with respect to the 'strategies for safety improvement' theme i.e. the main subthemes within in this theme represent the broad categories of safety improvement in which practices might engage. It is not possible to pick up every possible strategy by talking to staff from 10 practices so theoretical saturation is harder to test. Following a deductive approach, where a strategy was uncovered early in the study it could be used to stimulate discussion in later interviews (e.g. the national training scheme for receptionists). Where a strategy was uncovered late in the course of the interviews (e.g. promoting responsibility for continuity of care to patients) it could only impact on a smaller number of remaining interviews. Staff at practices 18 and 19 described some particularly innovative strategies but unfortunately were among the last to be interviewed. Where part of a study fails to reach saturation this does not mean that the data are invalid; merely that further study is needed (O'Reilly and Parker, 2013).

7.5 Implications for policy, practice and research

Based on my findings I have produced recommendations for the safer handling of discharge summaries (see figure 10). These recommendations focus on primary care but include some relevant information for secondary care providers.

Figure 10– Recommendations for safer processing of discharge summaries

Recommendations	Implementation strategies
Discharge Summary Design	
Standardised structure 'GP Action Box' Alphabetisation of medications listing Highlight changed medication (e.g. by using standard codes) Do not allow 'hand annotations'	Liaise with secondary care via CCG at local level Promote standardized discharge summary as a national priority via medical colleges
Primary Care Clinical Team (or trained administrative personnel)	
On-the-day workflow system for electronic documents Priority scanning for paper discharge summaries Priority 'flag' discharge summaries within the electronic mailbox Protected time and workspace for administrators involved in processing discharge summaries Aim for 'usual' or referring GP to process the discharge summary unless this will lead to potentially hazardous delay	Separate discharge summaries from the rest of the electronic inbox and process them daily, add an 'urgent' flag for the clinician. Look for the most appropriate clinician to send the summary to (have a leave planner on the wall near the scanning desk and take this into account). Scanning and distribution of electronic mail should occur at a dedicated desk space away from patient facing duties.
Primary Care Clinical Team (or trained administrative personnel)	
Prioritise higher-risk patients/carers to contact for medications reconciliation Consider making free text entries about clinical decisions taken after reading the discharge summary (this could be recorded at the place where the discharge summary document can be seen in the facing electronic record). Consider using a clinical pharmacist to assist with medicines reconciliation	Try to actively discuss medications changes with patients and carers – make space in the appointment book for this, pharmacists and suitably trained prescription clerks can be utilised for this role. Make it routine to enter a free text documentation about clinical thinking at the time of reading the discharge summary and teach this style of documentation to trainees.

Use IT to track actions e.g. electronic 'tasks', coded actions, diary functions Protected time and workspace for GPs and other colleagues involved in taking action in relation to requests in discharge summaries	Set up task 'groups' for care homes or for groups of vulnerable patients and check actions are completed periodically. Clinicians need booked time separate to patient facing duties to deal with discharge summaries, consider using the appointment book to assist this.
Wider Systems Redesign	
Enable visualisation of discharge summary and electronic health record at same time (split-screen or two screens) Consider creating a template or 'consultation style' in the electronic record (where possible, Read coded) to process the discharge summary e.g. data entry points for: diagnosis, significant test results, medication changes, discussions with patients/carers, outstanding actions. Interoperability of primary and secondary care IT systems to allow for 'co-creation' of the discharge summary. GPs would be able to comment on medication changes and requests for action prior to discharge.	Practices may choose to invest in extra screens or train their staff to use the split-screen options. Practices might like to create their own templates to assist and promote clinicians to document around the discharge summary. CCGs might be able to promote greater collaboration between secondary and primary care at the point of discharge at a local level but national policy in relation to IT also needs to change.

7.5.1 Implications for policy

It is important that the findings of this project should not be taken out of context to imply that general practice gives poor care to patients at discharge. General practices cope with medical complexity and ever-expanding workload whilst still managing to provide quality care for the majority of patients. Using the results of safety improvement research to chastise or sanction healthcare staff is unhelpful and instead it should be used to influence national policy and funding direction.

My findings call for improvements at a national level of the quality of discharge summaries which are sent out from secondary care. My results support government plans to rationalise delegation of workload across the interface by reducing burden on GPs to chase results and order additional tests. With whom responsibility for medicines reconciliation at discharge lies (hospital, general practice or both) may need legal clarification as a follow-up to the Care Quality Commission report of 2009 with consideration of the role of the pharmacist both in primary and secondary care.

My results may provide an incentive to fund improvements in GP systems (IT and otherwise) and to increase training of administrative and clinical staff in relation to handling discharge summaries. My qualitative evidence of the perceptions of practice staff regarding the effect of pressure in general practice on patient safety might incentivise funding to help ease the workload in general practice or to provide protected time for GPs to do administrative work. Indeed establishing administrative time for GPs (similar to that given to consultants as part of their Supporting Programmed Activities (NHS employers and the BMA, 2011)) might help embed this activity into the working week of a GP. My findings do not support the transfer of discharge summary processing to non-clinical staff but if this does become more standard then resources need to be directed to set aside protected time for administrative staff to perform this activity.

From a medico-legal perspective the defence organisations may be influenced by my results. If administrative work is evidenced as a ‘risky’ activity this might influence premiums for practitioners who do not have set aside administrative time. It might also influence the content of educational material from the defence unions or promote the need for specific training for GP registrars and foundation doctors in how to handle discharge summaries.

7.5.2 Implications for practices

My study highlights the need for GPs, as employers, to protect their administrative staff, who are processing documents, from the distractions of patient facing contact. They also need to have protected time from other work-strands in order to complete document processing without undue pressure. Within individual practices, employers may also see my results as indicative of the need to protect the time of their GPs to do administrative work safely (as was already occurring at a number of practice sites in the study).

On the basis of my evidence that GP medicines reconciliation at discharge has a relatively high failure rate, practices may choose to use the extended role of the clinical pharmacist to assist them with medicines reconciliation at discharge.

Strategies for safety improvement described by practices in the study were often highly applicable to other practices and yet staff had not shared them outside the practice of origin. This may reflect the traditional small business model of general practice where each enterprise competes with the other rather than working towards a collaborative goal. Harvesting these innovations collectively could facilitate the design of interventions. General practice needs to foster this culture of openness of ideas exchange in order to progress. Greater awareness and utilisation of schemes such as the RCGP Bright Ideas Scheme by practices could help to achieve this. It is possible that larger business model federations (such as practice 19) have already developed a range of solutions to discharge communication problems and it is important that these organisations are encouraged to work collaboratively with the wider NHS to share these innovations.

Interviewees were very interested in comparing themselves to, and in learning from other practices, in the form of the interim report. This is perhaps a sign that natural competition might be a driving force for patient safety improvement. If practices or CCGs had the ability to compile reports using indicators about the quality and safety of discharge processes then they could use these for benchmarking in a similar way to those reports already produced for medicines management (HSE, medicines management, 2013). These reports could be part of a more general 'score-card' of patient safety at a given practice.

7.5.3 Implications for research

Studying communication between secondary and primary care has recently been identified by the James Lind Alliance as one of the top 3 priorities of patients and primary care professionals involved in a consensus study (Morris et al, 2018). The concept of discharge summary processing was considered of high importance to patient safety by my interviewees who were able to identify an extensive range of factors contributing to failure to complete requested actions. The quantitative data reported to practices in the interim report certainly served to describe the problems even at these highly motivated and research active practices. Work in designing interventions to improve discharge summary processing needs to take into account existing strategies from 'grey' sources and more work needs to be conducted with practice staff and patients to identify what are their priorities for intervention.

7.5.3.1 Future work strands

A number of future work strands present themselves in the discussion of the current work. These are discussed below, beginning with ideas for measurement followed by ideas for interventions.

Measurement

Several of the GPs who were interviewed for the study expressed a wish to revisit the data set collected for the study after undertaking intervention work in their own surgeries. They wanted to do this in as an audit cycle but were put off by the length of time they thought it would take them to collect the necessary data. If a method of rapid retrospective review could be developed in relation to the discharge event this could save research clinician time. This could perhaps be achieved by building on the experience of creating the NHS Education for Scotland (NES) trigger tool which also requires rapid review (DeWet and Bowie, 2009). Indeed the author naturally began to use this method of data extraction as the study progressed, following a set sequence of areas of the electronic record to be reviewed.

Exploration of continuity of care by individual clinicians following discharge is needed (section 7.3.2). This would include determining what delay in discharge summary processing is acceptable in order to achieve continuity of care. Objective measures of whether continuity improves patient outcomes at discharge are also needed. This might be achieved by using the usual provider of care index as other researchers have done to show an association between improved continuity and reduced risk of hospital admission (Barker, Steventon and Deeny, 2017). Further research is also needed on how roles are changing within general practice (section 7.3.2), with evaluation of the national training scheme for receptionists and the *Clinical Pharmacists in General Practice* scheme already planned.

Exploration of the cost of failures to process discharge summaries (cost of harm/readmission versus cost of GP time) would be an essential basis for intervention research. A major barrier to suggested strategies for improvement described by interviewees was the fear of associated financial and time cost (section 6.7). In order to develop and prioritise future interventions and to influence national policy, cost-analysis will be essential. This type of analysis has been crucial to the successful roll-out of the PINCER intervention in general practice prescribing (Avery et al, 2012 (a)).

Interventions

Several practices expressed an interest in re-auditing elements of the research study (see above methodology strand) but would have been prevented from doing so by the lack of clinician time for such detailed record review. Automation of the data collection by development of indicators might be one solution. A search for potential indicators in discharge summary management similar to those employed in prescribing safety could assist this process (see the 56 indicators in Spencer et al, 2014 which are not re-presented here). Many indicators could potentially be extrapolated from the strategies for safety improvement described in the study (section 6.7) and subjected to RAND consensus methodology. In my post-doctoral work I have already begun this process by reviewing the literature for other indicators related to safe discharge management practices in primary care and aim to prepare summary material for Delphi panels to take place in the next year. I envisage that these indicators could be part of an RCGP toolkit to assist discharge processes.

The scope for IT interventions to improve discharge summary processing is wide and could target any or all stages of processing systems. It is likely that significant research time and funding would be needed to develop and adapt existing IT tools for medications reconciliation. It is important that any interventions are tested in UK general practice to assess their usability, propensity for alert fatigue and cost effectiveness in terms of safety improvement. Software interventions need to be regularly updated within the clinical record systems in order to be future proofed. An important scoping exercise would be to determine what in-house technology practices are already using at a local level e.g. templates, electronic task tracking systems, diary functions. It might be possible to obtain this information by surveying practices.

Patient involvement in designing interventions for discharge communication is an important but under-researched component. Patients themselves clearly feel discharge communication is an important research priority (Morris et al, 2018). My qualitative data suggest that GPs felt there was scope for greater empowerment of patients in order to prevent error especially in initiating medications reconciliation (section 6.5.1). Qualitative work with patients as part of the European Handover project indicated that vulnerable elderly patients particularly those without family support really struggled to take an active role in the discharge process (Groene et al, 2012) and that patients with chronic diseases also needed encouragement to take part in the discharge process (Flink et al, 2012) . The challenge remains as to how best to design an intervention targeting these groups. Work is underway to determine best practices for copying patients into their discharge summary communications (Weetman et al 2017). Some localised literature for patients exists describing the discharge summary at the secondary care end of the discharge process (Pennine Acute Hospitals Trust). A checklist of questions that patients should ask at discharge was published by the BMA but these questions were designed to be asked of secondary care providers and not of the patients' GP (BMA Patient Liaison, 2014). Perhaps something similar is needed in primary care or the current documentation should include advice for patients on how to liaise with their GPs. The author is currently a co-applicant on an NIHR funding bid to produce discharge material for patients in relation to acute kidney injury.

7.6 Reflections

7.6.1 Personal reflections on the research process

The most enjoyable aspect of the study was going into practices and having the informal discussions with practice staff required to construct the process maps. Perhaps because I was free from an interview schedule or audio-recorder but also because I was engaged in the creation of a potential quality improvement product for practices. This activity felt meaningful and has motivated me to undertake quality improvement work at my own practice. I also feel more aware of the variety of general practice structures and systems which will benefit my future research.

Initially I was very nervous about undertaking the interviews, a perceived lack of self-experience with qualitative techniques being the main influence. Looking back on the interviews feels different. There were many enjoyable human interaction moments and the interviews seem like high points in the research process. I am confident I have improved as a mixed-methods researcher. The chance to discuss the issues from the study with senior peers (the interviewees) has also helped me to develop as a GP.

The quantitative data collection process was also a good learning experience. Reading other GPs' consultation notes in the process of quantitative data collection has made me reflect on my own documentation skills (in a positive light). In my own practice I am much more aware to double check that I have completed actions whilst jumping between *EMIS* and *Docman* and now print complicated summaries so I can manually compare medicines lists. I keenly feel that lack of structured/protected administrative time has a negative impact on patient safety in my own experience of clinical practice.

7.6.2 Methodological reflections

7.6.2.1 General methodological considerations

In retrospect there would have been opportunity to consent practices in this study to contribute their strategies for safety improvement to national learning ventures such as the RCGP Bright Ideas Scheme. Indeed practices could have been consented to have their detected harms reported to the NRLS, this would have been easy to do using the anonymised vignettes. This could be factored into future research design.

7.6.2.2 Quantitative methodological considerations

Most of the data collection form worked as expected when out in the field. At some of the smaller practices in the study I was only just able to find the required sample size (30 records) using the inclusion criteria, this would need bearing mind if a larger sample were required. In considering the design of data collection forms for future studies more attention would be needed to the structure of the harm data collection. In particular there is a need to collect more background medical detail on patients who experience harm in order to place the clinical decisions made in context. This information was available to the researcher at the practice while judgements were made about whether a harm was present. However, it was not latterly available to the second clinician who ranked the severity and preventability of the harms because there was no place to document this information on the paper data collection forms. It will be interesting to track the learning from the Avoidable Harms in General Practice study in relation to their classification of harms (Bell et al, 2017).

7.6.2.3 Qualitative methodological considerations

The topics covered by the interviews were very diverse and have opened the field for future research. The original interview schedule was constructed in 2013. Having become more immersed in qualitative research during the course of the PhD the author could design a more focussed enquiry if it were required in future. Using vignettes has been a learning process. Some of the problems encountered with interviewees' responses to vignettes could be reduced by presenting cases from the wider study rather than vignettes originating in a particular organisation. Respondents would no longer feel the need to 'look up' the case during the interview. However this does have its downsides, principally that it might result in data loss about the learning of a given practice in response to the harms reported to them.

7.7 Conclusion

This PhD study has addressed its first main aim by quantitatively estimating the rate of failures in processing actions requested in discharge summaries. The failure rate in the study was 46% and 47% of these failures related to medicines reconciliation. The harm rate was 8% with an NNH of 13 in this high risk group of over 75's. To the author's knowledge it is the first study to determine such rates. I have identified a range of factors associated with these failures which were previously unknown. These factors include: newly started medicines, delay in uploading the discharge summary to the electronic record, the type of clinical record system used and male gender of patients. Higher risk of harm was associated with failure to prescribe cardiovascular medications and harms were, on average, of moderate severity and moderate preventability. I have confirmed that failures occur with all aspects of discharge summary processing and they are common. Requests for follow-up and tests were less likely to be completed than medicines reconciliation.

I met the second main aim of the study by interviewing key practice staff about the factors associated with failure to respond to requests in discharge summaries, thereby placing my quantitative results in context. I explored factors that might be responsible for failures such as poor delegation from secondary to primary care, under-developed IT systems and workload in primary care. This is the first qualitative study to look at this particular topic in the general practice setting. I have shown that safety of discharge from secondary to primary care is perceived as an important part of the daily work of general practice staff. My findings showed that practice staff could clearly identify where elements of their own and other's (including secondary care providers) processes for managing discharge summaries might be improved. In harvesting practice's strategies for safety improvement I have also shown that a variety of discharge safety work is already underway in primary care. These strategies involved the administrative team, including: changing administrative roles in document management, using administrative pathways to prioritise the discharge summary above other documents and looking at ways to seek continuity with the clinician to whom the discharge summary is sent. In the clinical team other strategies were in use including: innovative use of 'task' systems within the clinical record systems and the use of Read codes to track actions. Activities such as the unplanned admissions scheme, the Salford integrated record and encouragement to engage in significant event analysis were considered by interviewees to have had a positive impact on the safety of discharge summary processing.

Challenges for future work are to determine the human and financial cost of the harms associated with failure to correctly process discharge summaries in order to incentivise funding for intervention research. More work is needed to characterise the safety interventions already in place in practices and to understand practice staff's priorities for development of future interventions. There is scope to involve patients both in the design of these interventions and in determining where need is greatest.

References

Adams, W.L., McIlvain, H.E., Lacy, N.L., Magsi, H., Crabtree, B.F., Yenny, S.K. and Sitorius, M.A., 2002. Primary care for elderly people: why do doctors find it so hard?. *The Gerontologist*, *42*(6), pp.835-842.

Agency for Healthcare Research and Quality. 2017. Re-Engineered Discharge Toolkit. Available at: https://www.ahrq.gov/professionals/systems/hospital/red/toolkit/index.html. Accessed 4/7/18

Arksey, H. and O'Malley, L., 2005. Scoping studies: towards a methodological framework. *International journal of social research methodology,* 8(1), pp. 19-32

Avery, A.J., Savelyich, B.S., Sheikh, A., Morris, C.J., Bowler, I. and Teasdale, S., 2007. Improving general practice computer systems for patient safety: qualitative study of key stakeholders. *BMJ Quality & Safety*, *16*(1), pp.28-33.

Avery, A.J., Dex, G.M., Mulvaney, C., Serumaga, B., Spencer, R., Lester, H.E. and Campbell, S.M., 2011. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. *Br J Gen Pract*, *61*(589), pp.e526-e536.

Avery, A.J., Rodgers, S., Cantrill, J.A., Armstrong, S., Cresswell, K., Eden, M., Elliott, R.A., Howard, R., Kendrick, D., Morris, C.J. and Prescott, R.J., 2012 (a). A pharmacist-led information technology intervention for medication errors (PINCER): a multicentre, cluster randomised, controlled trial and cost-effectiveness analysis. *The Lancet*, *379*(9823), pp.1310-1319.

Avery, A.A., Barber, N., Ghaleb, M., Dean Franklin, B., Armstrong, S., Crowe, S., Dhillon, S., Freyer, A., Howard, R., Pezzolesi, C. and Serumaga, B., 2012 (b). Investigating the prevalence and causes of prescribing errors in general practice: the PRACtICe study. Report for the GMC.

Avery, A.J., 2017. Pharmacists working in general practice: can they help tackle the current workload crisis? *Br J Gen Pract*, 67 (662), pp 390-391

Asch, S.M., Kerr, E.A., Keesey, J., Adams, J.L., Setodji, C.M., Malik, S. and McGlynn, E.A., 2006. Who is at greatest risk for receiving poor-quality health care? *New England Journal of Medicine*, *354*(11), pp.1147-1156.

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

Barron, K., Atkins, C., Bone, P., Dowd, J., Gidley, S. and Hesford, S., 2009. House of commons health committee patient safety: Sixth report of session. p.2014.

Baxter, P. and Jack, S., 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, *13*(4), pp.544-559.

Barker, I., Steventon, A. and Deeny, S.R., 2017. Association between continuity of care in general practice and hospital admissions for ambulatory care sensitive conditions: cross sectional study of routinely collected, person level data. *bmj*, *356*, p.j84.

Belda-Rustarazo, S., Cantero-Hinojosa, J., Salmeron-Garcia, A., Gonzalez-Garcia, L., Cabeza-Barrera, J. and Galvez, J., 2015. Medication reconciliation at admission and discharge: an analysis of prevalence and associated risk factors. *International journal of clinical practice*, *69*(11), pp.1268-1274.

Bell, B.G., Spencer, R., Avery, A.J. and Campbell, S.M., 2014. Tools for measuring patient safety in primary care settings using the RAND/UCLA appropriateness method. *BMC family practice*, *15*(1), p.110.

Bell, B.G., Campbell, S., Carson-Stevens, A., Evans, H.P., Cooper, A., Sheehan, C., Rodgers, S., Johnson, C., Edwards, A., Armstrong, S. and Mehta, R., 2017. Understanding the epidemiology of avoidable significant harm in primary care: protocol for a retrospective cross-sectional study. *BMJ open*, *7*(2), p.e013786.

Beers, M.H., Ouslander, J.G., Rollingher, I., Reuben, D.B., Brooks, J. and Beck, J.C., 1991. Explicit criteria for determining inappropriate medication use in nursing home residents. *Archives of internal medicine*, *151*(9), pp.1825-1832.

Beers, M.H., 1997. Explicit criteria for determining potentially inappropriate medication use by the elderly: an update. *Archives of internal medicine*, *157*(14), pp.1531-1536.

Beasley, J.W., Escoto, K.H. and Karsh, B.T., 2004. Design elements for a primary care medical error reporting system. *WMJ-MADISON-*, *103*(1), pp.56-59.

Bergkvist, A., Midlöv, P., Höglund, P., Larsson, L. and Eriksson, T., 2009. A multi-intervention approach on drug therapy can lead to a more appropriate drug use in the elderly. LIMM-Landskrona Integrated Medicines Management. *Journal of evaluation in clinical practice*, *15*(4), pp.660-667.

Bhasale, A., 1998. The wrong diagnosis: identifying causes of potentially adverse events in general practice using incident monitoring. *Family Practice*, *15*(4), pp.308-318.

Blythe, A. and Buchan, J. eds., 2016. *Essential primary care*. John Wiley & Sons.

Booth, A., 2006. Clear and present questions: formulating questions for evidence based practice. *Library hi tech,* 24(3), pp. 355-368

Bowie, P., Pope, L. and Lough, M., 2008. A review of the current evidence base for significant event analysis. *Journal of Evaluation in Clinical Practice*, *14*(4), pp.520-536.

Bowie, P., McCoy, S., McKay, J. and Lough, M., 2005. Learning issues raised by the educational peer review of significant event analyses in general practice. *Quality in Primary Care*, *13*(2), pp. 75-83.

Bowie, P. Ferguson, J. Macleod, M. Kennedy, S. de Wet, C. McNab, D. Kelly, M. McKay, J. Aktinson, S., 2015. Participatory design of a preliminary safety checklist for general practice. *Br J Gen Pract, 65 (634) e330-43.*

Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. Qualitative research in psychology, 3(2), pp.77-101.

Brennan, T.A. and Leape, L.L., 1991. Adverse events, negligence in hospitalized patients: results from the Harvard Medical Practice Study. *Perspectives in Healthcare Risk Management*, *11*(2), pp.2-8.

British Medical Association. April 2018. Duty of care regarding communication of investigation results. Available at: https://www.bma.org.uk/advice/employment/gp-practices/service-provision/duty-of-care-to-patients-regarding-test-results. Accessed 4/7/18

British Medical Association. 2015. National Survey of GPs - The Future of General Practice. Available at: http://bma.org.uk/working-for-change/negotiating-for-the-profession/bma-general-practitioners-committee/surveys/future-of-general-practice. Accessed 4/7/18

British Medical Association Patient Liaison Group. 2014. Hospital Discharge: the patient carer and doctor perspective. Available at: https://www.rcoa.ac.uk/news-and-bulletin/rcoa-news-and-statements/hospital-discharge-the-patient-carer-and-doctor. Accessed 4/7/18

British Red Cross, 2018. In and Out of Hospital. Available at: http://blogs.redcross.org.uk/wp-content/uploads/2017/07/In-and-out-of-hosptial-report.pdf. Accessed 4/7/18

British Pharmacological Society. 2016. The Prescribing Safety Assessment. Available at: https://prescribingsafetyassessment.ac.uk/. Accessed 4/7/18.

Becker, S., Bryman, A. and Ferguson, H. eds., 2012. *Understanding research for social policy and social work: themes, methods and approaches*. Policy Press. Chapter 25.

Car, L.T., Papachristou, N., Gallagher, J., Samra, R., Wazny, K., El-Khatib, M., Bull, A., Majeed, A., Aylin, P., Atun, R. and Rudan, I., 2016. Identification of priorities for improvement of medication safety in primary care: a PRIORITIZE study. *BMC family practice*, *17*(1), p.160.

Care Quality Commission. National Study Oct 2009. Managing patient's medications after discharge from hospital. Available at: http://webarchive.nationalarchives.gov.uk/20101122140156/http://www.cqc.org.uk/_db/_documents/Managing_patients_medicines_after_discharge_from_hospital.pdf. Accessed 4/7/18

Carson-Stevens, A., Hibbert, P., Avery, A., Butlin, A., Carter, B., Cooper, A., Evans, H.P., Gibson, R., Luff, D., Makeham, M. and McEnhill, P., 2015. A cross-sectional mixed methods study protocol to generate learning from patient safety incidents reported from general practice. *BMJ open*, *5*(12), p.e009079.

Carson-Stevens, A., Hibbert, P., Williams, H., Evans, H.P., Cooper, A., Rees, P., Deakin, A., Shiels, E., Gibson, R., Butlin, A. and Carter, B., 2016. Characterising the nature of primary care patient safety incident reports in the England and Wales National Reporting and Learning System: a mixed-methods agenda-setting study for general practice. *Health Services and Delivery Research,* No. 4.27

Chenail, R.J., 2011. Interviewing the investigator: Strategies for addressing instrumentation and researcher bias concerns in qualitative research. *The qualitative report*, *16*(1), pp.255-262.

Cochrane Handbook for Systematic Reviews of Interventions. Available at: http://training.cochrane.org/handbook. Accessed 4/7/18

Cohen, M.R., 2000. Why error reporting systems should be voluntary: they provide better information for reducing errors. *BMJ*, 320(7237): 728–729

Colligan, L., Anderson, J.E., Potts, H.W. and Berman, J., 2010. Does the process map influence the outcome of quality improvement work? A comparison of a sequential flow diagram and a hierarchical task analysis diagram. *BMC health services research*, *10*(1), p.7.

Cooke, A., Smith, D. and Booth, A. 2012. Beyond PICO: the SPIDER tool for qualitative evidence synthesis. *Qualitative health research,* 22 (10), pp. 1435-1443

Cooper, A., Edwards, A., Williams, H., Evans, H.P., Avery, A., Hibbert, P., Makeham, M., Sheikh, A., J. Donaldson, L. and Carson-Stevens, A., 2017. Sources of unsafe primary care for older adults: a mixed-methods analysis of patient safety incident reports. *Age and ageing*, *46*(5), pp.833-839.

Cox, S.J. and Holden, J.D., 2007. A retrospective review of significant events reported in one district in 2004–2005. *Br J Gen Pract*, *57*(542), pp.732-736.

Cox, D.R., 1958. The regression analysis of binary sequences. *Journal of the Royal Statistical Society. Series B (Methodological)*, pp.215-242.

Cresswell, A., Hart, M., Suchanek, O., Young, T., Leaver, L. and Hibbs, S., 2015. Mind the gap: improving discharge communication between secondary and primary care. *BMJ Open Quality*, *4*(1), pp.u207936-w3197.

Crowe, S., Tully, M.P. and Cantrill, J.A., 2009. Information in general medical practices: the information processing model. *Family practice*, *27*(2), pp.230-236.

Cxpartners website. 2015. Reflexive thinking – 5 practical tips. Available at: https://www.cxpartners.co.uk/our-thinking/improve-your-research-technique-reflexive-thinking-5-practical-tips/. Accessed 4/7/18

De Wet, C., Spence, W., Mash, R., Johnson, P. and Bowie, P., 2010. The development and psychometric evaluation of a safety climate measure for primary care. *Qual Saf Health Care*, *19*(6), pp.578-584.

de Wet, C. and Bowie, P., 2011. Screening electronic patient records to detect preventable harm: a trigger tool for primary care. *Quality in primary care*, *19*(2). Pp. 115-125

de Wet, C., O'Donnell, C. and Bowie, P., 2014. Developing a preliminary 'never event' list for general practice using consensus-building methods. *Br J Gen Pract*, *64*(620), pp.159-167.

Department of Health and Social Care. 2000. An organization with a memory, report of an expert group on learning from adverse events in the NHS, London. Available online at: http://webarchive.nationalarchives.gov.uk/+/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4065083. Accessed 7/4/18

Department of Health and Social Care. 2001. National Service Framework for Older People. Available at: https://www.gov.uk/government/publications/quality-standards-for-care-services-for-older-people. Accessed 4/7/18

Department of Health and Social care. 2011. Good Practice Guidelines for GP electronic patient records – version 4. Available at: https://www.gov.uk/government/publications/the-good-practice-guidelines-for-gp-electronic-patient-records-version-4-2011. Accessed 1/7/18

Department of Health and Social Care. 2013. A promise to learn, a commitment to act – improving the safety of patients in England (the Berwick report). Available at: https://www.gov.uk/government/publications/berwick-review-into-patient-safety. Accessed 4/7/18

Department of Health and Social Care and Rt Hon Jeremy Hunt MP United Kingdom Secretary of State. 2014. Health Virginia Mason Hospital, Seattle Sign Up To Safety- The path to saving 6,000 lives, Published 27 March, 2014 Delivered on:26 March 2014. Available at: https://www.gov.uk/government/speeches/sign-up-to-safety-the-path-to-saving-6000-lives.
Accessed 4/7/18

Déruaz-Luyet, A., N'Goran, A.A., Tandjung, R., Frey, P., Zeller, A., Haller, D.M., Rosemann, T., Burnand, B., Bodenmann, P., Senn, N. and Widmer, D., 2015. Multimorbidity in primary care: protocol of a national cross-sectional study in Switzerland. *BMJ open*, *5*(10), p.e009165.

de Vries, E.N., Ramrattan, M.A., Smorenburg, S.M., Gouma, D.J. and Boermeester, M.A., 2008. The incidence and nature of in-hospital adverse events: a systematic review. *BMJ Quality & Safety*, *17*(3), pp.216-223.

Donabedian, A., 1980. The Definition of Quality and Approaches to Its Assessment [Explorations in Quality Assessment and Monitoring, vol. 1]. *Ann Arbor: Health Administration Press*.

Downs, S.H. and Black, N., 1998. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology & Community Health*, *52*(6), pp.377-384.

Elder, N.C., Meulen, M.V. and Cassedy, A., 2004. The identification of medical errors by family physicians during outpatient visits. *The Annals of Family Medicine*, *2*(2), pp.125-129.

Eggleton, K.S. and Dovey, S.M., 2014. Using triggers in primary care patient records to flag increased adverse event risk and measure patient safety at clinic level. *The New Zealand Medical Journal (Online)*, *127*(1390).

Esmail A, Neale G, Elstein M, Firth-Cozens J, Davy C, Vincent C. 2004. A report for the Manchester Centre for Healthcare Management Patient safety: lessons from litigation, Case studies in litigation: claims reviews in four specialties. Available at: https://www.birmingham.ac.uk/Documents/college-mds/haps/projects/cfhep/psrp/finalreports/PS006FinalReportVol3Walshe.pdf. Accessed 4/7/18

e-theses online service (EThOS) British Library Thesis Index. Available at; http://ethos.bl.uk. Accessed 4/7/18

Evans, A., Williams, L., Wiltshire, M., Patel, M., Burkhardt, K., Bradley, S. and Edwards, P., 2007. Incident reporting improves safety: the use of the RAID process for improving incident reporting and learning within primary care. *Quality in Primary Care*, *15*(2), pp.107-112.

Fernald, D.H., Pace, W.D., Harris, D.M., West, D.R., Main, D.S. and Westfall, J.M., 2004. Event reporting to a primary care patient safety reporting system: a report from the ASIPS collaborative. *The Annals of Family Medicine*, *2*(4), pp.327-332.

Fisseni, G., Pentzek, M. and Abholz, H.H., 2007. Responding to serious medical error in general practice—consequences for the GPs involved: analysis of 75 cases from Germany. *Family practice*, *25*(1), pp.9-13.

Fleiss, J. L., Levin, B. and Paik, M. C., 2003. *Statistical Methods for Rates and Proportions*, Third Edition, John Wiley & Sons, New York

Flink, M., Öhlén, G., Hansagi, H., Barach, P. and Olsson, M., 2012. Beliefs and experiences can influence patient participation in handover between primary and secondary care—a qualitative study of patient perspectives. *BMJ Qual Saf*, pp.bmjqs-2012.

Franklin, B.D., Shebl, N.A. and Barber, N., 2012. Failure mode and effects analysis: too little for too much?. *BMJ Qual Saf*, *21*(7), pp.607-611.

Freedman D. 2009. Statistical Models: Theory and Practice. Cambridge University Press. p. 128.

Gale, N.K., Heath, G., Cameron, E., Rashid, S. and Redwood, S., 2013. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC medical research methodology*, *13*(1), p.117.

Giddens, A., 1991. Structuration theory. *Past, Present and Future. In: Bryant, C. and Jary, D.(eds.). Giddens' Theory of Structuration. A Critical Appreciation. London: Routledge*.

Gillam, S.J., Siriwardena, A.N. and Steel, N., 2012. Pay-for-performance in the United Kingdom: impact of the quality and outcomes framework—a systematic review. *The Annals of Family Medicine*, *10*(5), pp.461-468.

Glasziou, P., Sanders, S., Pirozzo, S., Doust, J. and Pietrzak, E., 2002, July. Abstract screening–the value of two reviewers. In *4th Symposium on systematic reviews: pushing the boundaries. Oxford: Centre for statistics in medicine*.

GP Online, 2014. Exclusive: Huge variation in GP-patient ratio across England revealed. N. Bostock. Available at: https://www.gponline.com/exclusive-huge-variation-gp-patient-ratio-across-england-revealed/article/1327390. Accessed 16/7/18.

Gray, D.J.P., Sidaway-Lee, K., White, E., Thorne, A. and Evans, P.H., 2018. Continuity of care with doctors—a matter of life and death? A systematic review of continuity of care and mortality. *BMJ open*, *8*(6), p.e021161.

Gray, S., Urwin, M., Woolfrey, S., Harrington, B. and Cox, J., 2008. Copying hospital discharge summaries to practice pharmacists: does this help implement treatment plans? *Quality in primary care*, *16*(5) pp. 327-334

Green, J. and Thorogood, N., 2018. *Qualitative methods for health research*. Sage.

Greenhalgh, T. and Stones, R., 2010. Theorising big IT programmes in healthcare: strong structuration theory meets actor-network theory. *Social science & medicine*, *70*(9), pp.1285-1294.

Greenwald, J.L., Halasyamani, L., Greene, J., LaCivita, C., Stucky, E., Benjamin, B., Reid, W., Griffin, F.A., Vaida, A.J. and Williams, M.V., 2010. Making inpatient medication reconciliation patient centered, clinically relevant and implementable: a consensus statement on key principles and necessary first steps. *Journal of Hospital Medicine*, *5*(8), pp.477-485.

Grimes, T.C., Duggan, C.A., Delaney, T.P., Graham, I.M., Conlon, K.C., Deasy, E., Jago-Byrne, M.C. and O'Brien, P., 2011. Medication details documented on hospital discharge: cross-sectional observational study of factors associated with medication non-reconciliation. *British journal of clinical pharmacology*, *71*(3), pp.449-457.

Groene, R.O., Orrego, C., Suñol, R., Barach, P. and Groene, O., 2012. “It's like two worlds apart”: an analysis of vulnerable patient handover practices at discharge from hospital. *BMJ Qual Saf*, *21*(Suppl 1), pp.i67-i75.

Guest G, Bruce A and Johnson L. 2006. How many interviews are enough? An experiment with data saturation and variability. *Field Methods* 18(1): 59–82.

Habraken, M.M.P., Van der Schaaf, T.W., Leistikow, I.P. and Reijnders-Thijssen, P.M.J., 2009. Prospective risk analysis of health care processes: A systematic evaluation of the use of HFMEA™ in Dutch health care. *Ergonomics*, *52*(7), pp.809-819.

Hansen, L.O., Strater, A., Smith, L., Lee, J., Press, R., Ward, N., Weigelt, J.A., Boling, P. and Williams, M.V., 2011. Hospital discharge documentation and risk of rehospitalisation. *BMJ quality & safety*, *20*(9), pp.773-778.

Health Foundation (1) Evidence Scan, 2011. Levels of harm in primary care. Available at:https://www.health.org.uk/sites/health/files/LevelsOfHarmInPrimaryCare.pdf. Accessed 4/7/18

Health Foundation (2) Research scan, 2011. Does improving safety culture affect patient outcomes? Available at: www.health.org.uk/publication/does-improving-safety-culture-affect-patient-outcomes. Accessed 4/7/18

Healthcare Improvement Scotland (a). Ihub. Safety across the Interface Work-stream. Driver diagram and change package. Available at: https://ihub.scot/spsp/primary-care/safety-across-the-interface/ Accessed 4/7/18

Healthcare Improvement Scotland (b). Ihub. Medicines Reconciliation care bundle, available at: https://ihub.scot/spsp/primary-care/medicines-reconciliation-care-bundle/ Accessed 4/7/18

Health Service Executive. Medicines Management Programme. 2013. Available at: https://www.hse.ie/eng/about/who/cspd/ncps/medicines-management/. Accessed 4/7/18

Healthwatch. 2017. What happens when people leave hospital and other care settings? Findings from the Healthwatch network. Available at: https://www.healthwatch.co.uk/sites/healthwatch.co.uk/files/20171004_what_happens_when_people_leave_care.pdf. Accessed 4/7/18

Healthwatch. 2015. Improving discharges from hospital in Oxfordshire. Available at: https://healthwatchoxfordshire.co.uk/wp-content/uploads/2018/01/hwo_discharge_report_final.pdf. Accessed 4/7/18

Health and Social Care Information Centre UK. 2009. Trends in consultation rates in General Practice. Available at: https://digital.nhs.uk/data-and-information/publications/statistical/trends-in-consultation-rates-in-general-practice/trends-in-consultation-rates-in-general-practice-1995-2009 Accessed 18/7/18

Health and Social Care Information Centre UK. 2017. Prescription cost analysis. Available at; https://digital.nhs.uk/data-and-information/publications/statistical/prescription-cost-analysis/prescription-cost-analysis-england-2017. Accessed 4/7/18

Health and Social Care Information Centre UK. 2013. Hospital Episode Statistics, Admitted Patient Care, England 2012-13. Available at; https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity/hospital-episode-statistics-admitted-patient-care-england-2012-13. Accessed 4/7/18

Hennink, M.M., Kaiser, B.N. and Marconi, V.C., 2017. Code saturation versus meaning saturation: how many interviews are enough?. *Qualitative health research*, *27*(4), pp.591-608.

Hobbs, F.R., Bankhead, C., Mukhtar, T., Stevens, S., Perera-Salazar, R., Holt, T. and Salisbury, C., 2016. Clinical workload in UK primary care: a retrospective analysis of 100 million consultations in England, 2007–14. *The Lancet*, *387*(10035), pp.2323-2330.

Hoffmann, B., Beyer, M., Rohe, J., Gensichen, J. and Gerlach, F.M., 2008. "Every error counts": a web-based incident reporting and learning system for general practice. *BMJ Quality & Safety*, *17*(4), pp.307-312.

Hogan, H., Healey, F., Neale, G., Thomson, R., Vincent, C. and Black, N., 2012. Preventable deaths due to problems in care in English acute hospitals: a retrospective case record review study. *BMJ Qual Saf*, doi: 10.1136/bmjqs-2012-001159

House of Commons Health Committee. 2010. How many NHS GP consultations are estimated to have taken place in each year from 1995? Available at: http://www.publications.parliament.uk/pa/cm200910/cmselect/cmhealth/269/269we46.htm. Accessed 4/7/18

Hudson, P., 2003. Applying the lessons of high risk industries to health care. *BMJ Quality & Safety*, *12*(suppl 1), pp.7-12.

Institute for Healthcare Improvement (US). Medication Reconciliation to Prevent Adverse Drug Events. Available at: http://www.ihi.org/Topics/ADEsMedicationReconciliation/Pages/default.aspx. Accessed 4/7/18

Institute for Healthcare Improvement (US). Outpatient Adverse Event Trigger Tool. Available at: http://www.ihi.org/resources/Pages/Tools/OutpatientAdverseEventTriggerTool.aspx Accessed 4/7/18

Institute for Healthcare Improvement for NHS England. Always Events® Toolkit, December 2016. Publications Gateway Reference: 05993. Available at: https://www.england.nhs.uk/wp-content/uploads/2016/.../always-events-toolkit-v6.pdf. Accessed 4/7/18

Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, D.C: National Academy Press; 2001

Jacobs, S., O'Beirne, M., Derfiingher, L.P., Vlach, L., Rosser, W. and Drummond, N., 2007. Errors and adverse events in family medicine: developing and validating a Canadian taxonomy of errors. *Canadian Family Physician*, *53*(2), pp.270-276.

Joint Commission on Accreditation of Healthcare Organisations. 2018. The Targeted Solutions Toolkit. Available at: https://www.centerfortransforminghealthcare.org/tst.aspx. Accessed 4/7/18

Johnson, R Burke. Onwuegbuzie, AJ., Turner, LA. 2007. Toward a definition of mixed methods research. *Joural of mixed methods research*, 1(2) pp 112-133

Jones, C.D., Vu, M.B., O'Donnell, C.M., Anderson, M.E., Patel, S., Wald, H.L., Coleman, E.A. and DeWalt, D.A., 2015. A failure to communicate: a qualitative exploration of care coordination between hospitalists and primary care providers around patient hospitalizations. *Journal of general internal medicine*, *30*(4), pp.417-424.

Kaboli, P.J., Go, J.T., Hockenberry, J., Glasgow, J.M., Johnson, S.R., Rosenthal, G.E., Jones, M.P. and Vaughan-Sarrazin, M., 2012. Associations between reduced hospital length of stay and 30-day readmission rate and mortality: 14-year experience in 129 Veterans Affairs hospitals. *Annals of internal medicine*, *157*(12), pp.837-845

King, N., 2012. Doing template analysis. *Qualitative organizational research: Core methods and current challenges*, *426*.

Kirk, S., Parker, D., Claridge, T., Esmail, A. and Marshall, M., 2007. Patient safety culture in primary care: developing a theoretical framework for practical use. *BMJ Quality & Safety*, *16*(4), pp.313-320

Kringos, D.S., Boerma, W.G., Hutchinson, A., Van der Zee, J. and Groenewegen, P.P., 2010. The breadth of primary care: a systematic literature review of its core dimensions. *BMC health services research*, *10*(1), p.65.

Kripalani, S., LeFevre, F., Phillips, C.O., Williams, M.V., Basaviah, P. and Baker, D.W., 2007. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *Jama*, *297*(8), pp.831-841.

Kohn, Corrigan and Donaldson, To Err is Human, Institute of Medicine Report, National Academy Press, Washington DC 2000, available as a free book at: http://www.nap.edu/openbook.php?isbn=0309068371. Accessed 4/7/18

Kunz, R., Wegscheider, K., Guyatt, G., Zielinski, W., Rakowsky, N., Donner-Banzhoff, N. and Müller-Lissner, S., 2007. Impact of short evidence summaries in discharge letters on adherence of practitioners to discharge medication. A cluster-randomised controlled trial. *BMJ Quality & Safety*, *16*(6), pp.456-461.

Leape, L.L., 1997. A systems analysis approach to medical error. *Journal of evaluation in clinical practice*, *3*(3), pp.213-222.

Leape, L.L., 2010. Who's to blame? *Joint Commission journal on quality and patient safety*, *36*(4), pp.150-151.

Lorincz CY, Drazen E, Sokol PE, Neerukonda KV, Metzger J, Toepp MC, Maul L, Classen DC, Wynia MK. 2011. Research in Ambulatory Patient Safety 2000–2010: A 10-Year Review. American Medical Association, Chicago IL.

Machery, E., 2008. A plea for human nature. *Philosophical Psychology*, *21*(3), pp.321-329.

Makeham, M.A., County, M., Kidd, M.R. and Dovey, S.M., 2002. An international taxonomy for errors in general practice: a pilot study. *The Medical Journal of Australia*, *177*(2), pp.68-72

Makeham, 2007. The measurement of threats to patient safety in Australian general practice, Doctoral dissertation. University of Sydney.

Makeham, M.A., Stromer, S., Bridges-Webb, C., Mira, M., Saltman, D.C., Cooper, C. and Kidd, M.R., 2008. Patient safety events reported in general practice: a taxonomy. *BMJ Quality & Safety*, *17*(1), pp.53-57.

Malterud, K., Siersma, V.D. and Guassora, A.D., 2016. Sample size in qualitative interview studies: guided by information power. *Qualitative health research*, *26*(13), pp.1753-1760.
Mayor, S., Baines, E., Vincent, C., Lankshear, A., Edwards, A., Aylward, M., Hogan, H., Harper, P., Davies, J., Mamtora, A. and Brockbank, E., 2017. Measuring harm and informing quality improvement in the Welsh NHS: the longitudinal Welsh national adverse events study. *Health Services and Delivery Research*, *5*, pp.1-190.

Medication Errors Short Life Working Group Report. Department for Health and Social Care. Feb 2018. Available at: https://www.gov.uk/government/publications/medication-errors-short-life-working-group-report accessed 4/4/18

McKay, 2009. Significant events in general practice: issues involved in grading, reporting, analyses and peer review, Doctoral dissertation. University of Glasgow.

McKay, J., Murphy, D.J., Bowie, P., Schmuck, M.L., Lough, M. and Eva, K.W., 2007. Development and testing of an assessment instrument for the formative peer review of significant event analyses. *BMJ Quality & Safety*, *16*(2), pp.150-153.

Medical Protection Society. Jan 2018. Test results: learning from negligence claims. Available at: https://www.medicalprotection.org/uk/about-mps/media-centre/media-gallery/mps-blogs/blogs/support-for-doctors/support-for-doctors-blog-posts/claims/2018/01/22/test-results-learning-from-negligence-claims. Accessed 4/7/18

The Medications Discrepancy Tool – Care Transitions Program, Division of Healthcare Policy and Research, University of Colorado, Denver School of Medicine, available at; https://caretransitions.org/tools-and-resources/. Accessed 4/7/18

Mehta, R.L., Baxendale, B., Roth, K., Caswell, V., Jeune, I., Hawkins, J., Zedan, H. and Avery, A.J., 2017. Assessing the impact of the introduction of an electronic hospital discharge system on the completeness and timeliness of discharge communication: a before and after study. *BMC health services research*, *17*(1), p.624.

Mid Staffordshire NHS Foundation Trust Public Inquiry (The Francis report) 2013. Available at: www.gov.uk/government/publications/report-of-the-mid-staffordshire-nhs-foundation-trust-public-inquiry. Accessed 4/7/18

Moore, C., McGinn, T. and Halm, E., 2007. Tying up loose ends: discharging patients with unresolved medical issues. *Archives of internal medicine*, *167*(12), pp.1305-1311.

Moore, C., Wisnivesky, J., Williams, S. and McGinn, T., 2003. Medical errors related to discontinuity of care from an inpatient to an outpatient setting. *Journal of general internal medicine*, *18*(8), pp.646-651.

Morris, R.L., Stocks, S.J., Alam, R., Taylor, S., Rolfe, C., Glover, S.W., Whitcombe, J. and Campbell, S.M., 2018. Identifying primary care patient safety research priorities in the UK: a James Lind Alliance Priority Setting Partnership. *BMJ open*, *8*(2), p.e020870

Morse, J.M., 1995. The significance of saturation. *Qualitative Health Research, 5(2),* 147-149

Morse, J.M., 2004. Theoretical saturation. *Encyclopedia of social science research methods*, *3*, pp.1122-23.

Moss, F., Palmberg, M., Plsek, P. and Schellekens, W., 2000. Quality improvement around the world: how much we can learn from each other. *BMJ Quality & Safety*, *9*(1), pp.63-66.

The National Patient Safety Foundation. 2015. Free from Harm Accelerating Patient Safety Improvement Fifteen Years after To Err Is Human. Report of an Expert Panel Convened by The National Patient Safety Foundation. Available at: http://www.ihi.org/resources/Pages/Publications/Free-from-Harm-Accelerating-Patient-Safety-Improvement.aspx. Accessed 18/7/18

The National Reporting and Learning Service. Available at: http://www.nrls.npsa.nhs.uk/report/. Accessed 4/7/18

NHS Digital, eDischarge Summaries. Available at: https://digital.nhs.uk/services/transfer-of-care-initiative/edischarge-summaries Accessed 18/7/18

NHS employers and the British Medical Association. July 2011. A guide to consultant job planning. Available at: https://www.ed.ac.uk/files/imports/fileManager/national-job-planning-guide-consultants.pdf. Accessed 4/7/18

NHS England. Standards for the communication of diagnostic test results at discharge from hospital. March 2016. Available at: https://improvement.nhs.uk/uploads/documents/discharge-standards-march-16.pdf. Accessed 21/1/18

NHS England. Avoiding Unplanned Admissions Enhanced Service. Guidance and Audit Requirements. 2014. NHS England Gateway reference 01778. Available at: http://www.nhsemployers.org/~/media/Employers/Documents/Primary%20care%20contracts/Enhanced%20Services/2014-15/Unplanned%20admissions/Avoiding%20Unplanned%20Admissions%20-%20Guidance%20and%20audit%20requirements%20for%202014-15.pdf. Accessed 4/7/18

NHS England. 2017. Open letter to CCGs. Gateway Reference 06955. Available at: https://www.england.nhs.uk/wp-content/uploads/2017/07/joint-letter-with-nhs-improvement.pdf. Accessed 4/7/18

NHS England General Practice Forward View Website. (a). Clinical Pharmacists in General Practice. Information available at; https://www.england.nhs.uk/gp/gpfv/workforce/building-the-general-practice-workforce/cp-gp/. Accessed 4/7/18

NHS England General Practice Forward View Website. (b). Key Messages, July 2017 Gateway publication reference: 06935. Available at: https://www.england.nhs.uk/wp-content/uploads/2017/07/interface-between-primary-secondary-care.pdf. Accessed 4/7/18

NHS England General Practice Forward View Website. (c) National Training Scheme for Receptionists. Information available at: https://www.england.nhs.uk/gp/gpfv/redesign/gpdp/reception-clerical/ Accessed 4/7/18

NHS England General Practice Forward View Website (d) Special working group - Responsibility for prescribing between Primary & Secondary/Tertiary Care. Available at: https://www.england.nhs.uk/publication/responsibility-for-prescribing-between-primary-and-secondary-tertiary-care/. Accessed 4/7/18

NHS England General Practice Forward View Website (e) Brighton and Hove Integrated Care Service (BICS) – case study of workflow redirection (releasing capacity in General Practice) 2016. Presentation available at: https://www.networks.nhs.uk/nhs-networks/releasing-capacity-in-general-practice/documents/4-5-medical-assistants-workflow-redirection-in-brighton-and-hove/view Accessed 4/7/18

NHS Institute for Innovation and Improvement – Patient Flow Improvement Guide, available at; https://improvement.nhs.uk/resources/good-practice-guide-focus-on-improving-patient-flow. Accessed 4/7/18

NHS Institute for Innovation and Improvement – QSIR tools (formerly NPSA material). Available at: https://improvement.nhs.uk/resources/quality-service-improvement-and-redesign-qsir-tools/. Accessed 4/7/18

NHS Institute for Innovation and Improvement. Primary Care Trigger Tool. Webpage reconstructed and content no longer available, cited 28/11/13. Referenced in Health Foundation Evidence Scan, 2011. Levels of harm in primary care. Available at: https://www.health.org.uk/sites/health/files/LevelsOfHarmInPrimaryCare.pdf. Accessed 4/7/18

NHS Specialist Pharmacy Service, Medicines use and safety team – Medicines Reconciliation Audit and tools. Available at; https://www.sps.nhs.uk/articles/a-collaborative-audit-on-the-quality-of-medication-related-information-provided-when-transferring-patients-from-secondary-care-to-primary-care-and-the-subsequent-medicines-reconciliation-in-primary-c/. Accessed 4/7/18

National Institute for health and Care Excellence. 2015. Medicines Optimisation Standard: the safe and effective use of medicines to enable the best possible outcomes. Available at; http://www.nice.org.uk/guidance/NG5/chapter/1-recommendations#medicines-related-communication-systems-when-patients-move-from-one-care-setting-to-another. Accessed 4/7/18

National Institute for health and Care Excellence. 2018. Improving Patient Safety: Error Reporting and Risk Management. Available at; https://www.nice.org.uk/sharedlearning/improving-patient-safety-error-reporting-and-risk-management. Accessed 14/12/18

Nkansah, N., Mostovetsky, O., Yu, C., Chheng, T., Beney, J., Bond, C.M. and Bero, L., 2010. Effect of outpatient pharmacists' non-dispensing roles on patient outcomes and prescribing patterns. *The Cochrane Library*.

O'Brien, B.C., Harris, I.B., Beckman, T.J., Reed, D.A. and Cook, D.A., 2014. Standards for reporting qualitative research: a synthesis of recommendations. *Academic Medicine*, *89*(9), pp.1245-1251.

One thousand lives, Wales. Primary care trigger tool. Available at: http://www.1000livesplus.wales.nhs.uk/sitesplus/documents/1011/t4i%20%284%29%20how%20to%20use%20trigger%20tools%20%28feb%202011%29%20web.pdf. Accessed 4/7/18

O'reilly, M. and Parker, N., 2013. 'Unsatisfactory Saturation': a critical exploration of the notion of saturated sample sizes in qualitative research. *Qualitative research*, *13*(2), pp.190-197.

Open Thesis Online. Available at: http://www.openthesis.org. Accessed 4/7/18

Panesar, S.S., Carson-Stevens, A., Cresswell, K.M., Salvilla, S.A., Slight, S.P., Javad, S., Netuveli, G., Larizgoitia, I., Donaldson, L.J., Bates, D.W. and Sheikh, A., 2015. How safe is primary care? A systematic review. *BMJ Qual Saf*, pp.bmjqs-2015.

Payne, R.A., Abel, G.A., Guthrie, B. and Mercer, S.W., 2013. The effect of physical multimorbidity, mental health conditions and socioeconomic deprivation on unplanned admissions to hospital: a retrospective cohort study. *Canadian Medical Association Journal*, *185*(5), pp.E221-E228.

Pennine Acute Hospital Trust, Discharge Summary Patient Information Leaflet. Available at: http://www.pat.nhs.uk/downloads/patients-visitors/discharge-summary-leaflet.pdf
Accessed 4/7/18

Policy Research Unit in Commissioning and the healthcare system. 2015. Eighth national GP worklife survey. Gibson J, Checkland K, Coleman A et al. Available at: https://www.research.manchester.ac.uk/portal/files/39031810/FULL_TEXT.PDF Accessed 4/7/18

PRISMA - Transparent Reporting of Systematic Reviews and Meta-analyses guidelines, available at; http://prisma-statement.org/ Accessed 4/7/18

Purdy, 2010. Kings Fund Report. Avoiding Hospital Admissions, what does the research evidence say? Available at: https://www.kingsfund.org.uk/sites/default/files/Avoiding-Hospital-Admissions-Sarah-Purdy-December2010.pdf Accessed 18/7/18

R Core Team 2016. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Available at: https://www.R-project.org Accessed 4/7/18

Reason, J., 1990. Human Error. Cambridge University Press.

Reason, J., 2000. Human error: models and management. *Bmj*, *320*(7237), pp.768-770.

Richardson, WS., Wilson, MC., Nishikawa, J. and Hayward, RS., 1995. The well-built clinical question: a key to evidence-based decisions. *ACP journal club,* 123(3), pp. 12

Ritchie, J., 1994. Spencer, l., 1994. Qualitative data analysis for applied policy research. *Bryman and Burgess (Eds.), Analysing Qualitative Data*, pp.173-194.

Rubin, G., George, A., Chinn, D.J. and Richardson, C., 2003. Errors in general practice: development of an error classification and pilot study of a method for detecting errors. *BMJ Quality & Safety*, *12*(6), pp.443-447.

Runciman, W., Hibbert, P., Thomson, R., Van Der Schaaf, T., Sherman, H. and Lewalle, P., 2009. Towards an International Classification for Patient Safety: key concepts and terms. *International journal for quality in health care*, *21*(1), pp.18-26.

The Royal College of General Practitioners Patient Safety Toolkit. Available at: http://www.rcgp.org.uk/clinical-and-research/toolkits/patient-safety.aspx. Accessed 4/7/18

Royal College of General Practitioners Bright Ideas Scheme. Available at: http://www.rcgp.org.uk/clinical-and-research/bright-ideas.aspx. Accessed 4/7/18

Royal College of Physicians, 2011. Hospital Discharge Audit Tool. Health Informatics Unit. Available at: https://www.rcplondon.ac.uk/file/206/download?token=_XJ_6BbX Accessed 4/7/18

Sandars, J. and Esmail, A., 2003. The frequency and nature of medical error in primary care: understanding the diversity across studies. *Family practice*, *20*(3), pp.231-236.

Sanderson, W.C. and Scherbov, S., 2014. Measuring the speed of aging across population subgroups. *PloS one*, *9*(5), p.e96289.

Santschi, V., Chiolero, A., Burnand, B., Colosimo, A.L. and Paradis, G., 2011. Impact of pharmacist care in the management of cardiovascular disease risk factors: a systematic review and meta-analysis of randomized trials. *Archives of internal medicine*, *171*(16), pp.1441-1453.

Schedlbauer, A., Prasad, V., Mulvaney, C., Phansalkar, S., Stanton, W., Bates, D.W. and Avery, A.J., 2009. What evidence supports the use of computerized alerts and prompts to improve clinicians' prescribing behavior?. *Journal of the American Medical Informatics Association*, *16*(4), pp.531-538.

Schnipper, J.L., Liang, C.L., Hamann, C., Karson, A.S., Palchuk, M.B., McCarthy, P.C., Sherlock, M., Turchin, A. and Bates, D.W., 2011. Development of a tool within the electronic medical record to facilitate medication reconciliation after hospital discharge. *Journal of the American Medical Informatics Association*, pp.309-313.

Scottish Intercollegiate Guidelines Network (SIGN), Discharge document, 2012. Available at: http://www.sign.ac.uk/sign-128-the-sign-discharge-document.html. Accessed 4/7/18

Shepperd, S., Doll, H., Angus, R.M., Clarke, M.J., Iliffe, S., Kalra, L., Ricauda, N.A., Tibaldi, V. and Wilson, A.D., 2009. Avoiding hospital admission through provision of hospital care at home: a systematic review and meta-analysis of individual patient data. *Canadian Medical Association Journal*, *180*(2), pp.175-182.

Shiu, J.R., Fradette, M., Padwal, R.S., Majumdar, S.R., Youngson, E., Bakal, J.A. and McAlister, F.A., 2016. Medication discrepancies associated with a medication reconciliation program and clinical outcomes after hospital discharge. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, *36*(4), pp.415-421.

Silverman, D. ed., 2016. *Qualitative research*. Sage.

Spencer, R., Bell, B., Avery, A.J., Gookey, G. and Campbell, S.M., 2014. Identification of an updated set of prescribing-safety indicators for GPs. *Br J Gen Pract*, *64*(621), pp.e181-e190.

Spencer, R. and Campbell, S.M., 2014. Tools for primary care patient safety: a narrative review. *BMC family practice*, *15*(1), p.166.

Stitt, D.M., Elliott, D.P. and Thompson, S.N., 2011. Medication discrepancies identified at time of hospital discharge in a geriatric population. *The American journal of geriatric pharmacotherapy*, *9*(4), pp.234-240.

Stones, R., 2005. *Structuration theory*. Macmillan International Higher Education.

Sunquest Integrated Clinical Environment (ICE) software. Company website available at: https://www.sunquestinfo.com/laboratory-orders-results/integrated-clinical-environment-for-pathology-networks-software/
Accessed 20/7/18

Swinglehurst, D. and Greenhalgh, T., 2015. Caring for the patient, caring for the record: an ethnographic study of 'back office' work in upholding quality of care in general practice. *BMC health services research*, *15*(1), p.177.

The plan to reduce medication errors: Q&A with Jeremy Hunt and Professor Dame Sally Davies. You Tube, 26.2.18. Available at: https://www.youtube.com/watch?v=VxfgjM_iZGg. Accessed 4/4/18

Tong, A., Sainsbury, P. and Craig, J., 2007. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International journal for quality in health care*, *19*(6), pp.349-357.

Tsang, C., Bottle, A., Majeed, A. and Aylin, P., 2013. Adverse events recorded in English primary care: observational study using the General Practice Research Database. *Br J Gen Pract*, *63*(613), pp.e534-e542.

Unertl, K.M., Weinger, M.B., Johnson, K.B. and Lorenzi, N.M., 2009. Describing and modelling workflow and information flow in chronic disease care. *Journal of the American Medical Informatics Association*, *16*(6), pp.826-836.

van Sluisveld, N., Zegers, M., Natsch, S. and Wollersheim, H., 2012. Medication reconciliation at hospital admission and discharge: insufficient knowledge, unclear task reallocation and lack of collaboration as major barriers to medication safety. *BMC health services research*, *12*(1), p.170.

Vincent, C.A., Pincus, T. and Scurr, J.H., 1993. Patients' experience of surgical accidents. *BMJ Quality & Safety*, *2*(2), pp.77-82.

Vincent, C., Neale, G. and Woloshynowych, M., 2001. Adverse events in British hospitals: preliminary retrospective record review. *Bmj*, *322*(7285), pp.517-519.

Vincent C. The Essentials of Patient Safety (2012) Free Online Book adapted from Patient Safety 2nd edition Wiley Blackwell BMJ books. Available at; https://www1.imperial.ac.uk/resources/5D671B2E-1742-454E-9930-ABE7E4178561/vincentessentialsofpatientsafety2012.pdf. Accessed 4/7/18

Waring, J., Marshall, F., Bishop, S., Sahota, O., Walker, M.F., Currie, G., Fisher, R.J. and Avery, T.J., 2014. An ethnographic study of knowledge sharing across the boundaries between care processes, services and organisations: the contributions to 'safe' hospital discharge. *Health Services and Delivery Research*, *2*(29), pp.1-160. Available at: https://www.ncbi.nlm.nih.gov/books/NBK259993/. Accessed 4/7/18

Weetman, K., Wong, G., Scott, E., Schnurr, S. and Dale, J., 2017. Improving best practice for patients receiving hospital discharge letters: a realist review protocol. *BMJ open*, *7*(11), p.e018353.

World Health Organization. 2009. Conceptual Framework for the International Classification for Patient Safety. Available at: www.who.int/patientsafety/taxonomy/icps_full_report.pdf. Accessed 1/7/18

Wynia, M.K. and Classen, D.C., 2011. Improving ambulatory patient safety: learning from the last decade, moving ahead in the next. *JAMA*, *306*(22), pp.2504-2505.

Williams, H., Edwards, A., Hibbert, P., Rees, P., Evans, H.P., Panesar, S., Carter, B., Parry, G., Makeham, M., Jones, A. and Avery, A., 2015. Harms from discharge to primary care: mixed methods analysis of incident reports. *Br J Gen Pract*, *65*(641), pp.e829-e837.

Woloshynowych, M., Rogers, S., Taylor-Adams, S. and Vincent, C., 2005. The investigation and analysis of critical incidents and adverse events in healthcare. *Health Technology Assessment*; Vol. 9: No. 19

Yemm, R., Bhattacharya, D., Wright, D. and Poland, F., 2014. What constitutes a high quality discharge summary? A comparison between the views of secondary and primary care doctors. *International journal of medical education*, *5*, p.125.

Yin, RK., 2003. Case study research: Design and methods (3rd edition). Thousand Oaks, CA: Sage.

Zedan, H.S., 2012. Discharge summary communication from secondary to primary care, Doctoral dissertation. University of Nottingham.

Zwart, D.L., Steerneman, A.H., van Rensen, E.L., Kalkman, C.J. and Verheij, T.J., 2011. Feasibility of centre-based incident reporting in primary healthcare: the SPIEGEL study. *BMJ quality & safety*, *20*(2), pp.121-127.

Appendix 1 - Scoping review search terms

1. Setting

The first stem defines the population of patients and the healthcare setting of interest. Let us first establish what is meant by 'general practice', a term which in this thesis is used interchangeably with 'primary care'. The Oxford English Dictionary defines primary care as; 'health care provided in the community for people making an initial approach to a medical practitioner or clinic for advice or treatment'. The World Health Organisation further defined primary care in 1978 to be; 'based on practical, scientifically sound, and socially acceptable method and technology; universally accessible to all in the community through their full participation; at an affordable cost; and geared toward self-reliance and self-determination.' A number of synonyms for general practice were sourced from National Library of Medicine (NLM) MeSH terms (http://www.nlm.nih.gov/mesh) and suggestions from the project team, American and other world-wide terms were also used.

"Family physician" OR "primary care" OR "family practice" OR "general practice" OR "ambulatory care" OR "ambulatory health" OR "ambulatory health-care" OR "ambulatory healthcare" OR "community health" OR "community healthcare" OR "community health-care" OR "primary health" OR "primary healthcare" OR "primary physician" OR "primary health-care" OR generalist OR "family medicine"

2. Safety synonyms

Stem 2 defines the topic of interest; 'patient safety and error' is, as such, quite broad, including harm, adverse events, mistakes, safety culture and administration. MeSH term trees were exploded to seek terms and synonyms which could be useful for expanding the search in this area. Some of these MeSH terms were sourced from papers known to the author and some from the databases themselves. 'Malpractice' is defined differently to error and therefore needed to be included as a separate term in the search. 'Harm' and 'adverse event' were included as more general terms which might discover papers without keywords or MeSH terms assigned to them. A decision was taken to have both singular and pleural versions of the various terms as some of the databases did not search for plurals once the terms were placed within quotation marks. The steering group for the NIHR Patient Safety Toolkit project suggested further synonyms such as 'harm' and 'safety culture' which were inserted as free text terms in an all fields search.

"administration error" OR "administration errors" OR "dispensing error" OR "dispensing errors" OR "medication error" OR "medication errors" OR "medical mistake" OR "medical mistakes" OR "prescription error" OR "prescription errors" OR "prescribing error" OR "prescribing errors" OR "prescribing fault" OR "prescribing faults" OR "medical error" OR "medical errors" OR malpractice OR "safety" OR "safety-culture" OR "adverse event" OR "adverse events" OR "adverse effect" OR "adverse effects" OR "adverse reaction" OR "adverse reactions" OR harm OR harms

3. Types of tools

The third search stem refers to the type of papers, interventions and or outcomes of interest. As the aim of the NSPCR study was to develop a toolkit for patient safety it was felt important to further define the search to documents with some form of measureable output, be this quantitative or qualitative. Without this third aspect added to the electronic search, the number of papers returned was in the hundreds of thousands due to the fairly broad nature of the terms in stems one and two. For stem three, terms were chosen partly on knowledge of safe prescribing papers where the word ‘toolkit’ seems to be a particular ‘buzzword’; this does not however map to any particular MeSH terms. In order to validate this section further, MeSH trees were explored and the most encompassing umbrella heading was found to be “outcome assessment (health care)” The inclusion of the MeSH term “practice guideline” aimed to include documents which might have informed local or national policy. Further types of outcome were suggested by the research team for the NIHR toolkit project, including; “survey”, “questionnaire” and “indicator”.

scale OR scales OR survey OR surveys OR questionnaire OR questionnaires OR instrument OR instruments OR indicator OR indicators OR "outcome assessment" OR "outcome assessments" OR "patient reported outcome" OR "patient reported outcomes" OR "patient experience" OR "patient experiences" OR "practice guideline" OR "practice guidelines" OR "quality assurance" OR tool OR tools OR toolkit OR toolkits

Appendix 2 - Adaptations to literature review search strategy applied to individual databases and grey literature sources

PubMed
8651 articles were yielded by a search performed on 1/11/11 in which the only limitations were ‘human’. Manual manipulation of the search was necessary to remove ‘translations’ offered by the database which were not helpful – for instance the term “indicator” also draws terms relating to “reagents” and the term “survey” would also include “data collection” if it were not manually modified. “Scale” is a useful term but translated to “weights and measures” on *Pubmed* so these terms were also manually removed so that only “scale” and “scales” (all fields) remained.

Embase
Searching *Embase* using a ‘multi-field’ search option in *Ovid SP* resulted in about 94,000 publications Using the same search terms with correct operators and brackets on the single field advanced search found 3354 papers in total once limited to ‘human’. In depth investigation of the database found that this single line search is using the same terms but mapping them to; title, abstract, subject headings and keyword rather than just free text searching. This option was preferred as circa 3000 titles was manageable.

Medline (Ovid 1996 onwards)
Using *Ovid SP* to search *Medline*, 2609 papers were found using a single field advanced search limited to ‘humans’, again the multi-field search found many more papers than using an advanced search even when choosing not to ‘map to subject heading’. As the search engine is identical to that used to search *Embase*, the same strategy was used. Transfer of references is more difficult with this database – only 200 results at a time can be exported into endnote.

Health Management Information Consortium
Using Ovid SP to search this database yielded 290 papers in the area of health management; this database represents a different type of health services research to the more ‘medical’ databases. It was felt important to widen the net of the review by including these types of publication – see also the section on grey literature. The search engine does not feature a limit to ‘humans’ option but this database does not contain information on animal research. In other respects the search technique was identical to that employed with the *Medline* and *Embase* databases.

Web of Science
Advanced or basic search made no difference to the total of 2030 titles collected, setting the options on a basic search to ‘topic’ yields the most results. 522 results were in the general medicine category, 316 in the pharmacology category and 255 in public health. This database is very helpful in the way it splits up results but this function could not be fully utilised in this search and the results were downloaded into endnote in the same fashion as for other databases.

CINHAL (*Cumulative Index to Nursing and Allied Health Literature)*
This database represented the biggest challenge to the methodology so far employed. Several review articles in the field of patient safety had used CINHAL as a source so it was felt to be an important database to extract information from. Using both the University of Nottingham (UoN) and the University of Warwick (UoW) databases (available via the study statistician) revealed vastly different search results. Depending on the version of EBSCO host to which the university is signed up.

The same search gave 12,000 results via UoN and 4000 results via UoW. Only the UoW software would allow downloading to a citation manager so this search was chosen. Limiting to humans halved the number of results from 3400 to 1993. This turned out to be essential as only 50 titles can be downloaded at once (a very laborious process). Narrowing by the ‘subject majors’ offered by the database (Practice Guidelines, Family Practice , Quality Improvement, Quality of Health Care, Patient Safety and Primary Health Care) did not produce consistent results – important papers were missing.

Grey literature sources

UK websites; NHS Institute for Innovation and Improvement, National Patient Safety Agency, National Prescribing Council, Medicines and Healthcare products Regulatory Authority, Medical Protection Society, Medical Defence Union, General Medical Council, 1000 lives Wales, Scottish Patient Safety Programme.

US websites; Institute for Healthcare Improvement, Joint Commission on Accreditation of Healthcare, Agency for Healthcare Research and Quality, *DxPlain* and Society to Improve Diagnosis in Medicine.

Appendix 3 – Scoping review kappa statistics on inter-rater reliability of abstract inclusion

Measure of inter-rater agreement for inclusion of abstracts in the literature review - *Chance corrected proportional agreement: Cohen Kappa analysis*
The kappa (κ) value controls the chance agreement. The formula used is: (observed agreement – expected agreement) / (1 – expected agreement). When there is complete agreement between the instruments Kappa equals one. If the observed agreement is only that expected by chance the score equals zero. An example of the data used for analysis is given in the table below.

	SC include	SC uncertain	SC exclude	**Total**
RS include	104	37	70	**211**
RS uncertain	1	47	6	**54**
RS exclude	24	53	969	**1046**
Total	**129**	**137**	**1045**	**1311**

Worked example; O = observed, E=expected
P_O= (104+47+969) / 1311
P_E= (211x129) + (54x137) + (1046x1045) / 1311^2
K = 0.8543 – 0.6521 / 1- 0.6521
K = 0.58
Criteria for judging intermediate values of kappa (*κ)* vary*.* The following table is suggested by Altman to interpret the values between 0 and 1.

Value of *κ*	Strength of agreement
<0.20	Poor
0.21 – 0.40	Fair
0.41 – 0.60	Moderate
0.61 – 0.80	Good
0.81 – 1.00	Very good

Appendix 4 - Data extraction tool used in the scoping review (numerical data for *Excel* sheet)

Healthcare Setting

1. Family practice
2. Primary-secondary interface
3. OOH (Out Of Hours)
4. Pharmacies
5. Family practice & pharmacy
6. Family practice and OOH
7. GP and dentistry
8. Nursing homes
9. Nursing homes and family practice
10. Nursing homes and pharmacies
11. Primary care education per se
12. Health system
13. Other…………(free text)
14. HOSPITAL - EXCLUDE

Country

1. UK
2. More than one country
3. Germany
4. Dutch
5. USA
6. Nigeria
7. Sweden
8. India
9. Denmark
10. Australia
11. France
12. Spain
13. Norway
14. NZ
15. Ireland
16. Taiwan
17. Canada
18. Italy
19. Switzerland
20. Brazil
21. Tunisia
22. China
23. Portugal
24. Bulgaria

Type of study/study design

1. Qualitative
2. Quantitative - medical record review
3. Quantitative – GPRD, database analyses
4. Systematic review – quantitative
5. Systematic review – qualitative
6. Systematic review - mixed
7. Randomised Controlled Trial
8. Observational (including questionnaires/surveys)
9. Longitudinal cohort
10. Mixed methods
11. Consensus techniques
12. Opinion / recommendations / guideline
13. Time series design
14. Prospective controlled study
15. Other…………(Free Text)

Toolkit Outcome (Existing indicator-Toolkit)

Is there a clearly defined indicator / set of indicators or a clearly defined/validated Tool as an aim/outcome?

1. Yes: Toolkit (electronic data extraction)
2. Yes: Toolkit (paper based or mixed data extraction : NOT just electronic)
3. Yes: PROM/PREM
4. Yes: Questionnaire
5. Yes: specific indicator or set of indicators or RAND Appropriateness Method criteria etc. but not a named toolkit
6. No: BUT an indicator or indicators could be developed from the findings/outcome
7. Other: ………….(Free text)
8. No → EXCLUDE

What type of patient safety is assessed (topic)?

1. Diagnostic
2. Prescribing
3. Investigations
4. Referral
5. Data accuracy / informatics: internal to practice
6. Interface: primary-secondary – referral/discharge
7. Clerical error
8. OOH
9. Telephone
10. Training
11. Safety climate
12. Patient role
13. Organisational
14. Errors (generic) – no specific focus
15. Adverse events (generic) – no specific focus
16. Outcomes: mortality
17. more than one………………..(numbers)
18. Other ……………………….
19. Not clear

Final outcome of studies (including details of scales)

1. Indicators (as written in the paper)
2. Indicators we have extracted
3. Toolkit
4. Indices: e.g. medication appropriate index
5. RAND outcomes
6. PROM/PREM (patient completed questionnaire)
7. Questionnaire (not completed by patients so staff or GPs etc.)
8. Taxonomy or framework
9. Other: ………….(Free text)
10. Not clear
11. None

Validation/ratification

Indicators/Tool(s) ratified for use in family practice/pharmacy/primary-secondary interface?

1. Yes in family practice by research team (either as part of the study or statement/reference that this has been done previously)
2. Yes in family practice – by researchers other than research team
3. No but yes in hospital
4. No
5. Not applicable
6. Unclear

Clear statement of aims

1. Yes
2. No
3. Not applicable
4. Unclear

Choice of method *(Is there a statement that explains the research design (e.g. have they discussed how they decided which methods to use?).*

1. Yes
2. No
3. Not applicable
4. Unclear

Sampling (*is there a statement that explains how the participants were selected; If quantitative did they do a power calculation? If qualitative did they provide a statement of sampling?)*

1. Yes
2. No
3. Not applicable
4. Unclear

Data collection *(is there a statement by the researcher(s) justifying the methods chosen?)*

1. Yes
2. No
3. Not applicable
4. Unclear

Data analyses appropriate?

1. Yes
2. No
3. Not applicable
4. Unclear

Clear statement of results?

1. Yes
2. No
3. Not applicable
4. Unclear

Strengths/limitations (is there a discussion of the strengths/limitations of the paper?)

1. Yes
2. No
3. Not applicable
4. Unclear

Possible to adapt to GP clinical computer systems (existing or possible)?

1. Yes
2. No
3. Not applicable

Appendix 5 – *Word* data extraction form used in the scoping review (with worked example)

Ref. citation	Summary of aims; method and sample and analyses (extract from abstract where possible)	What is/are the Indicator(s) / results	Main strengths / weaknesses	Adaptable to GP Computer Systems?
Singh et al Identifying diagnostic errors in primary care using an electronic screening algorithm *Arch Intern Med. 2007;167:302-308*	**Safety focus:** diagnostic **Aim:** design and test an algorithm for automated detecting of unscheduled return visits to primary care (as a marker for diagnostic error). Also to develop a classification system for diagnostic error **Methods:** Structured query language (SQL) database used to extract information from computerised medical records in one closed hospital system. For hospitalisation 15580 records yielded 211 cases 139 of which met criteria. For repeat visit or ED attendance 5267 records yielded 175 cases. 199 controls with only 1 visit were chosen at random. Three reviewers were blinded to the aims of the study and used a standardised form to extract data on potential errors. Two physicians reviewed each case independently – diagnostic error was only assigned on the basis of information available to the doctor at the time and not future tests. **Sample:** A veteran's affairs clinic with a patient population of 6000. Cases had an index visit followed by either hospitalisation or an unscheduled return visit between 24hrs and 10 days later. Planned hospital admissions excluded by manual notes review **Analyses:** Kappas used for agreement between reviewers, p values levels <0.05 used.	**Outcomes:** 24% Positive Predictive Value (PPV) of hospitalisation for error, 10% PPV of second visit for error, 4% PPV in controls. The most common errors in the primary diagnostic process were failure/delay in history taking and misinterpretation of the history and physical examination findings. The most common secondary errors were lack of prioritisation/awareness of severity. This tool has PPVs comparable to other methods for diagnostic error detection and better than those for Adverse Drug Event detection. Potential criterion; the practice can demonstrate a certain sample of the medical records have been screened and invetigated for diagnostic error	**Limitations:** may not be generalisable outside the VA setting. These results may apply more to trainee doctors. **Strengths:** complete blinding by using a standardised tool	Yes - the initial screens were computerised but the later detailed review cannot be computerised

Appendix 6 – Comparison of primary care trigger tools

	Name of Trigger Tool			
Type of trigger	Institute for Healthcare Improvement[a]	NHS Institution for Innovation and Improvement[b]	NES (DeWet and Bowie, 2011)[c]	1000 lives Wales[d]
Attendance	>1 outpatient specialist		>10visits in 1 year	
	>3 nurse contacts in 1 week		≥3 contacts in 1 week	
	A+E attendance		Home visit	A+E or out of hours attendance
	Sudden change in GP			
	Hospital admission	Readmission to hospital within 2 weeks	Overnight hospital stay	Hospital admission
Medication		Repeat medicine stopped	Change to repeat medicine	Repeat medicine stopped
			New allergy/ADE	ADE
	>5 medications	Warfarin, NSAID Insulin, Opiate, Methotrexate or Amiodarone		
Diagnosis	New cancer diagnosis	Fall or fracture in patient aged >75		
Laboratory values		Wound or skin swab taken		abnormal LFTs
		MRSA/Clostridium Difficile		
		haemoglobin <9		>2g/dl change in haemoglobin
		sodium outside 130-150 range		sodium outside 125-150 range
		potassium outside 3.5-5.5 range		potassium outside 3-6 range
		GFR <20 ml/min		>25% increase in Cr
	INR >6	INR outside 2-5		INR >5

ADE=Adverse Drug Event, GFR=Glomerular Filtration Rate, Cr=creatinine, INR=International Normalised Ratio. N.b. other non-comparable diagnosis and event items exist in the NHS III. and the IHI tools. Tools a,b,c and d are described in text that follows

Trigger tools a,b,c and d

The IHI Outpatient Adverse Event Trigger Tool (a) is based on the IHI trigger tool used in hospital settings in the US. In 2005/6 the outpatient tool was tested at 2 private primary care facilities in the US. The tool consists of 11 triggers designed to be used together or alone, the aim being to review a set of triggered case notes within 20 minutes. Notes should be selected from patients making three or more visits within the last year (they propose that these patients are most at risk of error).

The NHS primary care trigger tool (b) was developed by the University of York for the NHS Institute for Innovation and Improvement. It was based on previous work by the IHI and a private company (Premier Informatics). As part of its development, data was gathered from 4415 case-note reviews by 32 clinicians across England, most harm uncovered was graded E on the NCC MERP scale (E='contributed to or resulted in temporary harm to the patient and required intervention'). The tool has an 81% sensitivity for adverse events in the over 75's – unfortunately the specificity rate is only 20% and this would be expected given the wide ranging nature of the triggers.

The NES trigger tool (c) was tested on 100 randomly selected electronic patient records in each of five urban general practices in central Scotland. In 500 records 2251 consultations caused 730 triggers. The actual adverse event rate was 9.4% on reviewing the notes. Of the actual adverse events 42% were judged to be preventable. There was also a 3.4% rate of potential adverse events. Low severity harms accounted for the vast majority of adverse event outcomes (82.9%). In line with the findings of most of the literature in patient safety, rates of error and harm were higher in the 60+ age group and most were medication-related (59%).

The development of a primary care trigger tool(d) was an integral part of the *'1000 Lives Campaign'* a Welsh scheme seeking to save 1000 lives and prevent 50,000 episodes of harm in NHS Wales. Data analysed in 2010 show it reached these goals. The trigger tool is adapted from the IHI's trigger tool. They suggest at least six sets of data are necessary before any change can be discerned and so a two monthly review would enable change to be seen over a year.

Appendix 7 - Rationale for data collection points

Data collection point	Rationale and literature source
Age	All patients in the study are >75 years of age – an at risk group who are frequently admitted as emergencies (HSCIC 2012/13 and Payne et al, 2013)
Sex	For statistical analysis
Duration of stay (date range of admission)	The duration of stay is compared to the frequency of requests for action to determine if shorter stays might put more onus on the GP to follow the patient up. Evidence is mixed as to whether shorter stays result in higher rates of readmission (Kaboli et al, 2012 and Sheppard et al, 2009)
Type of admission	Surgical discharge summaries were much less likely to contain a complete drug listing in the pilot – this is proposed to be a source for error. There is little literature comparing surgical to medical admissions so analysis of this factor created new data.
Hospital of origin	This information will be collected to track potential communication problems at a local level. In the pilot it was clear that some hospitals produce poor quality discharge summaries making life more difficult for the GP. Some discharge summaries in the pilot were so lacking in information that they make no requests of GPs at all, despite obviously needed follow-up.
Diagnosis	This places any subsequent error in context to see if particular conditions are associated with a higher rate of GP error.
Seen after discharge at the practice?	When and by whom? Most studies in discharge literature collect this information. The presence/absence of a follow-up appointment is compared with the risk of error.
Date of scanning	
Date of transfer to GP	Standards vary - these aims come from NES medicines reconciliation bundle (Healthcare Improvement Scotland (b)) with minor revisions as made in the RCGP Patient Safety Toolkit project.
Date of GP filing/work-flowing the summary	
Evidence of medicines reconciliation Discussion of medicines reconciliation with the patient or carer	Standards vary – NICE medicines optimisation guidelines stipulate medicines reconciliation should be completed within 1 week of discharge summary receipt (1.3.3) and that patients/carers should be involved in the process (1.3.6).
List of new repeats and discontinued drugs	The GMC Practice study (Avery et al, 2012(b)) collected this data – analysing the patterns of common hospital changes will be interesting but the primary function for these numbered lists in this study is to provide a register of drugs to refer back to.
Reason given by secondary care for new repeat medicine or for discontinuation of	To see if increased information from secondary care improves compliance with requests to change repeat medicines, the same data was collected in a medicines use

repeat or for dose change	and safety audit occurring nationally (NHS Specialist Pharmacy Services)
Named medicines when compliance with instruction to stop or start or change dose fails	From GMC practice study (Avery et al, 2012) – to see if particular therapeutic groups are more likely to be ignored or overlooked.
Medicines review since discharge summary received?	Adapted from GMC practice study (Avery et al, 2012) this data places errors with medicines reconciliation in context – have they been overlooked or compounded by further legitimisation or is there yet opportunity to spot error and make changes in this annual or 6 monthly period?
'Other' actions	These data points attempt to represent an exhaustive range of possible actions for primary care to complete, there are no obvious literature sources for these data points as few studies have been published relating to the non-drug elements of the discharge summary. Therefore the following are new data collection points for this study – based on the experiences of the pilot.
Follow-up test	
Follow-up appointment (internal)	
Follow-up appointment (external)	
Procedure to be undertaken e.g. sutures to be removed	
Specific medication to be reviewed e.g. review beta blocker in relation to pulse	
Specific GP action requested	
Harm has occurred	Free text data collection relating to the harm and error which caused it – who, what, when, where. Role of medicines, conflicting information and patient factors. Similar in structure to NRLS reports and SEA schema (McKay et al, 2007)

Appendix 8 - Business rules for quantitative data collection

Completed/non-completed actions

It can be complex to determine if a request made by secondary care has been actioned and completed. Standards of documentation vary across practices and across data type – e.g. 'hard outcomes' such as blood test results might be better documented than 'soft outcomes' such as 'discussion with patient'. To enrich the data, I collected information on 'actioning' by the clinical team, 'completion' of the action and also reasons why these might not have occurred. To use the example of a blood test; 'actioning' requires the presence in the record of a consultation note where the patient is informed that they need a blood test or the presence of a blood test form on the computer system. For the task to be 'completed' a result must be present on the system along with a comment by the clinician in relation to that result.

Sampling period

In order to allow enough time to elapse for actions to have been taken, only discharge summaries from 3 months or longer ago were selected. The electronic record could not be reviewed in the level of detail required in its entirety due to time constraints on the project and the researcher. Therefore each patient record was interrogated for up to 12 months of data after the date of discharge (this time period was based on previous studies conducted in our department). In order for the data collection not to become too historical, no discharge summaries from more than 15 months prior to the date of data collection were used. In the pilot (section 3.4) a six month window prior to the day of notes review was used with all discharge summaries dating from between 3 and 6 months ago. As demonstrated in the pilot, choosing too short a time period for study puts the data at risk of bias from factors such as staff absence, systems change and seasonal variances in admissions. The potential for introducing bias by selecting a different period of the year in different surgeries has also been considered – the 1 year window of included discharge summaries should negate this. The data were collected entirely from the electronic record by manual reading of the text of consultations and documents and did not rely on clinician's recall of events in interviews; therefore the window for study is not required to be recent.

Timeframes

For non-time delineated requests for action the index date was taken as the date of the discharge from hospital. Medication changes were allowed 30 days for completion and any other request was allowed 90 days. Deviation from these targets (without a documented reason) constituted a 'not completed' action. On occasion the record reviewer had a 'hunch' that action had only occurred serendipitously – e.g. a blood test requested by secondary care only completed co-incidentally for a medications review and these instances were recorded. If the action occurred within the time period these instances were still determined to count as 'completed action'. Sometimes requests for actions were time frame specific – e.g. 'check blood test in two weeks' time'. Where a request specified a particular time limit, a leeway of 50% in either direction was given, i.e. a blood test requested at two weeks may be conducted at three weeks or 1 week without counting as an error. Long term requests (e.g. 'organise bone scan in 5 years' time') were excluded from the study.

The ideal data on time to workflow discharge summaries would contain information not only on the number of days taken to workflow but also on whether these were 'working' days. There are no accepted standards for the speed of information processing in general practice, practices vary widely depending on the level of maturation of their systems and factors such as staff shortages. In one practice, a discharge summary received on a Friday but not processed until the following Monday would seem reasonable. Nevertheless it would contravene the strict targets taken from the NES 'safety across the interface' targets: on the day of receipt for admin workflow and within two days for GP workflow (Healthcare Improvement Scotland). By collecting the raw data as the actual dates on which the discharge summary is handled the data could subsequently be analysed to exclude weekends and bank holidays. These data will give a true estimate of workflow time – there are no pejorative targets set in this study as there is little background evidence to suggest what represents best practice.

Appendix 9 – Consent forms and participant information sheets

PRACTICE PARTICIPATION CONSENT FORM
Version 1.0 4/11/15

Title of Study: Information flow in General Practice: investigating the processing of discharge summaries to improve patient safety

REC ref: 15/WM/0442

Name of Researcher: Dr Rachel Spencer

Name of Practice Representative: **Please initial box**

1. I confirm that I have read and understand the participating practice's information sheet version number ………..dated...................................... for the above study and have had the opportunity to ask questions.

2. I understand that our participation is voluntary and that we are free to withdraw at any time, without giving any reason, and without our legal rights being affected. I understand that should we withdraw then the information collected so far cannot be erased and that this information may still be used in the project analysis.

3. I understand that data collected in the study may be looked at by authorised individuals from the University of Nottingham, the research group and regulatory authorities where it is relevant to our taking part in this study. I give permission for these individuals to have access to these records and to collect, store, analyse and publish information obtained from our participation in this study. I understand that personal details will be kept confidential.

4. I understand that the interviews undertaken for this study will be recorded and that anonymous direct quotes from the interview may be used in the study reports.

5. I understand the practice's contact details will be kept securely for up to 3 years in order for the research team to contact the practice with findings from the study and for possible involvement in follow-up studies.

6. I agree to my practice taking part in the above study.

_________________________ _______________ ______________________
Name of Practice representative Date Signature

_________________________ _______________ ______________________
Name of Person taking consent Date Signature

INTERVIEWEE CONSENT FORM
Version 1.0 4.11.15

Title of Study: Information flow in General Practice: investigating the processing of discharge summaries to improve patient safety

REC ref: 15/WM/0442

Name of Researcher: Dr Rachel Spencer

Name of Participant: **Please initial box**

1. I confirm that I have read and understand the interviewee information sheet version number ………..dated.................................... for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my legal rights being affected. I understand that should I withdraw then the information collected so far cannot be erased and that this information may still be used in the project analysis.

3. I understand that data collected in the study may be looked at by authorised individuals from the University of Nottingham, the research group and regulatory authorities where it is relevant to my taking part in this study. I give permission for these individuals to have access to these records and to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential.

4. I understand that the interview will be recorded and that anonymous direct quotes from the interview may be used in the study reports.

5. I agree to take part in the above study.

___________________________	_________________	________________________
Name of Participant	Date	Signature
___________________________	_________________	________________________
Name of Person taking consent	Date	Signature

2 copies: 1 for participant, 1 for the project notes

Participating Practice Information Sheet
Version 1.0 4.11.15

Title of Study: Information flow in General Practice: investigating the processing of discharge summaries to improve patient safety

Name of Researcher(s): Dr Rachel Spencer (Academic GP)

We would like to invite your practice to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. One of our team will go through the information sheet with you and answer any questions you have. Talk to others about the study if you wish. Ask us if there is anything that is not clear.

What is the purpose of the study?

Ensuring efficient and reliable information flow is critical for patient safety in General Practice. Anecdotally most General Practice staff will have seen examples of errors in information handling, or mismanagement of follow-up, that may have contributed to diagnostic delay or unnecessary patient harm. From the published literature it is difficult to demonstrate the harm arising from information flow deficiencies given that the area has been so poorly studied, however the potential for harm is widely acknowledged. Discharge summaries are a key document in the care transition process and demonstrate a range of management processes which occur in General Practice. Discharge is also a risky time in a patient's 'journey' especially if they are elderly and have complex medication histories or co-morbidities. We have conducted pilot work which shows that error does occur in the handling of discharge summaries and that patients are at risk of harm from these errors.
The purpose of this study is to collect information in relation to the processing of discharge summaries by different types of GP practices to better understand how this process works in English General Practice and to prepare for future work where interventions might be developed to improve this process.
The study is being conducted by one researcher (an academic GP) as part of their doctoral work.

Why has the practice been invited?

You are being invited to take part because you are a practice that has expressed an interest in the study and perhaps have taken part in the recent Patient Safety Toolkit project run by our department. We are inviting ten surgeries to take part. Your practice has been also been selected because you operate an electronic document management system within your electronic health record.

Do we have to take part?

It is up to you as a representative of your practice to decide whether or not the practice should take part in the study. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. This would not affect your legal rights.

What will happen at the practice if you agree to take part?

The study follows a distinct series of phases with each section of work informing the next.
Prior to the first phase of the study the practice manager will be asked to complete a brief demographics form about the practice. We ask that the practice manager or senior administrator could spare some time to set up computer log-ins for the academic GP to enable access to the electronic health record. If you have a way of coding or identifying hospital discharges it would be most helpful for the academic GP to know how you do this. We also need to know what Read codes you use to identify patients who have declined to have their records used for the purposes of research.
At an initial visit the academic GP would like to observe the administrative team at work for a few hours and ask them informal questions about their role in the processing of discharge summaries. This would be similar to the informal induction process for a new member of administrative staff. The researcher will prepare a 'process map' (a flow diagram) of the individual way in which your practice handle the discharge summaries. Please can you let your administrative team know that this will be happening as part of the study?
The medical record review phase of the study will take place over a series of visits which are at times convenient to you; the academic GP will need a computer terminal with electronic health record access. The search will be conducted by the academic GP. Data will be collected by the academic GP on a range of outcomes such as; speed and accuracy of administrative processing, successful medicines reconciliation and successful arrangements for follow-up appointments and tests. A method for informing practice staff of any error uncovered will be agreed individually with each practice prior to the start of data collection. This is likely to involve a gradated urgency response scale depending on the type of error or harm uncovered. You might like to nominate a GP to whom these issues can be fed-back and arrange how you would like the information to be received. A small computer file containing the necessary identifiers to link the patient records to the anonymised data extracted will need to be kept on the practice computer system for 7 years for the purposes of research audit.
The observational notes from the first visit will be analysed and a process map drawn up. This will be sent to both the practice manager and a senior GP who have agreed to participate in an interview. Two, hour long interviews will be

conducted (see interviewee information sheet). In the post-study phase interview transcripts will be returned for checking by participants. At a later date the academic GP aims to provide practices with their quantitative data (by secure email) as compared with other practices' anonymised data so that the practices may use this as a learning experience.

Expenses and payments

Practices will not be paid to participate in the study. We would like to encourage participants to take part for the potential benefits to their practice systems and to their patients. GPs may like to consider using their involvement with the project for CPD purposes.

What are the possible disadvantages and risks of taking part?

Part of this study is designed to collect data on medical error and it is therefore likely that some errors will be uncovered in patient's medical records which were not previously known about. The research team have a clear policy in place regarding how to deal with these instances. In previous similar projects we have been able to manage instances of error in a very positive light and knowing about them can indeed be seen as an advantage rather than a disadvantage of taking part. There are not expected to be any disadvantages or risks arising from the interview process or from the observational and process mapping stages.

What are the possible benefits of taking part?

We cannot promise the study will help you but the information we get from this study may help develop your practice systems in relation to processing incoming information. This would potentially be of benefit in future CQC inspections. Your patients may also benefit from the discovery of ongoing error or harm which may be ameliorable.

What happens when the research study stops and what will happen to the results of the research study?

We plan to submit the findings of this study to the funding body –NIHR SPCR (report), as part of a doctoral training programme (PhD thesis) and to medical journals (papers) for publication. Your practice will not be identified in any report/publication.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. If you remain unhappy and wish to complain formally, you can do this by approaching the lead investigator. The researcher's and Lead investigator's contact details are given at the end of this information sheet. If this achieves no satisfactory outcome, you should then contact your local Clinical Commissioning Group (CCG).

Will my taking part in the study be kept confidential?

We will follow ethical and legal practice and all information about your practice will be handled in confidence.

If you join the study, some parts of the data collected for the study will be looked at by authorised persons from the University of Nottingham who are organising the research. They may also be looked at by authorised people to check that the study is being carried out correctly. All will have a duty of confidentiality to your surgery as a research participant and we will do our best to meet this duty.

All information which is collected about your practice during the course of the research will be kept strictly confidential, stored in a secure and locked office, and on a password protected database. Practices will be assigned a unique code such that they can only be identified using a master list held securely by the lead investigator. Any information about your patients which leaves the practice will be anonymised and have a unique code applied that will only allow the researcher to identify patients should they return to the practice and use your electronic health record again at a future date with your consent.
Your practice's contact data (address, telephone number) will be kept for between 12 months and 3 years after the end of the study so that we are able to contact you about the findings of the study *and possible follow-up studies* (unless you advise us that you do not wish to be contacted). All other data (research data) will be kept securely for 7 years. After this time your data will be disposed of securely. During this time all precautions will be taken by all those involved to maintain your confidentiality, only members of the research team will have access to your personal data.

Although what is observed and said during the study is confidential, should you disclose anything to us which we feel puts you or anyone else at any risk, we may feel it necessary to report this to the appropriate persons but would always discuss this with you prior to taking such steps.

What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason, and without your legal rights being affected. If you withdraw then the information collected so far cannot be erased and this information may still be used in the project analysis.

Who is organising and funding the research?

This research is being organised by the University of Nottingham and is being funded by National Institute for Health Research School for Primary Care Research.

Who has reviewed the study?

This study has been reviewed and approved by the local NHS Ethics Committee.
Further information and contact details

Researcher - Dr Rachel Spencer (Academic GP), The University of Nottingham, Division of Primary Care, Tower Building, University Park, Nottingham, NG7 2RD. E-mail: mszras@nottingham.ac.uk
Study lead - Professor Tony Avery, Division of Primary Care, Nottingham University Medical School, Queens Medical Centre, Nottingham, NG7 2UH. Telephone: 0115 823 0207. Email: tony.avery@nottingham.ac.uk

Interviewee Information Sheet
Version 1.0 4.11.15

Title of Study: Information flow in General Practice: investigating the processing of discharge summaries to improve patient safety

Name of Researcher(s): Dr Rachel Spencer

We would like to invite you to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. One of our team will go through the information sheet with you and answer any questions you have. Talk to others about the study if you wish. Ask us if there is anything that is not clear.

What is the purpose of the study?

Ensuring efficient and reliable information flow is critical for patient safety and anecdotally almost every member of General Practice staff will have seen examples of errors in results handling, or mismanagement of follow-up, that may have contributed to diagnostic delay or unnecessary patient harm. From the published literature it is difficult to demonstrate the harm arising from information flow deficiencies given that the area has been so poorly studied, however the potential for harm is widely acknowledged. Discharge summaries are a key document in the care transition process and demonstrate a range of management processes which occur in General Practice. Discharge is also a risky time in a patient's 'journey' especially if they are elderly and have complex medication histories or co-morbidities. We have conducted pilot work which shows that error does occur in the handling of discharge summaries and that patients are at risk of harm from these errors.
The purpose of this study is to collect information in relation to the processing of discharge summaries by GP practices to better understand how this process works in English General Practice and to prepare for future work where interventions might be developed to improve this process.
The study is being conducted by one researcher (an academic GP) as part of their doctoral work.

Why have I been invited?

You are being invited to take part because you are either a practice manager or a senior GP at a practice where we have been collecting data for this study. We are inviting 20 participants like you to take part.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. This would not affect your legal rights.

What will happen to me if I take part?

The academic GP will contact you to arrange an interview which will take place on the practice premises where you work at a time convenient to yourself. Prior to the interview the academic GP will send you a copy of a discharge summary process map (a flow diagram) unique to your practice which has been created during the study. This will be sent either by email or post (whichever is most convenient to you). The interview will last up to one hour and will be recorded by the academic GP who may also take written notes. The academic GP will ask questions about the way in which your practice handles discharge summary communications from secondary care and discuss any issues arising from the process map. If you are a GP the academic GP will also ask you about how you personally handle discharge summaries in a medical capacity. Following the interview the transcript will be typed up and returned to you either by email or post (whichever method you prefer) so you have a copy to keep.

Expenses and payments

Participants will not be paid to participate in the study. We would like to encourage participants to take part for the potential benefits to their practice systems. GPs may like to consider using this as 2 hours CPD activity (1 hour for considering information and 1 hour for the interview). Further CPD time could be accredited should the findings of the study have impact for your patients. Submission of this information sheet along with the consent form would satisfy the requirements for evidence.

What are the possible disadvantages and risks of taking part?

There are not expected to be any disadvantages or risks for interviewees.

What are the possible benefits of taking part?

We cannot promise the study will help you but the information we get from this study may help develop your practice systems in relation to processing incoming information. This would potentially be of benefit in future CQC inspections.

What happens when the research study stops and what will happen to the results of the research study?

We plan to submit the findings of this study to the funding body –NIHR SPCR (report), as part of a doctoral training programme (PhD thesis) and to medical journals (papers) for publication. You or your practice will not be identified in any report/publication.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researcher who will do their best to answer your questions. If you remain unhappy and wish to complain formally, you can do this by approaching the lead investigator. The researcher's and Lead investigator's contact details are given at the end of this information sheet. If this achieves no satisfactory outcome, you should then contact your local Clinical Commissioning Group (CCG).

Will my taking part in the study be kept confidential?

Interviews will be anonymised from the point at which data is collected and throughout the study process. Only the main investigator of the study will have access to a master list with participants' personal details (this is required to be kept for legal reasons in relation to data traceability and will be stored securely on University premises in line with the Data Protection Act 1998). Recordings and transcripts will be kept in the study archives in a similarly secure location. Your personal data (address, telephone number) will be kept for between 12 months and 3 years after the end of the study so that we are able to contact you about the findings of the study and possible follow-up studies (unless you advise us that you do not wish to be contacted). All other data (research data) will be kept securely for 7 years. After this time your data will be disposed of securely. We will follow ethical and legal practice and all information about you will be handled in confidence.

Although what you say in the interview is confidential, should you disclose anything to us which we feel puts you or anyone else at any risk, we may feel it necessary to report this to the appropriate persons but would always discuss this with you prior to taking such steps.

What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason, and without your legal rights being affected. If you withdraw then the information collected so far cannot be erased and this information may still be used in the project analysis.

Who is organising and funding the research?

This research is being organised by the University of Nottingham and is being funded by the National Institute for Health Research School for Primary Care Research.

Who has reviewed the study?

This study has been reviewed and approved by the local NHS Ethics Committee.
Further information and contact details

Researcher - Dr Rachel Spencer (Academic GP), The University of Nottingham, Division of Primary Care, Tower Building, University Park, Nottingham, NG7 2RD. E-mail: mszras@nottingham.ac.uk
Study lead - Professor Tony Avery, Division of Primary Care, Nottingham University Medical School, Queens Medical Centre, Nottingham, NG7 2UH. Telephone: 0115 823 0207. Email: tony.avery@nottingham.ac.uk.

Appendix 10 – Practice demographics form

<u>Practice Demographics Form</u>
<u>Version 1.0 4/11/15</u>
Title of Study: **Information flow in General Practice: investigating the processing of discharge summaries to improve patient safety**

To be completed by the practice manager or senior admin personnel prior to the researcher visiting the practice. Please return via email if possible or the researcher will collect on arrival.
List size:
Size of population aged 75 years or older:
Description of location (rural/urban):
Level of Deprivation (IMD if known):
Training Practice: Y/N
Number of partners:
Total number of whole time equivalent GPs (excluding trainees):
Number of permanent staff:

Read codes used at the practice to identify patients who have chosen to have their medical records excluded from research:

Read codes (or other methods) used at the practice to identify discharge summaries or hospital admissions (if none then write none and the researcher will discuss this with you on arrival):

Appendix 11 – Example of a Practice Interim Report

Interim Report for Practice
************* (Study Code 16)**

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Title of Study: **Information flow in General Practice: investigating the processing of discharge summaries (DCS) to improve patient safety**
Dr Rachel Spencer

Here are some brief summary statistics and a flowchart for your practice which we would like you to look at prior to the study interviews taking place. As the study is still in progress we can only give you a comparison to the other surgeries involved so far. At the end of the study true comparative rates will be reported back to your practice. Please feel free to tell us if there is something not right about the flowchart – we will use this information to update it for you and to further inform the study.

	Your practice	Average so far
Average time (in days) for a GP to workflow the DCS	10 (range 0-55)†	3 (0-55)
Number of medicines reconciliations not recorded	1/22 (4%)	13%
Number of discussions with patient/carer about medicines reconciliation not recorded (when this was necessary)	5/21 (24 %)	33%
Number of drugs where requested changes were not made	14/67 (21%) changes not made (for 9 patients)	17.7%
Number of requested tests where action was not taken	2/7 (29%)	15%
Number of 'other' requests* where action was not taken	7/21 (33%)	25.5%
Number of patients harmed	2/30 (7%)	7.4%

*= follow-up appointments with hospital or GP and medication specific requests.
†= mean average affected by 4 outliers all over 2 weeks duration

2 clinical task(s) were sent. For your records, patients:
**1602 – referral to CKD clinic was requested, the patient remains un-referred despite diagnosis of CKD 4
**1613 – needs follow-up of iron status after not being prescribed oral iron as intended, very recent admission with anaemia and bladder clots complicates the issues

***Study codes can be linked back to clinical system numbers using the study spreadsheet which will be in the DCS study folder on the PM's 'my docs' area.*

Flowchart for Discharge Summary Handling at *******************

Arrival

- Most summaries arrive by electronic download
- Paper summaries (especially where the patient has changed GP surgery) arrive in the mail and are date stamped on arrival (throughout day)

Scanning

- All members of administrative staff can scan at all times of day
- Using *Intellisense* and manual visual check to confirm patient details
- Dedicated scanning desk but no protected time for scanning
- Shredded directly after scanning

Admin processing

- All summaries are printed out and passed to the prescriptions clerk to make medications changes which are written on post-it-notes and attached to the printout. 'R/V med' goes on as acute, 'New med' goes on as repeat.
- Dedicated member of admin staff calls all the discharged patients

Transfer to doctor

- Electronic documents filed (using *Docman* code for "discharge summary")
- Printouts then shared out equally between afternoon GPs and placed in envelopes for delivery to clinical rooms

Clinical processing

- GP reviews medication changes and uses red pen to highlight changes for prescription clerk to make
- GPs read and act on summary
- Read coding

Retun to admin

- Tasks from GPs in a variety of formats return to general administrative pool

Appendix 12 – Quantitative data collection forms

Quantitative Data Collection Forms (paper) for Investigating Discharge Summaries in General Practice version 1.0 4.11.15

Title of Study: **Information flow in General Practice: investigating the processing of discharge summaries to improve patient safety**

Data Collection Form 1 - Demographics and Workflow

Project					code number;

Age;
Sex;
Code number for hospital of origin of the summary;
Type of admission (med/surg. etc.);
Date of admission;
Date of discharge;
Reason for admission;

Seen after discharge within 90 day period?
  if so give date;
  type of contact (face/face, TC etc.);
  professional involved (GP, nurse etc.);

Date summary arrived in practice (if known);
The next 3 data items to be taken from audit trail of the electronic document management system
Date of scanning on to system;
Date of transfer to GP;
Date of GP filing/work-flowing the summary;

Is medicines reconciliation required of the GP? (if yes, continue to form 2);
Is other action needed? (if yes, also continue to form 3);
Did harm occur? (if yes, also continue to form 4)

Project code number;

Data collection form 2 - Medicines Reconciliation

1. Is there visible evidence within the record of medicines reconciliation? (Y/N);
   a) On what date did the medicines reconciliation occur;
2. Have changes to repeat medicines been discussed with the patient or carer? (defined as evidence of patient contact at the time a medication is altered on the system or consultation text describing discussion) (Y/N);
   a) Was it necessary to discuss them – if not, why not?

   b) On what date?
3. Name any new repeat medicines (numbered list);

4. Rationale/reason given for new drug by hospital? (numbered list of reasons to match above list of drugs – if none given write 'none');

5. Name any new repeat medicine failed to be started in primary care without documented reason? (numbered list);

6. Name any discontinued drugs (numbered list);

7. Rationale/reason given for discontinuation by hospital? (numbered list of reasons to match above list of drugs if none given write 'none');

8. Name any discontinued drug(s) failed to be discontinued in primary care without documented reason? (numbered list);

9. Changes made to dose of any **pre-existing repeat** medicines? (numbered list of named drugs with description of change);

10. Rationale/reason given for dose change by hospital? (numbered list of reasons to match above list of drugs if none given write 'none');

11. Name medicines where dose change is failed to be made without documented reason;

12. Has ‘medicines review’ taken place since the discharge summary was received? (Y/N)

Project code number;

<u>Data collection form 3 – ‘Other’ actions</u>

Follow-up test requested (describe/name test);

Follow-up test NOT **ordered** and no documented reason given (if uncertain if this was intentional give explanation here);

Follow-up test NOT **completed** and no documented reason given (if uncertain if this was intentional give explanation here);

Result of follow-up test NOT **followed-up on correctly** and no documented reason given (if uncertain if this was intentional give explanation here);

External Follow-up appointment requested;

Follow-up appointment NOT made and no documented reason given (if uncertain if this was intentional give explanation here);

Request for ‘procedure’ to be undertaken;

Procedure not undertaken and no documented reason given;

Request for review of specific medication;

No evidence of review of that medication documented;

Specific follow-up requested of the GP;

Specific follow-up NOT carried out and no documented reason given (if uncertain if this was intentional give explanation here);

Project code number;

Data collection form 4. – 'Harms'

Describe the harm that occurred?

What error occurred to harm the patient?

If medications were involved, which ones?

What do you think were the underlying causes of this error?

Did conflicting information in the discharge summary have a role to play in the error?

To what extent was this error responsible for the harm? (Please consider other factors which may have been involved e.g. patient co-morbidity, chance)

Other comments/explanation (as required)

Appendix 13 – Semi-structured interview schedule

Ordinary text shows the original structure submitted for ethical approval in 2015 *italicised text* show changes made during the course of the interviews.

Topic 1 - Discharge summary administrative processes

- Practice policies on mail handling
- Training for administrative staff
- Discussion of the process map created for the study
- Processing time targets (clinical and administrative) (prompts if required: does it depend on the information within it? the type of summary? *Leave/sickness? Patient factors?)*

Topic 2 - Clinical questions about discharge summaries (intended for GPs *only but PMs were also keen to contribute*)

- Systems for reading/assessing discharge summaries
- Factors affecting accuracy and speed of processing (prompts if required: time pressure, workload pressure, distractions)
- Making contact with patients (prompts if required; medication changes, clarification of information, when, how, if?)
- *Continuity of GP care*
- *Delegation from secondary care*

Topic 3 - Questions about error

- Error which came to light during involvement with the study (prompts if required: failure to follow-up/organise tests, incorrect medicines) *framed around practice-specific failures found during the quantitative enquiry*
- Contacting patients about error *removed from schedule**
- Previous experiences of error *removed from schedule**

Topic 4 - Questions about harm

- Harm which came to light during involvement with the study (prompts if required; complaints, SEAs, medical problems) *framed around the practice-specific case vignettes of harms found during the quantitative enquiry*
- Contacting patients about harm *removed from schedule**
- Previous experiences of patients having been harmed *removed from schedule**

Topic 5 - Questions about change

- Based on previous experiences of error and harm has anything been altered *prompts were added based on other surgeries innovations such as: improvement of 'task' systems, urgent paperwork systems, booked appointment slots for discharge summaries and narrative description of summaries in the record.*

- *Specific schemes such as the pharmacists in General Practice scheme, the unplanned admissions scheme and the national training scheme for receptionists.*
- Based on being involved in the study/ looking at the process map does anything need to change at the practice?

**Interviewees struggled to recall such instances in the interview setting, interviewees felt the need to search for computer files of SEA reports and this was disruptive to the interview process. Spontaneously recalled experiences were not relevant to the study, hence this type of question was abandoned.*

Theme and Subtheme	Definition	**Appendix 14 - Illustrative quotes from interviews**
1. Secondary care factors		
Ideal Discharge Summary	How the summary itself could be improved and issues with the content of summaries received	*"there can be stuff in the text which isn't obvious"* GP16 *"sometimes it just says to be reviewed and you think ah well it has come from the hospital, they must be reviewing them, you don't always think they want the GP to review it"* PM15 *"the request to do things are kind of hidden in lots of prose erm it is much easier so if I am looking at a patient that I don't really know very well and there is lots of prose I am looking for OK, what do they want us to do? Where is the section of GP action?...It doesn't matter where it is, but you know nice sort of prominent, in bold, in a box you know a section that says GP action"* GP10 *"Yes, yes there is on the discharge summary and that you know medication is stopped and why but it is not always in there, sometimes it is in the narrative itself at the beginning of the discharge summary*."GP12 *"I suppose a standardised format would be really good, one format so that you were always looking in the same place, and if it could be highlighted if there had been a change in medication, i.e. the drugs aren't the same as they went in on if new drugs have been started, that would be useful."* PM13 *"when it is done right, from their end, it is really helpful actually and particularly where they have altered the dose of the medication because you could quite easily skip over, OK they are on I don't, Lisinopril but you then have to… you really do have to check but if they have done that it really flagged it up, highlighted and makes life a lot easier yes, when it is done but sometimes you kind of think all of the letters are the same but this looks a bit different so you then have to really, really check."* GP13 *"They have N for new, I suppose seeing that you could see that oh that is new, definitely need to add that and then the ones that discontinued at the bottom in a separate panel so making sure they have been taken off, but yes so that helps."* GP17 *"I think in the recent discharge summaries it does say it, new or old but again it is very variable you know it is very variable because in the discharge summaries locally they put as GP action, some doctors will put new medication started or stopped but others won't and then that is a problem."* GP15

		"it would be really handy if they said started on X,Y or Z stopped X, Y or Z because sometimes they don't…. I think you just want someone to highlight don't you to you the dose change, new drug and then you would be more likely to not miss it….. I don't know why the pharmacists write on those… I know they are the ones to go home with the patient but whether they could electronically update them, and have a like a pharmacy tick box or any instructions in there instead of hand writing in green pen." GP16 *"do discharge letters specify… they do don't they? There is a column that shows whether they have changed or not but how accurate that is and whether the hospital actually bother to tick it if it has changed, I don't know. I have never done a survey"* PM10 *"both the hospital's and ours (medication listing) isn't, they seem to be quite random….. I think the only thing that could be improved if it was alphabetical"* GP10 *"I think that hospital people saying that it is the junior doctors but I don't think it is always them to blame, they are equally… they have probably not had that information, there are lots of junior doctors who don't know what happens in General Practice….. when they have an induction day, put a GP there, you know tell them how these results get processed, tell them how these letters get processed, as simple as that, you know you have somebody from the pathology department there, biochemistry telling them how to fill out blood forms and send this through the shoot or something, put a GP there and tell them to just you know when you send us letters we're not just sitting there to read your letters, so when you ask me to do something, just think from the other side, how it is going to get done. It is something as simple as that and I am afraid it hasn't been picked up yet"* GP11 *" if at all you're… you have to continue using two computer systems for same patient, you know in 2017 then the system should be there where across the board the discharge summary is going to be X, Y and Z."* GP15
Delegation between secondary and primary care	The way in which instructions are given to GPs in a discharge summary, wider comments about responsibility for care at care transition	*"once you have had sight of the discharge summary then it becomes your responsibility"* GP12 *"I mean it is them that is actually done the changes so really I would say it is probably the hospital that tell you about the changes but they don't always, it is left to the GP to actually do it."* PM 15 *"I suppose the problem is not medication, it is if people need a blood test within a week and I think to be honest a communication, that is a communication problem at the hospital that if they want a blood test done in a week they should ring us, you know I don't know why they're sending it through electronic, hoping that we get it, because you never know, you might not, you know erm and then by that time it has passed and it is too late or blood pressure in a week you know really they should be… could they not just drop us a line, a nurse could do that, an admin person could do that."* GP17 *"we have to because there is no other way, we sometimes get a bit bolshie and send a snotty letter back to the head of service in the department but nothing ever changes so yes we end up thinking well we have got to follow it up because no one else is, they are delegating their responsibility to us so who else will do it?"* GP14 *"I always think you know if somebody is your patient in the hospital, are you not responsible for anything you find that needs dealing with?"* PM17

		"To be honest I think some of that is… it should be reflected back on and said well how appropriate are these investigations and requests? And how realistic are they to be done?" GP18 *"I think it is where does it that request come from and how much do I value that? That is another part of it as well, fairly spurious request from the foundation doctor who may have no knowledge of this patient erm may be less inclined to keep it"* GP18 *"I wouldn't necessarily say is it about an individual's responsibility, I think it has to be more about a better system and we're all responsible in some ways, yes of course the clinician has decided to do X, Y or Z, is ultimately responsible but there has got to be a better system in place to allow that to happen."* GP18 *"It is everybody's responsibility we can't put the blame on anybody who's responsibility, I believe we're in the best of places….if someone is asking because they can't see them but they ask other health professional that is reasonable, I think that should happen."* GP15 *"over the last few months there has been a trend that the hospital should follow up its own test results, so I think certainly erm there has been a bit more information and knowledge certainly spread around that if people are sending in some test request and you have the follow up send it back to them and tell them to follow it up themselves"* GP 11 *"it does frustrate me when chase histopathology is probably the most annoying ones, from OGD's because you get them and you don't know what they mean, I have no idea…also it doesn't come back to us, so it is not like the results… so you end up having to put them on your telephone calls like every week until they come back, I find those really, really annoying"* GP16 *"I don't mind that (chasing results) if it is erm… if it is going to affect my clinical management of the patient. So I will do it then and I will write a letter"* GP19 *"both parties need to realise that they should play their fair share, so the hospital should have that discussion, even carry forward that discussion but if they, secondary care, thinks only primary care is going to carry that burden of initiating that discussion and making sure it follows through, and you're laying a lot of burden on the primary care."* GP11 *"if it has been started, the hospital has had that discussion it is clear on the discharge summary I would you know put it on repeat"* GP13 *"Well I would hope that the hospital have discussed their medicine changes if they initially prescribed them and taken off you know not just wandered around randomly giving them something to take or something taken off"* GP 17 *"Well I would have hoped that the hospital would have done it, that you know they are instigating all medicines but they are explaining what they are for and how they are going to work"* PM17
2. Safety features of processing systems		

Continuity of care	'Ownership' of patients by particular GPs, professional pride, curiosity about patients	*"I would first of all look at who it is because usually if it is somebody who has been in to hospital and especially if there is anything… particularly with lots of chronic diseases and so on, you probably know who they are and so you have probably got a bit on background on them already"* GP13 *"we will review at our 10:30 or 12 o'clock meeting and say who knows everybody? Do you know this patient? If you do then it is more appropriate for that clinician to review the discharge, obviously if I have sent someone in I know them, I will probably take that person on."* GP18 *"they had a chart actually as to where it needs to go to and erm last doctor who saw patient or named GP and then it has really become the named GP's responsibility to forward it on, not everybody does that and I would also say that I don't, sometimes when you just look at it and I know this is easy for me to just manage."* GP11 *"Well first of all I look at it and see if I recognise the patient, erm because sometimes I have sent them in or I know them really well and obviously you want to know what the outcome is and then read the letter…..particularly with discharge letters then if they admitted them then they ought to have the discharge letter back for continuity and if they are not there, whoever deputises for them"* GP17 *"we have a system whereby we try and share it out so if someone has a holiday and we have discussions about you know should it wait until the person comes back again? What if it is something important?"* GP19 *"the whole point our current system works on the basis of it going to the doctor who referred them for the problem if that is possible. But of course with it being a training practice and having so many registrars and F2's, sometimes it has to go to the trainer if they have already moved on."* PM10
Team-working	How particular individuals fit into teams, areas of speciality, character/ personality, and diligence levels, delegation within primary	*"a lot of experience behind there, yes in the admin team, I have done 25 years as a practice manager and everybody is very good at their jobs and we all pass the information around which is really good."* PM12 *"my reception staff they are excellent and very experienced yet I know how anxious they get about missing clinical things and they would be devastated if they missed something that then caused harm to a patient"* GP14 *"I think our reception, I mean we have got a good team certainly and we can see the secretarial and reception they do… they go the extra mile certainly to get things sorted."* GP11 *"it is quite interesting we use it as a bit of peer review so we share labs, we have one bit pot for labs and you can keep an eye on what everyone is doing"* GP16 "the GP's are very open with each other, they are very friendly, they meet every lunchtime so I don't think there would ever be a problem with asking a colleague…" PM11 *"the scanning clerk is experienced, has been here for many years…she is very efficient…she gets very stressed if this is a day or behind, she is generally on it, because that is her only task"* PM13

	care (ownership of tasks) and autonomy of work roles.	*“It (scanning) is normally done by the person who has been here the longest, erm… you know because invariably they are the best people sometimes.”* PM18 **“** *my impression from things that people have said over the years, if they weren’t to know what their role is and actually don’t like having a lot of different things to do, shared within the team every day, they find that I think erm is a bit too variable depending on how much work different people do, how much effort people put in,” PM19* “we have actually got somebody who is more dedicated to scanning, we try and give them a variant so they don’t get bored” PM18 “there was one member of staff though that probably doesn’t do it (scanning) very much because she is not very good at it, she is slow and whatever and the girls have accepted that it is probably easier if they do it, she doesn’t want to know any more so I have got to go with that, she is of an age where…” PM17 “they are not very erm… computer sort of people, so that you know we would just have to reinforce that 'put it on the computer'” PM15
Protocols and procedures/ systemisation	Reference to documents or procedures already in place at the surgery that have relevance to the admin safety systems	“on paper our system should always be… should always work” GP12 “I think the process of how we deal with the mail is good” PM14 “people that come here, especially when they have worked in other practices, they always say with the amount of systemisation that we have here is much higher than in other places and that actually is quicker and more reliable on the whole…. Having protocols is really important and that is something that we have tried to improve on recently…. we have just recently started a process of looking at all of our protocols and we now have a protocol for a group of protocols and it sounds like we have obviously gone mad, erm but it is actually very necessary” PM19 “But most people don’t read them, that is the problem you know you do a new protocol, you get everyone to read it, sign for it etc. but how many would be able to tell you 6 months later exactly what it said if you didn’t have some sort of precis and I don’t find many doctors read large volumes of print, they like an A4 precis” PM10 “paper copies are left in for the month and then they are shredded at the end of the month which is good because there was something that had happened a few months ago actually when I was looking for a particular thing which I couldn’t find on the system for some reason and we were looking for the paper copy” GP11 At practice 16 there was a dichotomy between what administrative team members were actually doing (immediate shredding) and what the practice manager felt on this issue “we leave a time period before we destroy so we don’t scan them on and destroy them the next day, it tends to be about three weeks to a month after so we do leave a little bit of a gap so if there is any follow on or it hasn’t scanned on correctly…..I wouldn’t be comfortable shredding immediately because you know the if the system goes down or there is some errors and I think a small buffer is a good idea.”PM16

Training issues	relating to training of administrative staff	"we do a lot of in house training, obviously anybody who joins us and we think they are going to be scanning, they have an intensive scanning, partnering so they will sit with one of the scanners, for a good few days going through it and they will do it in a couple of hours at a time until they get the feel of what is happening" PM12 "what we tend to do is especially with the apprentices is we always sit them with someone who is an experienced member of staff and we let them observe initially and we do that for a while, quite a few weeks before we let them attempt to do it" (PM14) "our more experienced senior staff will train the new members of staff, it is not quite see one, do one, teach one, but it is they go through a process of teaching the process, supervising until they're comfortable and then we will leave them to it but they can go back to them at any point if there is a problem." GP14 "Depending I suppose on who we got, to you know do the job, if you know we felt that we could train them up yes or if [name of lead admin] felt that she could you know take the role of training them up yes, we would do that" PM15 *"New staff members they are trained as and when, they are not given big responsibilities until they are competent, it is just on the job training to be honest, it is not… there is no training courses unfortunately"* PM11
Staff numbers	practice managers identified this as a crucial feature of the safety of their systems	"Because of the way that the staff teams have now changed it can mean that you have got fewer people in the afternoon" PM18 *"it is a bit of a challenge when because being a small practice we haven't got that many members of staff to spread out"* PM15
Workflow targets	processing times for discharge summaries	"I mean I think probably within a week is fine, they will have had all of the medication, you need to make sure that by the time they request it again, it is on there." GP 16 "Well I think I mean if somebody has been discharged with their 14 days medication then theoretically you should do it within the 14 days but obviously the pressure is always on to get the prescriptions ready for the next prescription so I would say you know within a week would be more appropriate and probably achievable" GP17
3. Medicines Reconciliation		
Communication with patients about meds reconciliation	How and why GPs might speak to patients about	*"you don't always need to speak to the patient, because they… most medication changes have come from the hospital and they have already had the appointment, they have already discussed it with the doctor you know"* APM12 *"Well I would hope that the hospital have discussed their medicine changes if they initially prescribed them and taken off you know not just wandered around randomly giving them something to take or something taken off"* GP17

	medicines reconciliation	*"I guess if it is a new medicine or something like that that has been started in hospital and it is pretty obvious that the patient would have been discharged with it and all of that than I would probably just add it to the list and not think too much more about it…you don't really want to miss the new medications, on there and again it is something that you would hope the patient would help you with" "usually what would happen is a patient would come to us and say 'well this medication hasn't been changed'"* GP13 *"I will just pick up the phone and phone the patient and they often know best if they were told to stop, not to stop or to continue etc… I am not sure that we would record all of the discussions, I am not sure that we would have them discussions actually with each patient, I don't… I think that would be an extra bit of work that I would have to kind of look in to you know is it needed really yes?... if it has been started, the hospital has had that discussion it is clear on the discharge summary I would you know put it on repeat… this is probably a personal view that actually and to remain resilient and be able to do everything within your working day is that you have to give some responsibility back to the patient haven't you? So they have a copy of that discharge summary, they have been in hospital, they have been counselled on the medication"* GP12 *"I think it should be done…they are making a judgement and saying well actually I should have a discussion with the patient but I am just going to change it and at some point when they come in I will discuss it with them which I think happens quite often"* GP19
Pharmacy intervention	Using pharmacists in the medicines reconciliation process	**"** Yes if they were willing to do it that would be helpful yes because then obviously the… I would have thought a pharmacist would know a bit more about the medication than the prescription clerks." PM15 "I am sure we could do it better and maybe we are not the most appropriate person to do it in terms of our skill set, we are but it is the time and everything else that we're doing and whether the advent of pharmacists based in practices and things like that who have dedicated time to check these sorts of things would be a better use of resources." GP14 *"we don't get her looking at discharge summaries because that is our work… they are not funded to do that work."* PM17 *"whether there is a role for community pharmacy to be more involved, whether we could utilise those skills"* PM13 "we're often under pressure from the community pharmacist to get the discharge medication solved quickly when they are on dosettes so almost although they come out with two weeks' worth, almost immediately as soon as they come out we have got to set the dosettes up" GP17 *"the pharmacy next door who a lot of our patients go to, quite often get to the discharge before we do"* (PM10), *"they (pharmacists) should have up to date information about what the patient is on, erm you know and it is a second way of telling us how urgent it is for the prescription to be generated and that things have been changed"* GP10

Prescribing responsibility and roles	Receptionists', prescribing clerks' and nurse practitioners' involvement with medicines reconciliation	"*only a clinician can change the medication so it has got to be a clinician I am afraid*." (PM10) *"I don't think we would ever want anybody to do anything that was clinical, not admin staff, definitely not, the doctors have never agreed with that and I don't think admin staff would be happy to do that… if they were able to change something and you gave the wrong medication, potentially it could be life threatening or it could have serious consequences for the patient and so I don't think they would want that responsibility and I don't think it is fair to put that responsibility on the admin staff or prescription clerks."* PM14 "*so some of them have been doing you know feel competent doing that or they have had prescription, medication training so they will do it and the ones that don't there is no compulsion for anyone to do it, some of them they don't feel competent doing particular medication so they won't do that so then… but final responsibility lies with the GP*" GP12 *"it is not a fool proof system but it is probably not bad. But it is done by a doctor*" GP14 "*if a receptionist is doing it, they may feel uneasy about change of medication, they don't change any medication in this practice, they don't issue any medication other than what is on repeat… I think it is mainly their confidence and possibly then that reflects in our confidence on them because if they don't feel confident doing it then I don't feel confident asking them to do it"* GP17 *"Well I wouldn't completely rule it out, but I think that certainly all of the admin people that we have got find it (medicines reconciliation) difficult, we have tried little things in the past and feel anxious that mistakes might get made but that might be just because the staff we have had and if there was you know erm appropriate training for admin staff to do it and it was felt to be good governance to allow that to happen I think we would go on board with that. If we felt that it could be done well."* GP10 "the green discharge summaries you used to get, the girls were updating medication and I came here and we merged from I was managing a small practice in [place in Nottingham], a PCT practice and we merged and I was horrified by that, erm but it had gone on for years and everybody was happy with it but I did plug to get that changed and in the end they conceded that you know really they are not indemnified for doing anything like that so that changed at that point." PM17 "I think medication is really complicated and it is a really specialist erm area and names are very similar, dosage don't mean anything to you unless you're trained and I just think it is putting somebody in an area beyond their capability, their training, a lay person to enter medication, I was shocked that that was their process. Erm and that is something that just never… and admin person does not have… never, ever enters medication here." PM13 "our staff will tick off each medication so they will put a tick next to it erm and said this is the same, this isn't the same so some of that is done by one of our administrative erm team who is involved in medications so she will look through and see has there been any changes, potentially through a medication request, erm which could have been done electronically, this patient has been discharged and they will put a medications request saying erm new medication, please look at the discharge summary etc. so there is a bit of a twofold system, they will look at it to see if it matches and then it will come through and we will do the same thing." GP18

		"It would be great if somebody could do it for us, we even had discussion about whether a nurse practitioner would be qualified enough, somebody who you know has done their prescribing course and things like that" GP10
4. Error and Harm a result of failure to process discharge summaries		
Causes of error and harm	Reasons why error and harm might have occurred/ occur in future	*"time pressure is probably the main factor and I am sure that there is some simple just human error things sometimes that just don't see things as well"* GP13 *"could be pure oversight, that it has not registered"* GP11 *"I think from experience a lot of the time it is just human error unfortunately, I can't think of any pressures in particular no, I think it probably would have just been human error unfortunately, some of the discharge letters do have a lot of information contained in them so it might have just been missed. I think we probably need to drill down on those* (instances of failure) *to see if there is a pattern … maybe it is a training issue that everybody needs to just be reminded about looking at the fine detail but without knowing, digging down, and drilling down it would be…"* PM11 *"you know you sort of think it is obvious and you know the patient and you take a short cut really and that is the problem"* GP19 "I think that is the decision to be made isn't it? Whether… how important is it to check on the follow up? How much is the patient's responsibility as well?" PM17 *"if it is more complex, especially if you need review the patient then it is… well it is probably still a phone call but it is a bit more around the houses and going to arrange reviews and stuff"* GP13 *"one of the difficulties is think is the doctor contacting the patient because sometimes like I said we try and make… you don't get through and then you… time slips and you either forget it"* GP14 *"And why does it happen? I think that is where the system needs to be put in place, if there is a review they should be you know asked to book them and see. And you know you might say well that might not be good enough that you know you could ring them and they forget or do you book an appointment, they don't turn up? So the system needs to be a bit more robust."* GP15
Time and workload pressures	Separated from other quotes on causes of error and	*"having time to do admin is becoming an increasing struggle because of the amount of contact time increasing exponentially…so when am I doing admin stuff? There is sometimes a small window in the middle of the day, erm then we have laptops which we take home, erm and I will do it either at the end of the day or go home and do it via a laptop and then increasingly I come in on a Saturday and do an admin session on the Saturday and certainly spend my half days doing admin so I never leave"* GP10

	harm due to weight of data	*"Some of them do it on the laptops at home, some of the part timers will do it at home but that is becoming a contentious issue isn't it from a medico-legal point of view. Part time GP's working more hours because they are working when they are not on the premises and I gather then MDU and MPS have raised it as an issue recently."* PM10 *"From our end it is probably the time and the weight of work coming at you, there is a sort of… try and get it all done really and there probably isn't just the time to do that some days so yes time pressure is probably the main factor."* GP13 *"the first thing is we get far too many (discharge summaries) OK it is one of an enormous list of mail which erm which is one of the difficulties is the amount of mail and the amount of time it takes to process the mail."* GP10 *"I now come in for 8, quarter past and spend three quarters of an hour doing more admin erm but even then some days at present it is actually squeezing more patients in."* GP10 *"I hate to blame the fact that we have no time but I suspect that the fact that we have no time, we are so busy means that we cut corners and we forget to do every little cross the T's and dot the I's on every little thing like that."* GP14 *"I can see how things can possibly get missed sometimes I think because it is so busy you know when they are checking all of the letters every day*" PM14 *"Pressure of work, I would say that is about the only thing, you know if things happening in the surgery, on that day, that is the only thing I could think that you know it got overlooked"* PM15 *"it is so easy to miss them because you're always pressing, trying to get on you know to the next thing erm you don't have enough time to sit and think and digest."* GP10 *"And you know you think why didn't I do that at the time? But I guess it is because of the volume of stuff that you're trying to squeeze in to the smallest amount of time which mistakes can be made… I think this problem is one of those things where in your heart you know it is important and you ought to be doing it but I don't… I don't know any GP that I have talked to recently who is just so much under pressure they are beginning to think you know I can't cope with any of this, I can't keep you know making all of the decisions I have to do, erm because I am not going to get… I can't get everything done."* GP10 *"I think the time that is allocated to doing this job as well isn't that… in the day it isn't that great but the amount of work that has to be done in a day is also phenomenal and I think to an outsider coming in and looking I do feel coming and looking at all of the tasks a GP has to do in one day, the time that is allocated for this is quite a small period of time… … and if you have got maybe I don't know 20 Doc Mans, you're actually not allocating very much time to each Doc Man"* PM14 *"it does help when then the things that need looking at urgently are flagged because it can't always be the case that it is like that but then at least you can prioritise what needs to be done and the time available."* GP13 *"So it seems to be over and above what one is doing as their regular clinical work I would say certainly."* GP11 *"from the afternoon onwards it is so busy, you just didn't have the chance and you probably don't have enough brain space left to deal with it at that stage, you can probably go home, have your you know tea and then do it, you could even do that yes."* GP11

5. Strategies for safety improvement		
IT Strategies	Templates and IT for medicines reconciliation	*"Unless you know you have seen it (*a template*), it is difficult to say you know how it is whether it is going to be as active or not, you know I noticed in my experience, sometimes tick box exercises is actually more detrimental rather than useful"* GP15 *"I think you just want someone to highlight don't you to you the dose change, new drug and then you would be more likely to not miss it."*GP16 *"if it is a big medication list it takes a long time you know you need to get up the medication on the computer and match it with the one on the discharge summary erm and sometimes it is quite difficult switching screens so you have to print off the discharge medication lists so that you can sort of eye ball them and see what changes have been made"* GP10 *"you know I have found them quite difficult to do actually because it is in two… because we can't really split the screens can we you know? Well you can but it is a palaver isn't it?... I resent it but I have to do it"* GP19
Significant Event Analyses	Commonly used error/near miss analysis method	*"we're really, really keen on and we do a lot of significant events so things do go wrong because it is a system failures, human errors and we are really, really hot on significant events…we probably do too many but it just means that you're always looking at systems"* PM13 *"We did have an SEA I can't remember what it was now, something to do with discharge letters and we did change our system because of a result of it. I can't remember what the outcome was."* PM19 *"we probably don't do the near misses so much as the ones where there has actually been harms because you kind of I guess it is easier to minimise those in your mind as not so much as a significant event but the near misses are probably more important because really because you caught it in time… not everything, especially small stuff because we all mess up and you don't want to have everything flagged up all of the time do you?"* GP13
Impacts from the study	Learning or changes made as a result of being part of the study	*"You know having talked to you today and looked at this, I am going to be thinking every time I see a discharge summary now I am going to be you know treble checking that we're following everything up."* GP14 *"We need to check specific things on those discharge summaries so perhaps we should all be a bit more aware of what they all look like."* GP13 *"I think we need to be very more… cautious, more cautious, more alert, I think whosoever is dealing with it there needs to be more vigilant in dealing with that and just be aware that these type of errors can happen."* GP15 *"I am just being a lot more vigilant since we have received those two (tasks related to error)"* GP17 *"if there was protected time in practice for the right person to erm process the documents that would help, I still think that particularly with discharge summaries there has to be clinical input because the nuances of the information I think would make it very difficult for a non-clinician to understand"* GP14

		"I am kind of hesitating to say more time because… and dedicating time and things like that because I don't know how helpful that would actually be, I think you kind of get a level of being able to manage your time as you get experienced at doing the job, after a while you kind of are able to slot things in and prioritise things where they need to be, but I don't know whether saying this is my time for doing admin, this admin, this discharge summary task, is going to be helpful because they are so variable in how difficult they are or how much time they take… but perhaps a bit less stress and a bit more time would help because that is sometimes what obviously pushes…." GP13 *"support for the amount of time that it actually takes to do this"* GP10 *"I have seen this data yes so we should discuss this at our audit of the practice actually and erm we need to look at these two I think which is very high isn't it yes? And try and understand what is happening and why?"* GP19 *"So I think personally I need to probably audit my own discharge summaries, just to see where I stand personally because it makes me feel kind of guilty because I know that sometimes discharge summaries sit along time in the inbox, rarely longer than a week but you know I can see that two or three days is the average…"* GP10

Appendix 15 – Coding framework

Themes are in bold

- Subthemes appear at each bullet point

Secondary care factors

Hospital factors is a theme covering factors outside the control of primary care, it emerged de-novo during the interviews. Originally the interview structure had been intended to focus only on primary care issues but it was clear that interviewees wanted to talk about hospital responsibilities especially in relation to delegation.

- Ideal Discharge Summary – interviewees' ideas about how the summary itself could be improved and issues with the content of summaries received. *Change ideas relating to the summary itself are discussed here and not in the innovations section which relates entirely to primary care.*
- Delegation between secondary and primary care – comments on the way in which instructions are given to GPs in a discharge summary, wider comments about responsibility for care at care transition. *Distinct from continuity of care which relates to individual practitioners in primary care.*
- Safety of information transfer – including route of delivery, timeliness and issues with electronic downloads.
- External NHS pressures - including costs, referrals, comparison to other practices and comparison of primary and secondary care. *Distinct from hospital factors in delegation of work.*

Safety features of discharge summary processing systems

This was developed from the original interview schedule which included talking through the process map generated for the practice. Some of the subthemes were generated direct from the process maps (particularly 'continuity of care' which was an intrinsic part of system design at many of the sites).

- Continuity of care – including feelings of 'ownership' of patients by particular GPs, professional pride, curiosity about patients. Multiple interviewees think it is essential and some practice's entire systems are predicated on it. *Distinct from delegation between primary and secondary care.*
- Team-working- including how particular individuals fit into teams, areas of speciality, character/personality, and diligence levels. *Distinct from individuals as a cause of error*, delegation within primary care (ownership of tasks) and autonomy of work roles.
- Protocols and Procedures (systemisation) – reference to documents or procedures already in place at the surgery that have relevance to the admin safety systems. Includes policies on delay to shredding. *Distinct from training issues.*
- Training issues – relating to training of administrative staff. *Distinct from protocols generated by practices.*

- Staff numbers – this emerged from interviewing practice managers as a crucial feature of the safety of their admin systems.
- Workflow targets – interviewee's opinions on processing times for discharge summaries, including the challenges of part-time working. *Distinct from processing time pressures.*

Medicines reconciliation

Questions about medicines reconciliation were a key part of the interview schedule which GPs were particularly interested in talking about. The volume of information on this theme warranted analysis separate to the more global topic of harm and error.

- Communication with patients about meds reconciliation – who, what, when, why? Patient experience of communication, patient's agenda versus doctor's, patient responsibility in a wider sense. Interviewees' ideas on target rates for discussion of medicines reconciliation.
- Medicines related factors – comments on individual drugs, poly-pharmacy, 'minor-indication' medicines.
- Patient vulnerability factors - including age range chosen for the project, cognitive status, vulnerability at discharge itself, mental health, multi-morbidity.
- Prescribing responsibility and roles – who should undertake medicines reconciliation?
- Pharmacists – use of practice pharmacists as an innovation, community pharmacist's role, copying information to pharmacists.

Error and harm a result of failure to process discharge summaries

A broad theme relating to error and harm resulting from problems with discharge summary processing.

- Causes and of error and harm - reasons why error and harm might have occurred/occur in future. Both hypothetical and actual. Including blame of individuals and working groups and patient responsibility. *Distinct from time and workload pressures which was a major subtheme (see below)*
- Time and workload pressures – including pressure specifically for medicines reconciliation which may be from pharmacy or patient. Protection of admin time (including; on-call, long hours, fatigue, dedicated desk space).
- Harm severity/preventability – examples of harm for illustration and comments on the case vignettes are discussed in an appendix.

Strategies for safety improvement

Change ideas were collected partly to understand the context in which practices sit and the maturity of their safety culture but also as an ideas generating exercise from content on innovations suggested or implemented by participating practices and impacts directly from the project.

- Administrative Systems – changes made to administrative systems at practices as a result of past experiences either to improve safety or efficiency (includes comments on the national training scheme for receptionists to transfer document handling to admin staff). Prioritising time in the appointment book is a major component of content. Includes changes made to staffing, admin roles and training and frustrations with inability to make change.
- IT – both negative and positive experiences of information technology use in relation to discharge summary processing including problems with IT methods. Includes IT solutions to prescribing and diary/task functionality. Includes templates for discharge summary processing.
- SEA – relating to the use of significant event analyses in practices as a method of responding to error/harm detected in discharge summary processing.
- Unplanned Admissions Scheme – comments relating to this specific enhanced service. Not part of the original interview schedule this topic was a common part of the practices' process maps and both GPs and practice managers mentioned it frequently.
- Impacts directly from the project - impacts for individual patients – changes to medications, follow-up, contact with patients. Impacts for individual practitioners. Impacts for the practice – systems changes, staff changes.

Appendix 16 - Requested changes to medications which were not made (by therapeutic group)

Failure to change which cardiovascular medicine?	Change status	Indication for change	Harm associated?
ACE inhibitor	Stop	Acute kidney injury	Yes
ACE inhibitor	Start	Hypertension	Yes
ACE inhibitor	Stop	Acute kidney injury	No
Amlodipine	Stop	Low blood pressure	No
Amlodipine	Start	None given	No
Aspirin	Stop	Other drugs for atrial fibrillation prescribed	Yes
Bendroflumethazide	Stop	Low sodium	No
Bisoprolol	Dose change	None given	Yes
Bisoprolol	Start	Hypertension	Yes
Bisoprolol	Stop	Bradycardia	No
Digoxin	Stop	None given	No
Furosemide	Dose change	Uncontrolled cardiac failure	Yes
Furosemide	Start	Arm oedema	No
Statin	Start	Hypercholesterolemia	No
GTN	Start	Myocardial infarction	No

Cardiovascular medicines n=15

Drug Category	Drug Name	Frequency Count
Laxatives	Senna	17
	Macrogols	14
	Docusate	5
	Lactulose	2
	Fybogel	2
	Total	**40**
CNS drugs	Paracetamol	15
	Oral morphine	4
	Ibuprofen	2
	Oxycodone preparations	2
	Zopiclone	2
	Total	**25**
Other drugs	**Total**	**15**
Cardiac drugs	Bisoprolol	3
	Angiotensin Converting Enzyme Inhibitors	3
	Amlodipine	2
	Diuretic	3
	Other (e.g. statin)	4
	Total	**15**
Antacid Drugs	Ulcer healing drugs	5
	Alginates	4
	Total	**9**
Bone protection	Calcium supplements	3
	Alendronate	2
	Cholecalciferol	2
	Total	**7**
Nutritional supplements	**Total**	**7**
Respiratory drugs	Carbocisteine	2
	Inhaled corticosteroids	2
	Total	**4**
Haematological drugs	Ferrous Fumarate	2
	Total	**2**
Overall Total		**124**

All requested medicines changes which were not completed

Appendix 17 – Harm vignettes

This appendix begins with notes on the severity and preventability scoring scales used. Vignettes are then presented with scoring from both raters and are accompanied by relevant quotes from the interview data.

Harm Severity

Two different harm severity scales were used to assess the vignettes. The severity element of the NHS Education for Scotland Trigger tool was used as this is a primary care validated score (for details see table below).

NHS Education for Scotland Harm Severity Scale (De Wet and Bowie, 2011)	
1	Potential to cause harm
2	Mild harm: inconvenience, follow-up or investigation to ensure no harm occurred
3	Moderate harm (requiring intervention or duration longer than a day)
4	Prolonged/substantial/permanent harm (including hospitalisation)

Most other harm scales are skewed towards 'severe harm' and cannot adequately capture the more subtle harms in primary care. There are some difficulties with the application of the NES trigger tool scale to the data set. Level 1 does not exist in the harm data in this study – it would only count as a 'failure'. Another problem is that the failures had mostly not been detected and therefore amelioration attempts had not been made. For these reasons I also decided to use the 5 point WHO harm severity scale (see table below)

WHO Harm Severity Scale (Runciman et al, 2009)	
1	No harm
2	Mild harm
3	Moderate harm
4	Severe harm
5	Death

Harm preventability

A preventability scale from secondary care was used (Hogan et al, 2012), this scale originates in the Harvard Medical Practice Studies (Brennan et al, 1991). It is also the scale used in the avoidable harm project (Bell et al, 2017). The NES trigger tool preventability scale is not applicable to this study as all the failures originate in general practice.

Hogan Healey Preventability Scale (Hogan et al, 2012)	
1	Definitely not preventable
2	Slight evidence for preventability.
3	Possibly preventable but not very likely, less than 50:50 but close call
4	Probably preventable, more than 50-50 but close call.
5	Strong evidence for preventability
6	Definitely preventable

Vignettes

Vignettes are numbered by unique patient identifier, those starting 10** originate in practice 10 and so on. Vignettes start with a description of the admission **in bold** and then describe events leading up to the harm which is underlined. Mitigating or explanatory factors follow. It is not always possible to comment on the patient's co-morbidities or complete medication listing as this information was not routinely collected as part of the study. After each vignette the independent and combined severity and preventability scores are presented in a table. Where interviewees commented on specific vignettes in a way which was felt to add to the analysis, quotes are presented below each vignette.

1009
76 year old female initially admitted with exacerbation of Chronic Obstructive Pulmonary Disease
During the admission *Seretide* was replaced with *Fostair* as the patient was "unable to use (*Seretide*) effectively". The discharge summary also requested the GP to prescribe carbocisteine to "bring up phlegm" (these were the only requests made on the discharge summary). No change was made to the inhaled therapy on discharge and carbocisteine was not initiated. The patient was admitted with one further exacerbation of COPD subsequently in the 9 months between discharge and the date of data collection although their COPD had been generally well controlled as evidenced by lack of attendances in general practice with COPD symptoms. This patient was diagnosed with palliative pancreatic cancer just a few weeks after the index discharge and therefore reviewing COPD was unlikely to have been the clinical priority. There are local agreements about carbocisteine prescribing and GPs are often told to start patients on this drug when they do not meet stringent local authority criteria.

Scale	RS score	TA score	After deliberation
NES TT	4	4	4
WHO	3	3	3
Hogan Healey	4	3	4

We can see that the GP thinks the clinical impact is minimal for the patient but agrees that the suggested change in medication should have been made:
"On the less bad I think because erm you know Seretide and Fostair are very similar you know I would have thought that changing those two was going to make minimal difference and similarly with carbocisteine…I mean it is not clever but it is not massively…Well we should have changed the medication, no doubt about that you know the specialist had suggested that we change it and we have obviously omitted to read the letter properly and read the changes so that is not clever." (GP10)

1024
83 year old male initially admitted with pain from nerve root compression
During admission the patient's bisoprolol was reduced from 10mg to 5mg. No reason was given for this in the text of the discharge summary and there was no conceivable connection to the admission diagnosis. The GP did not reduce the dose of beta blocker as requested by the hospital (and also did not make any of the 3 other medication changes requested for laxatives and analgesia). The patient presented repeatedly in primary care following discharge with poorly controlled

COPD. It is possible that this was connected with higher dose beta blocker (although bisoprolol is one of the most cardio-selective beta blockers and less likely to exacerbate respiratory problems). Blood pressure was recorded at 118/74 which would have allowed for reduction in dose in terms of hypertension control, but equally the GP may have decided that this level of blood pressure was evidence that the 10mg dose was well tolerated. Contributory factors for this harms were that no medicines reconciliation was done at discharge and that no rationale for the change in dose of beta blocker was given in the discharge summary.

Scale	RS score	TA score	After deliberation
NES TT	3	3	3
WHO	3	3	3
Hogan Healey	5	3	3

The GP feels there is a clinical connection between not reducing the dose of bisoprolol and the harm and that failure of medicines reconciliation is likely to blame:
"Yes I guess it is quite a recognised thing that beta blockers can make asthma, COPD worse and because the patient went on having symptoms…whoever saw them would look back at the discharge summary and realise that a mistake had been made and also be confident in querying the beta blockers, COPD anyway, if you were getting ongoing symptoms so I think you know it is always bad that the medicines reconciliation hasn't been done, it is obviously being done in the best interests of the patient and again erm there has been adverse outcome so yes it is not great." (GP10)

1103
81 year old female initially admitted with dyspepsia
On discharge the GP was requested to arrange *H.Pylori* testing. Within 2 weeks of discharge the surgery sent a letter sent to the patient explaining that they needed to attend for the test. Unfortunately the test was never taken. Subsequently the patient was repeatedly re-admitted with dyspepsia over the following year. These admissions may have been connected with a potential missed treatment opportunity. There were repeated consults in general practice for mental health problems, indeed there were so many entries in the electronic health record that it was extremely hard to collect the data to analyse this problem. This patient was clearly a vulnerable adult and therefore the responsibility to attend for testing may not have lain solely with the patient. The harm of admissions was considered only 'possibly' preventable (less than 50:50) partly due to the likelihood of the patient not being infected with *H.Pylori*.

Scale	RS score	TA score	After deliberation
NES TT	4	4	4
WHO	2	3	3
Hogan Healey	2	3	3

1112
75 year old male initially admitted with an iatrogenic stroke after a stent procedure
The discharge summary requested the GP to monitor blood sugar and review the need for diabetes medications after the patient's 2 oral anti-hyperglycaemics were stopped on admission due to low glucose levels. In total 6 drug changes were requested and all were carried out by the GP 3 weeks after discharge, 1 day prior to

a face to face review. However there was no diabetic review recorded and no blood sugars were recorded on the clinical record for 2 months. A finger prick glucose was checked serendipitously when the patient <u>had a fall</u> and found to be 21 (high). <u>The harm is the possibility that the fall was connected to poor diabetic control.</u>

Scale	RS score	TA score	After deliberation
NES TT	3	2	3
WHO	3	2	3
Hogan Healey	3	4	2

1128
97 year old female initially admitted with a Urinary Tract Infection (UTI)
Folic acid was requested on the discharge summary but was not prescribed (the only other drug change was an increase in analgesia which was successfully processed by the admin team). The patient still had low folate levels on repeat testing 2 months later and folic acid was not prescribed then either. <u>The patient had an increased level of confusion which could possibly be attributable to low folate levels</u>. This patient did not have medicines reconciliation done by a GP after discharge and although there was record of a consultation 2 weeks after discharge at the patient's home, there were no notes on the EHR to determine what was discussed.

Scale	RS score	TA score	After deliberation
NES TT	3	3	3
WHO	2	3	3
Hogan Healey	2	2	2

1218
88 year old male initially admitted with chest infection and a fall
The discharge summary requested sodium docusate for 'constipation'. The GP did not start docusate laxatives as suggested by the hospital but did review the patient face to face on the day after discharge as part of the unplanned admission scheme. No documentation was made regarding bowel habit. <u>The patient re-attended in primary care for constipation 2 months later</u> and was prescribed *Movicol*. The 2 changes to cardiac drugs requested on the summary were made so it is likely that the GP felt the laxative prescription to be of lower import.

Scale	RS score	TA score	After deliberation
NES TT	2	2	2
WHO	2	2	2
Hogan Healey	5	4	5

1308
77 year old initially male admitted with renal colic
The hospital stopped his Angiotensin Converting Enzyme Inhibitor (ACEI) because he had an Acute Kidney Injury (AKI) on a background of Chronic Kidney Disease (CKD) which was potentially made worse by the ACEI. The GP did not complete medicines reconciliation and did not stop the ACEI (or prescribe 2 other suggested drugs). The

discharge summary asked the GP to 'monitor urea and electrolytes' (U+E). The test was completed but the results were not acted on even though the creatinine level was akin to that at discharge. U+E was not repeated for another 4 months when it was tagged 'no change' and no further action was taken. The harm here is potential prolongation of AKI and contribution to worsening CKD. One possible explanatory factor is that the GP may have looked at the most recent result when comparing the U+E (which was more deranged due to the AKI and did not represent his usual CKD state) but this is an assumption. There was conflicting information in the discharge summary - at one point the discharge summary said stop the ACEI for a few days and then at another place it was recommended to stop it totally.

Scale	RS score	TA score	After deliberation
NES TT	3	3	3
WHO	3	3	3
Hogan Healey	4	4	4

1314
84 year old male initially admitted with Acute Kidney Injury
The discharge summary requested the GP to monitor U+E after discharge and continue with a reduced dose of furosemide only if the U+E was 'OK'. Though the initial dose reduction was made the patient's furosemide was continued for 5 months despite worsening Chronic Kidney Disease (CKD). Despite a doubling of the creatinine level to over 900µmol/L, the advice regarding furosemide was not heeded. This worsening of CKD 5 led to the patient needing dialysis. This was a very complex patient medically. Letters from the patient's renal team did not list furosemide on the drug list – the researcher's presumption was that they didn't know the patient was still taking this drug.

Scale	RS score	TA score	After deliberation
NES TT	4	4	4
WHO	4	4	4
Hogan Healey	4	4	4

1322
76 year old male initially admitted with hypertension
The discharge summary requested prescription of bisoprolol to treat hypertension but the medication was not added to the patient's drug listing in the general practice. The patient presented with uncontrolled blood pressure after dialysis 2 months later as evidenced by communication from the hospital. Bisoprolol was then prescribed in liaison with the hospital pharmacist. There were no vascular events but there was the potential for end organ damage from untreated hypertension. The discharge summary did not contain the new drug in the medications listing, the instruction to start it was in the text only and no dose was given. The patient was not seen by their GP for 2 months after discharge.

Scale	RS score	TA score	After deliberation
NES TT	3	2	2
WHO	3	2	2
Hogan Healey	5	5	5

1330

84 year old female initially admitted with confusion likely due to tentatively diagnosed dementia

The discharge summary requested the GP to make a referral to the memory clinic to confirm the dementia diagnosis. No referral was made at the time of discharge. Two months later the referral was made after <u>repeated contacts with the surgery about medications confusion, problems for carers and upset for the patient.</u> The patient took alendronate in minor overdose during this time but no admission or treatment was needed for the overdose. A dosette box was already in use but the alendronate wasn't in it for reasons that were obscure from the EHR. The patient was seen by 3 different doctors after discharge so there may have been confusion about who was responsible for referring the patient. The admin team at the surgery had produced a free text entry in the facing record when they uploaded the discharge summary stating "memory clinic referral suggested".

Scale	RS score	TA score	After deliberation
NES TT	2		
WHO	2		
Hogan Healey	2		

1411

94 year old female initially admitted with fast Atrial Fibrillation due to sepsis

Harm 1

There were 8 medications changes requested on the discharge summary (including 3 new cardiac drugs; digoxin, rivaroxaban, bisoprolol and 2 dose changes; furosemide and gliclazide). This patient was medically very complex with multiple morbidities, including heart failure. The discharge summary requested the GP to increase furosemide from 20mg to 40mg twice daily, this change was not made. The patient had a subsequent hospital admission with heart failure within a few months of the initial discharge. On discharge the same change to furosemide dose was requested. The researcher commented on the likelihood of the patient's co-morbidities contributing to the need for the second admission.

Scale	RS score	TA score	After deliberation
NES TT	4	4	4
WHO	3	4	4
Hogan Healey	5	5	5

Interview quote - GP14

The GP expresses consternation as to the reasons why the medicines reconciliation was not done. He wonders why the patient does not take more responsibility for medicines changes but caveats this with an allusion to medical reasons for reduced responsibility:

"I suspect it is human error you know whoever looked at the discharge summary, the first or second time obviously hasn't followed up some of the changes, I… obviously without going in to the notes I couldn't tell you why that was, erm, the frusemide one is a mystery because I would have thought… I would expect us to pick that up and change the dose. I would also have expected the patient if they would come out on a new dose to have carried on taking the new dose but you know who knows, that is the problem."

Harm 2
The patient's diabetic medication was adjusted during admission; gliclazide was reduced from 120mg to 40mg and changed to a standard release preparation. Diabetes may not have been optimally controlled as the gliclazide dose was not adjusted as requested. <u>The patient had episodes of hallucinations after discharge</u> (a complex and multifactorial symptom which may have been related to blood glucose control – hypoglycaemia can induce confusion). There was no glucose level recorded on the EHR. No reason was given for the diabetes treatment changes made on the discharge summary.

Scale	RS score	TA score	After deliberation
NES TT	3	3	3
WHO	2	3	3
Hogan Healey	2	2	2

1412
85 year old female initially admitted with chest infection
The discharge summary requested prescription of a new ACEI for 'hypertension' diagnosed on admission. The patient was known to have CKD at this stage. The prescription was not added to the patient's medication listing and there was no blood pressure reading taken for 10 months. When the blood pressure was subsequently taken it was raised sufficiently to cause the GP to initiate a beta blocker to treat it. <u>The patient suffered a 10 month period with lack of treatment of the hypertension and this may have been the cause of mild worsening of CKD 3b.</u> The ACEI was the last medication in the listing on the discharge summary and the only one to be changed; there was also no mention of blood pressure readings in text of the discharge summary.

Scale	RS score	TA score	After deliberation
NES TT	3	3	3
WHO	3	3	3
Hogan Healey	3	3	3

Interview quote
This interviewee describes the GP as having the ultimate responsibility for medicines reconciliation but also continues to speak on a personal theme of greater patient responsibility for their own medications:
"You see this is where again it is the interface who was… well ultimately we are responsible, well the GP's really you know the custodian of the medical record and the patients sort of general practitioner… this is where it comes back to patient responsibility versus doctor responsibility versus both and yes you know absolutely there was a… we should have followed it up, but maybe the patient should also have come back to us and said you know I am on these new tablets, should I be having a blood pressure check?" (GP14)

"That would be to me that would be an instance where if the hospital had sat down with the patient and said, right we are going to put you on this new blood pressure treatment to control your blood pressure which is a bit up, you need to go and see your doctor in a couple of weeks to have it checked because it needs monitoring,

please make an appointment to see your GP in two weeks' time, two to three weeks' time because you will need more of these. (GP14)

1414
76 year old male initially admitted with exacerbation of Chronic Obstructive Pulmonary Disease
Harm 1
At his index admission the discharge summary requested the GP to prescribe *Oramorph* 2.5mg four times daily (no indication was given on the discharge summary but oral morphine is frequently prescribed for breathing difficulty in addition to pain). Although the GP did prescribe the other new medication on the discharge summary (folic acid), oral morphine was not prescribed. The patient was readmitted 2 weeks later with chest pain and shortness of breath at which point the *Oramorph* was again requested on the discharge summary and this time prescribed by the GP. This patient suffered from diagnostic delay in secondary care. After multiple admissions he was finally diagnosed with tubercular abscesses having been suspected of having vasculitis and having treatment for haemoptysis and suspected pulmonary emboli. The GP did attempt to perform the initial medicines reconciliation just one day after discharge but not with the patient or carer.

Scale	RS score	TA score	After deliberation
NES TT	4	4	4
WHO	3	3	3
Hogan Healey	2	2	2

Harm 2
The discharge summary requested the GP to book an Ear Nose and Throat follow-up appointment for a biopsy to confirm a diagnosis of vasculitis that was suggested while he was an inpatient. Neither the GP nor secondary care made this appointment. The patient had a possible undiagnosed vasculitis but was subsequently given a more likely microbiological diagnosis (TB) as the cause of his symptoms.

Scale	RS score	TA score	After deliberation
NES TT	1	1	1
WHO	1	2	2
Hogan Healey	5	4	4

Interview quote - GP14
We can see that the GP felt strongly that the original request for referral was unreasonable to direct to primary care because of the perceived urgency of its nature and the severity of the diagnosis:

"that is a classic example of the hospital transfer of work or you know transfer of work to general practice failing the patient…a complex patient maybe we should make more effort to contact the patient and review them, erm… to check they're aware of what is happening…for something as urgent as vasculitis, you know yes a routine appointment to ENT because he has got a blocked nose, maybe that is the GP thing to discuss but a query vasculitis he ought to have a biopsy, that should have been a hospital ENT referral."

1425

86 year old male initially admitted with aspiration pneumonia

The GP did not order the follow-up chest X-ray requested by the hospital for 6 weeks following discharge. The patient subsequently died from aspiration pneumonia 4 months after the initial discharge. 2 ½ months elapsed between the time of the anticipated X-Ray and the death – it is possible therefore that the pneumonia which caused the death would have been picked up earlier if the X-ray had been performed. The patient was multiply-morbid with poor mobility following a stroke and would have struggled to attend the X-ray department. The GP may have made a best interests decision regarding the need for X-ray but there was no documentation to this effect.

Scale	RS score	TA score	After deliberation
NES TT	4	4	4
WHO	5	5	5
Hogan Healey	2	2	2

Interview quote

The GP raises important points about the accuracy of documentation in medico-legal defence of actions. He starts to explore process errors in general practice:

"I would have hoped that if there had been a discussion about best interests or a review of the patient we might have erm written 'too ill to attend x-ray, manage symptomatically' or something…I suspect it is a process issue that started it all rolling and this is the point here that a lot of these things are weakening, we didn't not do the chest x-ray because we weren't bothered it is the process of following the process of checking what the plan is and then deciding to follow it or giving good reason not to. Either way that needs recording so you have got a trail so you can defend what your decision was, or you at least before you have a trail so you can follow up on doing what you were meant to be doing. So yes it comes down to accuracy in the process in the end." (GP14)

Later in the interview he describes how the local hospital has started to arrange many of its own follow-up chest X-rays. He intimated that they perhaps felt they should take responsibility for their own tests, indeed the issue of inappropriate delegation was a recurring theme within this interview:

"What I suspected they will have done is they will have treated the chest infection, they are busy, wards are full, booted them out as soon as they are clinically well and may or may not have said anything about this (the need for a CXR) or may have mentioned it in passing." (GP 14)

1521

89 year old female initially admitted with symptomatic anaemia (haemoglobin 77g/L) followed by myocardial infarction (MI)

Harm 1

After the patient was found to be in AF, warfarin was started by the hospital and the patient's usual aspirin was discontinued. On discharge the aspirin was not stopped as requested in the discharge summary, co-prescription with warfarin continued until the patient's death (3 months from discharge from a further MI). The patient's International Normalised Ratio (INR) was found to be 11.9 (very high) after one month's co-administration of warfarin and aspirin. The patient required vitamin K treatment as an outpatient in anticoagulation clinic. There were no bleed events but given the patient's propensity to profound anaemia the combination was risky in the extreme. INR fell to 6 then to normal with adjustment of the warfarin dose but aspirin was continued. Medicines reconciliation was done 5 days after discharge but was not done with the patient. Anticoagulation clinic did not pick up on the co-prescription either.

Scale	RS score	TA score	After deliberation
NES TT	3	2	3
WHO	3	2	2
Hogan Healey	5	6	5

Interview quotes
The GP clearly believes the harm is both attributable to the failure to reconcile medication and preventable:
"It is preventable isn't it? You know aspirin you know if you stop then the INR perhaps wouldn't be that high and then she wouldn't have to go to hospital." (GP15)
He went on to describe how he would have taken steps to investigate this error and to mitigate its effects had this had the patient still been alive:
"I think this would be discussed in the significant event and I think the patient needed to be brought in, have an open discussion and admit you know this has been an error which has been made one part and what steps have been taken to ensure that this doesn't happen in the future." (GP15)
The practice manager also commented on severity and preventability of the harm, she thought the harm was "quite bad" – about a 3/5 where 5 is most severe:
"It was a combination of the GP not stopping the aspirin and the anti-coag clinic not picking it up either. So it is a bit of 50/50 there really…Mostly preventable I would say, if the doctor actually stopped the aspirin." (PM15)

Harm 2
The original discharge summary requested that the patient have a Do Not Attempt Resuscitation (DNAR) order placed by the GP at discharge. This DNAR documentation was not instituted in the 90 days following discharge. At the subsequent admission via 999 ambulance CPR was performed for this patient who had very recently been determined to be futile to resuscitate and the patient subsequently died during the admission. There was no text in the consultation record regarding any discussions about DNAR with family or patient. Possibly this patient was thought to be functionally well prior to the admission based on their EHR. The patient was found conscious and coherent so may well have still been admitted had the DNAR been in place. The hospital would usually retain a copy of their own records in relation to DNAR but this may not have been available at the time of time of the CPR given.

Scale	RS score	TA score	After deliberation
NES TT	3	2	2
WHO	3	2	2
Hogan Healey	5	4	4

1522

90 year old male initially admitted with Urinary Tract Infection and urinary retention

In order to investigate the reason for this patient's urinary retention a repeat Prostate Specific Antigen was requested in the discharge summary (PSA is often artificially raised by concurrent UTI). Further instructions suggested this test should be completed in 1 months' time with request for subsequent referral to urology if the PSA was raised (the concern was possible prostate cancer as a cause of urinary retention). Full medications reconciliation was conducted (2 drug changes were made to the patient's drug listing) but the blood test was never actioned. The harm connected to this was 2 further admissions in the months following the index admission with a blocked catheter. This could possibly have been connected to debris from a potential undiagnosed cancerous lesion. This patient was demented and was seen by the GP without his carers, his relatives lived distantly. The discharge summary was work-flowed at separate time (8 days later) to that at which the patient was seen. Unfortunately urology did not request the PSA either when they saw him on a subsequent admission. This scenario was considered to have only 'slight' evidence for preventability due to the clinical uncertainty as to the cause of the catheter blockage.

Scale	RS score	TA score	After deliberation
NES TT	4	4	4
WHO	4	3	3
Hogan Healey	2	3	2

Interview quotes

The GP clearly feels that the patient has been harmed and blames the systems of communication between the hospital and primary care:

"I think that is system failure isn't it?... so you would say you are jointly responsible you know for that, different people taking responsibility and then you know the practice is part of that team so you know we all need to… we would have done a bit better in that respect." (GP15)

The practice manager similarly felt that the responsibility should be shared *"50/50"* between the GP and urology. The GP relates this harm to the previous case (1521) in order to explain its comparatively lower severity:

"clinically this is not that dangerous, you know if you said amber, green, red so this, that stage is when you say OK, well...you think maybe you know what if he has a you know focus of prostate cancer, you know what treatment options, the chances of him dying of a natural death is more than from prostate cancer you know?" (GP15)

1612

77 year old male initially admitted with a Urinary Tract Infection (UTI)

Laxatives were not prescribed as requested on the discharge summary despite his admission UTI clearly having been associated with constipation. The free-text of the GP consult shortly after discharge stated he was constipated. The harm was four further UTIs which followed in the next 3 months, all treated with antibiotics but the patient was never prescribed laxatives. There are other clinical predispositions to UTI (and also the patient's self-care may have been somewhat impaired by excessive alcohol intake). The discharge summary format from this hospital was not clear about which medicines were new - hand annotation from the hospital pharmacist "new" had not scanned well into the EHR.

Scale	RS score	TA score	After deliberation
NES TT	3	3	3
WHO	3	3	3
Hogan Healey	3	4	3

Interview quotes
The GP clearly felt the harm was attributable to the failure to reconcile medications:
"The four UTI's and the three months you would expect someone would ask for constipation… you would hope… I mean it is difficult to know whether it is due to that but it is definitely a possibility isn't it?" (GP16)
We discussed how seeing 3 different doctors in the months following discharge may have been responsible for the failure to prescribe laxatives at any stage. When asked to think of the reasons why the original failure to prescribe laxatives might have occurred she described errors of both commission and omission:
"you picked up that a laxative might have been recommended, from the same documentation that the GP was reading, so it must have been in a format that was appropriate to be read, so I suppose my immediate… it is one of two things, had the GP had a very quick scan of the document and not picked it up, would be one or have they made a conscious decision not to would be two and I can't see anything else really" (GP16)

1613
81 year old female initially admitted with a chest infection
The patient's haemoglobin was 96 g/L (moderately low) on the index admission. Iron requested in the discharge summary was not prescribed so the patient only received the 1 month course issued by the hospital on discharge. There is possible evidence that <u>the patient was symptomatic of anaemia as they presented with shortness of breath</u> 3 months later (though given the breathlessness was wheeze associated and the patient had a smoking history COPD could also be contributing). No follow-up blood test was done until a subsequent admission 6 months later when the haemoglobin was 73 g/L (very low). The patient had a blood clot in their bladder at the time which may have been the cause for the drop in haemoglobin (i.e. bleeding related). Medicines reconciliation is likely to have failed here because the GP never received the discharge summary – the electronic document was not transferred to a GP inbox.

Scale	RS score	TA score	After deliberation
NES TT	2	3	3
WHO	2	3	3
Hogan Healey	2	4	4

Interview quotes
The GP interviewed felt the harm was only "possibly" attributable to failure to prescribe iron but certainly felt that the patient needed a longer course:
"She could have still been on the iron couldn't she if her HB was 96 she needs more than one lot." (GP16)

1729

87 year old female initially admitted with Congestive Cardiac failure

The discharge summary requested referral to endocrine clinic for an incidental parathyroid adenoma seen on a scan performed during admission. Referral had not been sent in the 6 months between discharge and data collection. The patient presented to primary care with poor balance, dysarthria and repeated falls and had been referred to outpatient clinics for the symptoms. These are complex neurological symptoms which could be related to hyperparathyroidism (the symptoms of which are vague and global including fatigue, weakness and confusion). The patient's calcium level (which might have helped to establish a cause) was unknown at the time of data collection. The diagnosis of adenoma was Read coded and a task was sent to admin to call the patient in about the referral. The patient had a follow-up appointment booked to discuss this but this appointment was never documented. It may have been cancelled when the patient came in with gastroenteritis at an earlier date. The request was in the OP booking section of the discharge summary rather than the GP action box - ambiguous as to who is responsible but the GP clearly felt they should be organising it based on their actions.

Scale	RS score	TA score	After deliberation
NES TT	2	1	1
WHO	2	1	2
Hogan Healey	2	No data	2

Interview quotes

The GP describes here some of the complex reasons why this referral might have fallen down which include patient factors, GP factors, booking system problems and pressures from the external NHS:

"The big question is who is responsible for arranging that follow up? And if the hospital probably if they picked it up should probably have arranged it in my opinion… I might suspect whoever looked at the letter thought well we won't do referrals without seeing patients, we won't just do referrals, we have been told not to, we have got to monitor referrals… we have no idea from that whether she knew possibly from the letter I don't know whether she had been told what was wrong with her parathyroid… I presume when she came in for the D&V whoever saw her for that didn't see that she had a pending, outstanding letter, the patient possibly didn't mention that she had had a letter to come in, erm and that then cancelled the appointment because she thought well I have seen the doctor now so it is a bit of an all-round…" (GP17)

The practice manager spoke about this vignette in response to questions about the electronic task system, balancing staff responsibility with patient responsibility:

"It would be down to the person making the referral to decide how important and how crucial this referral was and you know then task diary or task themselves, scheduled tasks up, has this person been seen in clinic?…How much is the patient's responsibility as well?" (PM17)

1821

76 year old male initially admitted with Community Acquired Pneumonia (CAP)

This case describes the second incidence of harm related to follow-up chest X-ray, this admission was for severe CAP requiring ventilation and high dependency care and the 6 week chest X-ray requested in the discharge summary was not performed. <u>The patient had another chest infection 8 weeks after the admission</u>, was given oral antibiotics and responded well. It is possible that had the chest X-ray been performed it would have revealed a lingering infection that could have been treated 2 weeks' earlier (but the outcome for patient would have been unlikely to have been different). There was evidence of detailed note making on the EHR including instruction to order the X-ray but the request may not have been adequately communicated to the patient's nursing home as it did not translate to a completed test.

Scale	RS score	TA score	After deliberation
NES TT	2	3	3
WHO	2	3	3
Hogan Healey	2	3	2

The GP at practice 18 spoke at length about this harm vignette describing to me conversations had with their patient about the missing chest X-ray some months down the line. The patient also has lung cancer and cognitive impairment, she told me, and when asked directly if he wanted another chest X-ray said; "I don't want to go for an x-ray, I have had loads of x-rays". She went on to describe how they had instituted special task groups for each nursing home (see strategies for safety improvement data) and that this vignette had made a difference to their systems:
"in some ways we are very happy to see this down as harm because otherwise I wouldn't have investigated it" (GP18)

Both GP and practice manager did ascribe blame to the nursing home for failing to arrange transport for the patient to attend the X-ray.

Appendix 18 - Requested tests which were not completed

Group	Test	Frequency Count
Bloods tests	Multiple common tests or non-specific request for 'bloods'	6
	Urea and Electrolytes	5
	Other; Full Blood Count, digoxin levels, Prostate Specific Antigen, folate	4
	Total	**15**
Imagining	Chest X-Ray for resolution of pneumonia	3
	Dual-energy X-ray absorptiometry scan	1
	Cardiac Echo	1
	Total	**5**
Other	Pulmonary Function Testing	1
	24 hour electrocardiogram	1
	Electroencephalogram	1
	Total	**3**
Overall Total		**23**

Appendix 19 – The Concise Safe Systems Checklist

General Practice Safe Systems Checklist

Introduction

During the development of the Patient Safety Toolkit the study team identified a number of important aspects of patient safety not currently covered by any existing tools or legislation and which specifically relate to background systems in practices. We formed the checklist from these concepts and have tested it in GP surgeries in stage 2 of this project. The tool is intended to prompt internal discussion in your practice rather than be simply a tick-box exercise.

Instructions

This practice-wide checklist should be filled in by a senior member of practice staff. Please answer for the practice as a whole not for your individual role. Please consider each statement and indicate whether or not you are satisfied with the system your practice has in place to address each issue. If you answer No to a statement, or there are any improvements which you think could be made to your existing system, please document them below and use this document for reference in future meetings or audit. If the system is not applicable to your practice please indicate N/A. If you are uncertain whether your practice has systems in place in relation to each of the issues please investigate so you can give an answer.

	Yes	No	N/A	Any changes required?
All incoming clinical information is seen by nominated members of the team trained (or with relevant clinical experience) to deal appropriately with this information before the information is filed in the patient’s record.	☐	☐	☐	Click here to enter text.
Where incoming clinical information requires follow-up or diarised activity this is recorded in the patient’s record and acted upon	☐	☐	☐	Click here to enter text.

Where a clinician decides it is indicated, the patient (or where appropriate the patient's representative) is informed of abnormal investigation results in an appropriately and timely manner and this contact is documented in the patient's record.	☐	☐	☐	Click here to enter text.
	Yes	No	N/A	Any changes required?
The practice keeps a log of minor operations containing all the following information • Date/patient's name • Procedure performed • Who performed the operation and who assisted • Consent taken • Any complications • Specimen sent for Histology Y/N • Patient informed of result	☐	☐	☐	
Up-to-date information on practice policies, procedures and local facilities/services is provided to guide all temporary clinical staff (including GP registrars).	☐	☐	☐	Click here to enter text.
Vulnerable patients discharged from hospital are followed-up by a member of the clinical team within 1 month	☐	☐	☐	Click here to enter text.
Non-collection of prescriptions is monitored or followed-up and is a trigger for review and audit in partnership with local pharmacies	☐	☐	☐	Click here to enter text.

The indication for all repeat medications is coded within the electronic record (excluding topical preparations)	☐	☐	☐	Click here to enter text.
All staff are trained to make safe use of the prescribing elements of the clinical IT system which are relevant to their role	☐			Click here to enter text.

Do you have any comments on the checklist items? Click here to enter text.