

Exploration of care continuity during the hospital discharge process

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Abstract

Background

Communication regarding medicines at hospital discharge via discharge summaries is notoriously poor and negatively impacts on patient care. With the process being dependant on the quality of patient records during admission, junior doctors who write them and General Practitioners (GPs) who receive them, the objectives of this thesis were, with respect to discharge summaries, to:-

- assess their timeliness, accuracy and quality
- describe GP preferences
- explore experiences of junior doctors regarding their preparation.

Methods

Discharge summaries produced from one district general hospital were audited, as was the impact of changing the format of inpatient drug charts. A combination of observation, think-aloud and ethnographic interviews were conducted to investigate experiences of junior hospital doctors preparing summaries. A survey of GPs and junior doctors was undertaken to compare attitudes towards the discharge process. A pilot Discrete Choice Experiment (DCE) was developed and undertaken with GPs to determine their preferences with respect to the format, quality and timing of discharge summaries.

Results

A large proportion of discharge summaries were found to be inaccurate, however this was reduced when checked by a pharmacist. Key barriers to summary preparation identified were lack of time, training and knowledge of the patient. GPs perceived medicine changes on discharge summaries to be more important than did junior doctors. The DCE found that GPs were willing to trade timeliness of discharge summaries with accuracy.

Discussion and conclusions

The error rate within discharge summaries highlights the importance of a pharmacy accuracy check. The national requirement to deliver discharge summaries within 24 hours of discharge results in the pharmacist being bypassed and places additional pressure on junior doctors to prepare them in a timely manner, which might provide explanation for poor quality. Interestingly, GPs were willing to forego receipt of discharge summaries within 24 hours in preference for a reduced error rate.

Keywords: *patient discharge, discharge summary, patient transfer, interdisciplinary communication, medication errors.*

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List of abbreviations and terms

BNF	British National Formulary
CCG	Clinical Commissioning Group
CHUFT	Colchester Hospital University NHS Foundation Trust
CQC	Care Quality Commission
DCE	Discrete Choice Experiment
EDS	Electronic Discharge Summary
EAU	Emergency Admissions Unit
EP	Electronic Prescribing
FY1	Foundation Year 1 junior doctor (previously junior house officer)
FY2	Foundation Year 2 junior doctor (previously senior house officer)
GP	General Practitioner
IT	Information Technology
QALY	Quality-adjusted Life Year
MR	Medicines Reconciliation
MNL	Multi-nomial Logit
NHS	National Health Service
NPSA	National Patient Safety Agency
NRLS	National Reporting and Learning Service
NPC	National Prescribing Centre
PCT	Primary Care Trust
RY	Rowan Yemm (PhD author)
VAS	Visual Analogue Scale
UK	United Kingdom
USA	United States of America
SPSS	Statistical software programme used to conduct data analysis
Ngene	Statistical software programme used to design and model DCE
SurveyMonkey	Online questionnaire development software

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“The place to improve the world is first in one's own heart and head and hands, and then work outward from there”

— Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance: An Inquiry Into Values*

Chapter 1: A review of the literature in transfer of care

1.0 Care across the interface

In 2000, there were over 11 million hospital admission episodes in the United Kingdom (UK), with a mean length of patient stay of 8.2 days. By 2009, this had risen to over 14 million admissions, with a mean stay of only 5.6 days (1). The substantial increase in patient turnover, together with increased pressure on hospitals to free hospital bed spaces to accommodate new patients, has resulted in less time being available to healthcare staff in which to coordinate and plan patient discharges from acute hospital settings.

1.1 Hospital discharge

A hospital discharge, by definition, is when a patient leaves an acute care setting, to which they have been admitted, and either returns to their own home or another care setting. In 2001, 79.7% of adults over the age of 65 years were discharged home following a hospital admission in the UK (2), and this figure is likely to be even higher in the general population. When a patient is discharged home, the responsibility for their care transfers from secondary care to primary care.

A hospital discharge is a process, not an isolated event (3), and the discharge planning process begins as soon as possible in the patient's journey. Whilst this is normally after admission, in the case of planned admissions, discharge planning can begin even before the admission. In 1994, Marks (4) identified five key steps involved in the process of discharge planning: pre-admission assessment, admission procedures, inpatient assessment, discharge from hospital and post-discharge monitoring. These are fully described in Table 1.1. The steps identified highlight the importance of planning for the discharge as early as possible, communication between healthcare professionals involved and accurate documentation of relevant information at all stages in the discharge process.

In the UK National Health Service (NHS) in 1997, 47% of acute trusts employed a discharge coordinator (5), rising to 82% of trusts in 2003 (6), whose role is to assess, plan and facilitate discharge arrangements for admitted patients. NHS trusts often have discharge lounges for the

latter stages of discharge, where patients who no longer require their hospital bed can wait for their final discharge arrangements to be completed - such as transport or acquisition of medicine from the pharmacy department. Hospital patients are provided with a letter at discharge summarising the relevant clinical details of their admission, to take to their General Practitioner (GP), who will assume responsibility for the medical care of the patient post-discharge.

Discharge process	Explanation
Pre-admission assessment	Possible for elective admissions; may include pre-admission clinics, information from community services and/or laboratory tests
Admission procedures, case finding and screening	Assessment of patient needs after hospitalisation, identification of high risk patients and referral to other care bodies of professionals as necessary
Inpatient assessment and preparation of a discharge plan	Multi-disciplinary assessments and co-ordination of services
Discharge from hospital and implementation of discharge plan	Provision of transport, medicine, and written discharge information (for example, via a discharge summary) including relevant clinical information, treatment, and follow-up plans.
Post-discharge monitoring	Audit of implementation of the discharge plan, satisfaction surveys to patients and GPs, analysis of readmissions

Table 1.1: The discharge process as described by Marks (4)

In the UK, the NHS differentiates discharges as being either minimal or complex. Minimal discharges are those for which patients require only simple care after discharge, whereas complex discharges, which account for around 20% of all UK hospital discharges (7), are those requiring specialised care packages, often involving organisations outside of the NHS. Each NHS body or local authority will have a local discharge policy, providing clear guidance, procedures and locally agreed standards for the provision of discharge planning and coordination within that area.

In 2010 Shepperd *et al.* (8) conducted a systematic review of 21 randomised controlled trials investigating the impact and effectiveness of discharge planning. Discharge planning was defined as '*the development of an individualised discharge plan for a patient prior to them leaving hospital for home*' and the review included all types of patients, hospitals and discharge

planning care packages. Across the 11 trials which investigated readmission rates, discharge planning was associated with a significant reduction in readmission rates (readmission rates RR 0.85, 95% CI 0.74 to 0.97). However, the details of each planning intervention were not extensively described or compared, and the review only considered discharge planning interventions that were conducted in isolation. This is a limitation because interventions or discharge packages with integrated approaches may have provided different perspectives or outcomes.

1.1.1 Premature discharge

Premature discharges, in which a patient is sent home before being clinically ready or before care packages or treatment have been properly arranged, are associated with unmet needs of the patient, and poor preparation for their return home (9), which may be further complicated by their subsequent readmission to hospital. In 2009/10 there were 535,336 emergency readmissions of adults to hospitals in England within 28 days of their discharge, an increase of over 70% from 2000/01 (1). Between 2009 and 2010, readmissions within 30 days were estimated to have cost the NHS around £1.6billion (1). In 2012, the King's Fund investigated discharges of older people from NHS trusts and reported "*a considerable increase in the proportion of emergency readmissions that occur within 0 to 1 day of the original admission*" (10).

Until 2011, the NHS did not receive any penalties for readmissions to hospital, and with a payment system based on admissions there was no incentive to prevent readmissions. In an attempt to reduce the number of readmissions, Government policy was changed to enable local commissioners to refuse to pay for emergency readmissions (except in certain circumstances) that occur within 30 days of hospital discharge after elective admissions or for a proportion of emergency admissions (11). Consequently, NHS trusts are now incentivised to reduce the number of readmissions which occur.

1.1.2 Delayed discharge

An Audit Commission investigation of bed management in NHS acute organisations reported in 2000 the internal and external factors stated by healthcare professionals which can contribute to discharges being delayed. Internal factors included the time of day of discharge, the patient's

medicine not being ready and issues with arranging patient transport, whilst external factors include waiting for a place in a residential home, arrangement of care provision and securing of funding for social services (5). The UK Department of Health further classifies these contributory factors as poor communication, poor organisation and inadequate assessment (3). Sheppard *et al.* (8) argue that despite advances in Information Technology (IT) at discharge, increased funding and availability of good practice guidance, these are the same factors that Barker *et al.* identified in 1985 (12) in the United States as being causes of delayed discharges for older people.

In 2001, the UK Government announced details of The Building Care Capacity £300 million grant, the use of which was aimed at reducing delays in discharging people from hospital. The funding, which was distributed mainly to local authorities, paid for more residential and nursing care places to be provided. The Government acknowledged in its 'Response to the Health Select Committee' report on delayed discharges in 2002 (13) that whilst the grant has had the desired effect on figures for delayed discharges, the "*top-down approach is not sustainable in the long term*". With more patients being discharged, more funding would be needed to spend on supporting people in the community and on preventive measures to avoid hospital admission.

The Community Care (Delayed Discharges etc.) Act was passed in 2003, which introduced a financial incentive for local authorities to provide and put into place appropriate community care and carer services, in order to enable patients to make safe transfers between care settings (14). Under the Act, NHS bodies are required to notify the local authority, with adequate notice, of patients whom they believe will need community care services upon discharge. If the local authority subsequently fails to arrange a discharge plan or where a discharge is delayed due to lack of preparation, the local authority are obligated to make a payment to the NHS body.

1.1.3 Communication at discharge

Following this Act, also in 2003, the Health and Social Care Joint Unit and Change Agents Team issued guidance for managing the discharge process (3), in which they recommend that discharge should be planned for at the earliest opportunity and a 'whole system' approach should be applied to discharge planning. This relies on different healthcare professionals, services and care settings working and communicating effectively together. The best practice

guidance was preceded by the Hospital Discharge Workbook, published in 1994, which described how *'it is increasingly evident that effective hospital discharges can only be achieved when there is good joint working between the NHS, local authorities, housing organisations, primary care and the independent and voluntary sectors in the commissioning and delivery of services'*

When a patient is discharged, the hospital has a duty and obligation to provide information about the patient's admission to the next care provider (15). A discharge letter or summary is the method adopted by hospitals, in which they communicate relevant clinical information relating to the patient's admission to the next care provider. In the UK, discharge summaries are largely written by hospital doctors. The next care provider is heavily reliant on these documents to continue with safe patient care, as they frequently contain a summary of the changes that have been made in hospital to a patient's regularly prescribed medicine or regimen during their admission; changes which have enabled the patient to make a recovery, such that they are medically fit to be discharged. Provision of this information is directly linked to the process of Medicine Reconciliation (MR), in which a patient's previous list of medicines is checked and corresponded with their current list of medicines, in order to ensure that accurate and timely information about their medicines is available to the healthcare professionals responsible for their care. The role of MR in the discharge process is discussed in detail later in this chapter.

Another function of discharge summaries is to communicate not only what has happened to the patient during their admission, but also what is recommended or expected to happen following their discharge. This comprises clear instructions or suggestions to the next care provider, so that they may continue the treatment that has led to the patient's recovery during their admission. However, requirements for the format and content of a discharge summary, and specifically what information it needs to contain, are undefined.

1.2 Content of discharge summaries

Historically, the content of discharge summaries has varied greatly across disciplines, localities and geographical location. Discharge summary content is largely dependent on factors such as

the type of care setting, internal policies and guidance, the complexity of the patient's condition, the recipient, and the competency of and time available to the author. In the UK, no official standards exist which define the exact information that is required on a discharge summary or how it should be presented, but good practice guidance has been released in recent years, which advises on the core content which will facilitate an efficient transition between care settings. In 2005, the Royal Pharmaceutical Society of Great Britain (now the Royal Pharmaceutical Society) issued guidance on discharge and transfer planning, which advised what information on discharge for medical and older patients should include (16). Similarly, in 2008, the National Prescribing Centre (NPC) published implementation tools for MR, which advised on the minimum information that should be provided to healthcare professionals when patients are transferred between care settings (17). Both documents focus on the provision of information about medicines at discharge, and whilst they advise that information should be clear, unambiguous and legible, no recommendation regarding the format or layout is provided. Also in 2008, the Academy of Medical Royal Colleges recommended key discharge headings in their guidance for the structuring of medical records (18), which should include more details regarding the clinical information that is expected to be provided at discharge.

Despite the availability of a wide variety of guidance, in 2009 when the Care Quality Commission visited 12 Primary Care Trusts and surveyed GPs within each of them, GPs reported having particular concerns with the quality of the information provided in discharge summaries, with 73% of practices reporting discharge summaries to be frequently incomplete or inaccurate (19).

The Royal Pharmaceutical Society (RPS) revised its guidance in 2011 (20). This guidance was developed through multi-disciplinary collaboration with key stakeholders in health and social care, and endorsed by organisations including the Royal College of Physicians and the Royal College of Nurses. The new guidance, designed to be applicable across all transfer interfaces, provided core principles and key responsibilities for healthcare professionals involved in patient transfer, building on those recommended by the Academy of Medical Royal Colleges. The guidance further emphasised the importance of including details about medicines, their changes, and recommendations. It also states that information should be communicated in a

way that is timely, clear, and legible; ideally generated and/or transferred electronically. The content of this guidance and its application is further discussed in Chapter 3.

All four pieces of guidance were constructed based on the expert opinion of senior professionals and managers, rather than published research evidence or practitioners at the 'coal-face'. The latest guidance published by the RPS is highly detailed, with no indication as to which information in particular should be prioritised by discharging doctors, who are under increasing pressure to produce high quality discharge summaries within very short timeframes. A summary of the different recommendations is provided in Table 1.2.

Core content	Royal Pharmaceutical Society of Great Britain (16), 2005	National Prescribing Centre (17), 2008	Academy of Royal Medical Colleges (18), 2008	Royal Pharmaceutical Society (20), 2011
Patient details		X	X	X
GP details			X	X
Details of admission		X	X	
Medication list	X	X	X	X
Dose, frequency, formulation and route of medication	X	X		X
Medication duration and continuation plans	X	X		X
Medicine changes and rationale	X	X	X	X
Allergies		X		X
Information given to patient			X	X
Future plans / follow-up plans			X	
Contact / person completing summary			X	X
Other				Transferred electronically

Table 1.2: Overview of UK good practice guidance regarding discharge summary content

It can be seen that there is no consistent message, and over time the list of desired content has increased with limited rationale, other than the RPS guidance in stating that details regarding admission are not required. This pattern probably reflects the different approaches taken to

deriving the guidance, the use of previous guidance to develop new guidance, the lack of evidence underpinning recommendations and the fact that without financial or organisational constraints a list of desirable attributes is likely to be idealistic rather than pragmatic. Furthermore the guidance seems to have been published at each point with a lack of evaluation post implementation.

There is little recent research to establish the working needs of GPs and other healthcare professionals who are in receipt of discharge summaries regarding summary content. Two surveys in the 1990s investigated which content of discharge summaries GPs considered most important through surveys. Solomon *et al.* (21) in 1995 asked 400 GPs to rank twenty clinical items on a discharge summary in order of importance; details of drugs at discharge were given then highest ranking of one. Munday *et al.* (22) in 1997 investigated the preferences of 71 GPs for details of medicine changes on discharge summaries, and reported that 91% of GPs wanted to be provided with details of new medicines and 89% details of discontinuations, but that these were only received by 30% and 14% of GPs respectively.

No study has since investigated the preferences of GPs for discharge summary content. Similarly, no research exists which links the discharge summary content with clinical outcomes.

The Joint Commission, a non-profit organisation which accredits and certifies healthcare organisations in the United States for quality and adherence to performance standards, lists six mandatory components of discharge summaries: reason for hospitalisation; significant findings; procedures and treatment provided; patient's discharge condition; patient and family instructions (as appropriate); and attending physician's signature. In comparison to UK guidance, the headings listed by The Joint Commission are relatively broad, which may explain the high adherence to standards reported by Kind *et al.* (23), who observed that it would be easy for a discharging doctor to meet the component standards with only minimal documentation, and so suggested that modification of the standards could influence discharge summary content and help to improve quality.

1.2.1 Adherence to standards

A systematic review of international studies relating to deficits in communication across the interface by Kripilani *et al.* in 2007 (24) identified 55 observational studies published between 1970 and 2005 which investigated transfer of information at discharge. A median (range) of 21% (2-40%) of discharge summaries were found to lack details of medicines, and 14% (2%-43%) lacked follow-up plans. Summaries also lacked important information such as diagnostic test results, treatment or hospital course and test results pending at discharge. Kripilani *et al.* recommended the use of a standard format for discharge summaries in order to highlight and ensure inclusion of the most pertinent information.

1.3 Format and delivery of discharge summaries

Handwritten discharge summaries may be subject to misinterpretation, by being illegible or containing inappropriate abbreviations (25), and as a result, electronically written discharge summaries have been suggested, and, together with other IT innovations within healthcare, are being increasingly used in practice in hospitals in the UK and worldwide.

Discharge summaries are currently issued in a variety of ways including e-mail, fax, post, or delivery by hand (26-28). In Australia, a randomised controlled trial by Chen *et al.* in 2010, (28) in which 168 summaries (email, fax, hand, n=40; post, n=48) were sent via the four main delivery methods found that discharge summaries sent by email had a higher receipt rate than those sent by fax (73.9% compared to 69.4% respectively). One of the key advantages of electronically sent discharge summaries is the speed and reliability with which they can be received by the next care provider, providing an audit trail, enabling GPs and other practice staff to recall, review and check the provision of discharge information.

In recent years, acute hospitals have come under increased pressure to provide information at discharge in a timelier manner. NHS Alliance conducted national surveys in 2005 and 2007 of 650 UK GP practices, and found that many were waiting weeks or months for the provision of discharge information. In the previous 12 months, patient safety and clinical care were

reportedly compromised at 39% and 58% of practices respectively as a result of late, incomplete or inaccurate discharge communications (29).

1.4 Timeliness of discharge summaries

The poor timeliness reported by GPs in these surveys prompted the Department of Health to include a requirement for punctual transfer of information into the Operating Framework, in order to ensure that timely information transfers were considered imperative. The Department of Health's new standard NHS contract for acute services in 2008 to 2009 began to implement a yearly reduction in the time frame in which information should be issued to primary care (30). Prior to 31st March 2009, the patient's discharge summary was required to be issued to the patient's GP within 72 hours of patient discharge. Between 1st April 2009 and 31st March 2010 this requirement had decreased to 48 hours, and further after the 1st April 2010 to within 24 hours of the patient's discharge.

The most recent NHS contract for 2011 to 2012 (31) is consistent with this requirement to provide information within 24 hours. A timely transfer of information is undoubtedly desirable, however, the rationale behind the reduction down to a 24 hour transfer target is unclear. Hospitals will generally supply at least seven days' worth of medicines at discharge, and it is unlikely that a patient will need to visit their GP within 24 hours of being discharged.

Currently, there is no UK evidence to support the 24 hour target in terms of patient outcomes, only that improved continuity of care with GPs and structured discharge planning are effective in reducing emergency admissions and re-admissions respectively (32).

In 2011, Li *et al.* established a relationship between the timeliness with which GPs were sent discharge information and the readmission rates to hospital within seven and 28 days of their discharge (33). Of the 16,496 patients discharged from an Australian teaching hospital, 1,899 (11.5%) discharge summaries were incomplete, i.e. unfinished and not released to primary care, after seven days. These summaries were associated with significantly higher readmission rates at seven and 28 days than those completed within seven days (increasing from 2.89 to 4.58%

and from 7.18 to 9.53% at seven and 28 days respectively). 1,498 (9.1%) patients' discharge summaries were never completed, and these patients had the highest readmission rates of 5.54% and 10.28% at seven and 28 days respectively. This study identifies a benefit, not only to patient safety but to hospital finances, associated with sending timely discharge information from secondary care. It does not however support the need for discharge information to be provided within 24 hours.

However since the introduction of a reducing timeframe in which to provide discharge information, assuming all other aspects of discharge have remained the same, GPs in the UK have reported an increasing number of incidences where late, incomplete or inaccurate discharge information has compromised patient safety and clinical care. In 2010, NHS Alliance conducted a survey of 124 GP practices across three Primary Care Trusts. Between 2008 and 2010, the proportion of GP practices who experienced incidences where discharge information had compromised patient safety increased from 58% to 70%, and clinical care from 26% to 57% (34).

This indicates that the provision of timely information is not without risk, and may adversely affect the quality of discharge information. If hospitals are under increased pressure to provide information quickly, discharging doctors will have less time available to dedicate to discharge summary composition, leading to the production of discharge summaries which are shorter in length, less detailed and potentially less accurate. In 2010, NHS Alliance commented that whilst *"punctuality is essential, it is not sufficient"* (34) for discharge communications. It is therefore necessary to establish from GPs their perceptions as to the significance of timeliness in comparison to quality and accuracy.

1.5 Accuracy of documentation at discharge

In the aforementioned CQC survey of 2009, 81% of GP practices within 12 Primary Care Trusts reported the documentation of medicines to be inaccurate or incomplete 'all or most of the time' (19). The occurrence of medicines related inaccuracies in clinical settings is a significant issue, despite a scarcity of UK-specific research on the impacts of medication errors in

healthcare (35). The Audit Commission's 'A spoonful of sugar' report of 2000 (25) marked the importance and need for change towards improving medicines management within NHS hospitals, in order to effectively manage the ever-increasing expenditure on medicines, and to reduce the risk of errors involving medicines. Theory which aims to explain the occurrence of error is discussed in the new few sections.

1.5.1 Error theory

In 1990, Reason *et al.* defined an error as "*the failure of a planned action to be completed as intended – without intervention of some unforeseeable event; or the use of a wrong plan to achieve an aim*" (36). Errors made by individuals are often referred to as 'human errors', which imply that people are, indeed, only human and are therefore, irrespective of competence or experience, potential sources for the introduction of error. Due to the 'hands on' nature of healthcare, unlike many other disciplines which now rely on technology for quality control and assurance, individuals are responsible for a large proportion of day-to-day tasks and processes.

1.5.2 Human error theory

In 1974, Rasmussen and Jensen (37) defined three types of human performance which can be applied to the analysis of human error: skill-based, rule-based, and knowledge-based performance. Skill-based performance relies on structured thought pattern to determine action, and rule-based performance relies on the application of rules to determine action. Knowledge-based performance relies on the application of novel thought to determine action, often in novel situations where rules cannot be applied. The authors argue that as a process becomes more familiar, humans tend to default to a series of 'tried-and-tested' actions, which increases their use of skill-based or rule-based performance, and so reducing the need for knowledge-based performance.

Human error theory encompasses two alternative approaches: the person approach and the system approach. The person approach considers the individuals themselves responsible for errors which have occurred due to forgetfulness, inattention or carelessness (38). Consequently, the counter measures to prevent such errors are focused on fear tactics which appeal to human nature, such as fear of disciplinary action or punishment, retraining, and 'naming and shaming'. This approach is linked to the 'just world hypothesis', suggested by Lerner *et al.* in 1978, which

states that humans wish to live in a fair and orderly environment in which individuals 'get what they deserve' (39). Application of error theory to discharge process is further described in section 1.5.4.

Both Reason in 2000 (38), and Armitage in 2009 (40), observe that the person approach is common in healthcare settings, as attributing blame to an individual is often less costly and time-consuming than investigating the system or organisation. If an individual can be blamed, then the reputation of the organisation which employs them is not affected. Consequently in an environment where hospitals and groups of GPs are increasingly reliant on their reputation to maintain their 'customer base', the incentive to identify system or organisational reasons for error diminishes. However, Armitage (40) argues that a blame culture results in individuals fearing authority, which is likely to reduce transparency through a reduction in the willingness of individuals to report incidents. In the UK, incident reporting has been increasingly encouraged within the NHS, and in 2010 the NPSA's National Reporting and Learning Service, in collaboration with the CQC, the Department of Health and the Medicines Regulatory Healthcare Agency among others, published a national framework for reporting serious incidents which was designed to "*facilitate openness, trust, continuous learning and service improvement*" (41). This framework supports the use of preventative measures to reduce the risk of serious harm to patients, which is consistent with a system approach. However, this is contradicted within certain areas of UK healthcare, for example, in pharmacy where dispensing errors are punishable by law under the Medicines Act Section 64.1 and 85.5, relating to the incorrect dispensing and labeling of medicine respectively (42). It is necessary for individuals to report errors in order for the system to improve. However, errors are unlikely to be openly reported if individuals fear retribution or blame.

The system approach instead considers that errors made by individuals are expected due to their fallible nature, and that it is the systems within which individuals are working that are responsible for preventing these errors from occurring. Counter measures in this approach therefore relate to improving the system itself through the inclusion of system defences (38), which act as barriers and safeguards to potential errors.

1.5.3 Error defences

The 'Swiss cheese model' (36) can be used to portray how multiple layers of defences (represented by slices of cheese) may be penetrated (through holes in the cheese) to lead to the occurrence of an error, if at any one time the holes in the layers of defences are aligned. Two types of factors can contribute to the appearance of holes in the defences: active failures and latent conditions. Active failures are errors made by those individuals in direct contact with the system, whereas latent conditions are failures or inadequacies within the system itself. Whilst latent conditions can be managed by proactive evaluation of the system, active failures are unpredictable.

Active failures, which relate specifically to the individual performance of a task, can be divided into three types: slips, lapses and mistakes (40):-

- Slips are errors which occur in the human automation process, without conscious control, and are often more common as the individual becomes more experienced and competent, as the processes become more repetitive and second nature to them. An example of a slip would be a junior doctor writing the discharge summary under the wrong patient's name. The doctor knows the process of how to complete a discharge summary, but makes an error in the individual details.
- Lapses are errors in which something is simply forgotten, such as the junior doctor forgetting to sign the discharge summary. The doctor knows that summaries should be signed, but fails to execute that task.
- Mistakes are errors which occur in the execution of a plan. For example, a junior doctor decides to change the dose of a medicine on the discharge summary but prescribes an incorrect dose. In terms of performance, this example of a mistake may be knowledge-based (where the doctor does not know the correct dose) or rule-based (where the doctor incorrectly applies a formula to calculate the dose).

1.5.4 Errors in the discharge process

Within the discharge process, active failures which could contribute to errors occurring might include the junior doctor who is writing the summary feeling tired or stressed, and/or the lack of knowledge of that individual doctor of the patient. Latent conditions might include the level of training of the junior doctor in how to operate the discharge system, the functionality of the

system itself (such as level of complexity, mandatory fields, and any loopholes in the system), and the working environment in which the summary is written, including how much time is available to the junior doctor. Table 1.3, developed by RY from the literature, describes some of the stages of discharge summary composition in which errors might occur, and links them to system defences and potential active failures. It can be observed in the table that defences which currently exist within the discharge summary composition process primarily aim to combat errors involved in the content of the summary in terms of technological and writing errors. One such defence on electronic discharge systems is use of mandatory fields to ensure completion of certain summary fields (allergy status, diagnoses etc.). Whilst these defence measures do nothing to ensure the accuracy or quality of the information included in the summary, a pharmacist providing a secondary accuracy check of the discharge summary can (see section 1.62).

Stage in discharge summary composition process	Type of failure (36)	Type of active failure (40)	Human performance level (40)	Existing defences
Record keeping and documentation during admission (in written notes and drug chart)	Active failure – individual healthcare professional incorrectly/fails to record clinical information	Lapse (forgets to document) Mistake (error in document)	Skill-based	Standardised forms to guide documentation of some notes (e.g. admission notes use a standardised form)
Communication between staff (both in written notes and verbal instructions)	Active failure – individual healthcare professionals incorrectly/fail to communicate discharge instructions effectively	Mistake	Knowledge-based	Staff training
Interpretation of discharge instructions	Active failure – junior doctor composing discharge summary incorrectly interprets instructions e.g. restarts stopped medicine, fails to continue long-term medicine, fails to include follow-up instructions	Mistake	Knowledge-based	Staff training and experience
Transcribing from the drug chart into the discharge summary (e.g. copying the information incorrectly)	Latent conditions – process of transcription likely to introduce error (predictable), distractions in working environment Active failures – individual junior doctor incorrectly transcribes information from the chart (e.g. copies incorrect strength, omits medicine)	Mistake (copies incorrectly)	Rule-based	Electronic prescribing systems which automatically populate summary from prescribed medicines during admission (not yet commonplace in UK)

Continued overleaf

Stage in discharge summary composition process	Type of failure	Type of active failure	Human performance level	Existing defences
Writing the summary (e.g. writing incorrect information, typos, spelling mistakes, legibility, content)	Active failures – individual junior doctor makes errors in the information they write on the summary Latent conditions – distractions in working environment	Lapse (forgets info to include)	Parts will be skill-based, others knowledge-based	Electronic system prevents illegible discharge information and prompts inclusion of key content through subheadings. Pharmacist accuracy check acts as defense.
Operating the electronic system (e.g. checking the wrong tick box, selecting the wrong item in a drop-down list, sending to the wrong GP)	Active failures – individual junior doctor operates electronic system incorrectly (i.e. understands system but makes mistakes) Latent conditions – staff are not competent operating system	Slip (routine operation disrupted)	Rule-based	Staff training for system use
Nurses' check of patient medicines against those listed in discharge summary	Active failures – individual nurse checks ineffectively (misses error)	Slip	Rule-based	Staff experience
Pharmacist check of discharge summary content	Active failures – individual pharmacist checks ineffectively (misses error). Latent conditions - pharmacy check is bypassed due to time constraints/ available resources	Slip	Rule-based	Staff experience

Table 1.3: Potential stages which could introduce error within discharge summary composition

However, potential errors at discharge are likely to be caused mostly by active failures rather than latent conditions, meaning that stages in the process are heavily reliant on individual competence and errors are therefore unpredictable. Existing defences within the process of discharge summary composition are reliant on staff performance, which may lead to high

variation in quality between different teams within healthcare organisations. Introduction of system defences to assist individuals with these process stages, such as electronic prescribing (see section 1.6.4.3) could therefore be warranted. This will reduce dependence on the performance of individuals, who are fallible, and instead move the onus on to the conditions under which individuals are working. Interestingly however, there is evidence that by implementing lines of defence, healthcare professionals become less risk-averse (43), which may instead introduce a higher baseline level of inaccuracy.

1.5.5 Junior doctors and discharge

The majority of items on discharge summaries are prescribed by junior doctors (44), who are undertaking training between graduating from medical school and undertaking specialist medical training. The foundation training programme spans two years, with trainees in their first foundation year (FY1) previously known as junior house officers, and those in their second year (FY2) previously known as senior house officers. A GMC-commissioned report of prescribing errors amongst junior doctors across 20 hospital sites in North West England (the EQUIP study) reported 24,398 (77.4%) of the 31,502 items on discharge summaries were prescribed by FY1 and FY2 doctors (44).

In Australia, an observational study of the working time spent by 19 hospital doctors by Westbook *et al.* (45) reported the proportion of time interns (junior doctors) spent on documentation in notes and on discharge summaries was almost double that engaged in direct care (23 hours compared to 11 hours), and the time spent on discharge summaries was on average much greater than the more senior doctors (10 hours compared to 4 and 0.1 hours respectively). Although no such study exists in the UK, it can be reasoned that a similar amount of time is spent on discharge summaries by junior doctors in the UK, given the proportion of discharge summaries they write.

In 1995 Frain *et al.* (46) conducted telephone interviews with 100 junior doctors across England about the teaching they had received on preparing discharge summaries and the arrangements for doing so at their trust. Of 100 doctors, only 6% had received teaching as an undergraduate – all 6 of whom had studied at overseas medical schools - and only 19% had received on-the-job training. Junior doctors reported a lack of guidance for preparing discharge summaries, and

that time limitations were often placed on writing discharge summaries, as priority was often given to more immediately important clinical tasks. A lack of guidance is likely to result in a higher proportion of rule-based errors occurring, and if 'rules' surrounding discharge are unknown by junior doctors at the outset then it is unreasonable to blame the individual junior doctors for failing to adhere to them.

Even in recent years, a lack of adequate teaching on prescribing during medical training continues to be reported as a concern of educators (47), and more recently medical students too (48). In a 2008 survey of 2,413 medical students and recent graduates across 25 UK-based medical schools by Heaton *et al.* (48), 74% felt that the amount of teaching they received on prescribing was 'too little' or 'far too little'. Currently in the UK, each NHS trust uses its own unique prescribing system, and consequently training of junior doctors and other non-medical prescribers is difficult to standardise, with in-house training often being relied upon.

Inadequate training may be a cause of the high error rate in prescribing observed in UK hospitals: error rates of between 7.4% and 15.2% have been reported (44, 49-51), with one study reporting the involvement of junior doctors being a significant predictor for the occurrence of prescribing errors on discharge orders (n=2630, Odds Ratio = 2.54, p=0.03) (50)

In 2009, the aforementioned EQUIP study was conducted across 19 UK hospitals to investigate the causes of prescribing errors by foundation trainees in relation to their medical education. One of the key recommendations of this study was the need for further prescribing and writing education for junior doctors (44). Junior doctors in the UK were interviewed about the reasons why they thought they had made prescribing errors, classifying them into two types of unintentional errors discussed earlier in this chapter: appropriate plans incorrectly executed (slips or lapses), or inappropriate plans correctly executed (mistakes). Rushing whilst prescribing, due to workload and other pressures, was the most common reason for making slips.

Similarly in Australia, Westbrook *et al.* in their study of hospital doctors' working time also reported that doctors spent 20% of their time multitasking, and on average, were interrupted every 21 minutes (45), both of which could introduce error. It is unsurprising then that in 2008,

Callen *et al.* observed that “*not enough care is taken by doctors when creating discharge summaries*” (52).

1.5.6 Communication of medicine changes

Information regarding medicine changes provided on discharge summaries is only able to be as good as the information that is available to the doctor completing the summary. Consequently, the process is heavily reliant on the documentation of medicine changes in medical notes or other patient documentation during the inpatient stay. If the information is not present, or there is only limited information available, composing a ‘story’ for the GP on a discharge summary will be a difficult task for a junior doctor to execute.

Unclear prescribing documentation by other doctors was found to be a common cause of prescribing errors made by junior doctors (44), which were often perpetuated within the patient’s admission. The GMC guidance for good clinical care (53) states that doctors should report the clinical decisions that have been made and any medicines or other treatment prescribed in medical notes. However, in 2010 an audit of communicated changes to medicine during admission in a UK hospital found 61% of medicine changes which had been made were not documented in the patient’s record (54).

In 2004 Tully *et al.* (43) conducted a qualitative study to explore documentation of prescribing decisions in medical notes, and the views of hospital doctors on their quality and completeness. Common themes emerging from interviews with doctors included the desire to be concise when writing in notes, being subject to time constraints, and the assumption that other healthcare professionals would be able to understand their decisions, even with minimal documentation. With regard to medicine changes, one junior doctor said, “*We are always supposed to write in the notes when we add a new drug or when we change the drug. It doesn’t happen...*”

1.5.7 Medicine changes on discharge summaries

In the 1990s, a survey to GPs and community pharmacists in Scotland by Munday *et al.* (22) designed to elicit whether changes to drug therapy and their reasons should be included on discharge summaries. Of the 71 GPs who responded, 96% expressed a desire for information on the reasons for drug therapy changes. They also reported that reasons for starting new drugs

are better documented than those for discontinued drugs (30% of GPs received information on new drugs compared to 14% for discontinued drugs). Two decades later, the provision of details of medicine changes that occurred during admission on discharge summaries is still poor. In 2011, a study of non-reconciliation in a hospital in Ireland identified failure to document changes to medicine at discharge on 7.5% (720 of 9569) medicine orders, the greatest of which being failure to document the stopping of a medicine (4.2% (420) medicine orders) (55).

In Switzerland, provision of 'evidence summaries' (a brief evidence-based justification for prescribing each medicine, written by a consultant) on discharge letters resulted in a significant reduction in hospital-prescribed medicine being discontinued by the GP (29.6% to 18.5%; difference adjusted for underlying medical condition 12.5%; $p = 0.039$) (56). This is indicative of the need for hospitals to provide clear rationale for medicine changes to GPs in order for prescribing to continue as the hospital intended, and not be misinterpreted by the GP as unintentional errors.

The qualitative study conducted by Tully *et al.* also observed that doctors are often forced to make assumptions about the rationale for medicine changes which have been made during admission, but where this is not possible, the information is often omitted: *"you'll come to do the discharge summary and it's not completely obvious from the notes why things have been changed . . . you tell him [the GP] it has been changed but you can't always give information why"* (43). Both of these actions could result in unintended and inappropriate treatment being adopted by the GP and continued post-discharge in primary care.

The processes by which discharge summaries are prepared by junior doctors have not been extensively investigated in the literature, nor have their experiences and perceptions of summary composition. Confirmatory research in this area may be of benefit in order to firstly explore whether junior doctors are competent in terms of their knowledge of what is required of them when a patient is discharged, and secondly, whether the systems and resources in place within secondary care allow them to effectively complete this task within their hospital role.

1.5.8 Defining accuracy at discharge

The NPSA's National Reporting and Learning Service defines a medicine error as being any incident where there has been an error in the process of prescribing, dispensing, preparing, administering, monitoring or providing medicines advice, regardless of whether any harm occurred or was possible (57). 86,085 medicine incidents were reported to the National Reporting and Learning Service between 1 January 2007 and 31 December 2007. The NPSA has estimated that preventable harm from medicines could cost more than £750 million each year in England (58). The transfer of care between care teams, services and settings has been identified as an area in which medicine incidents are at a high risk of occurring, and in particular when moving between inpatient settings and the community (57), due to poor communication at the interface.

Errors made on discharge summaries are usually defined as a difference in what is prescribed on the inpatient medicine chart, and what is prescribed on the discharge summary, where there is no obvious explanation. This definition is an umbrella term which has encompassed both omissions of medicines from discharge summaries, transcription errors made during the process of composing the discharge summary using the notes and inpatient medicine chart for information, and prescribing errors in new items on discharge prescriptions made by the doctor completing the discharge summary.

In 2000, Dean *et al.* (59) used a panel of 34 healthcare professionals to reach their consensus definition of a prescribing error: *"A clinically meaningful prescribing error occurs when, as a result of a prescribing decision or prescription writing process, there is an unintentional significant reduction in the probability of treatment being timely and effective, or increase in the risk of harm when compared with generally accepted practice"*. Dean *et al.* acknowledge the process elements to a prescribing error as being either within the prescribing decision-making (in which a prescription - drug, form or dose - is clinically inappropriate for the patient concerned) or the writing of the prescription (where there has been a failure to communicate essential prescribing information, or where the prescription has not been transcribed accurately). The panel also reviewed 42 example error scenarios, stating whether each met the consensus definition and constituted an error, concluding that errors in these two process

elements were prescribing errors, whilst those which involved deviation from guidelines and policies were not.

1.5.9 Investigating accuracy in the literature

In the UK, discharge summaries have reported error rates of between 8.4% and 10.8% (50, 60). Outside the UK, higher error rates of between 12.1% and 89.0% have been observed (61-65). This may be a consequence of methodological differences or other practice influences. Studies investigating accuracy at discharge have adopted different definitions of an error and have detected errors at different stages in the prescribing or discharge process, where the outcome of the error may or may not be known (i.e. did the error reach the patient or was it intercepted by a pharmacist).

Table 1.4 summarises literature investigating the accuracy of discharge summaries and provides a comparison of the methodology and results between the different studies. It can be observed from this table that there is tremendous variation between error rates reported by these studies, which report between 12.1 to 89.0% of patients being affected by errors at discharge. Two studies originated from the UK (50, 60), one from Europe (62), and four from the rest of the world. (63-66). Both the lowest and highest error rates were reported by studies conducted in Australia (64, 65), which were conducted only two years apart. Gilbert *et al.* (64) reviewed discharge summaries which did not receive pharmacy input, and drew a comparison between these and a new discharge document created by a pharmacist, which communicated details of medicine only. This document had an error rate of only 8%, which is more comparable to that reported by Callen *et al.* (65).-

Three studies (63, 64, 66) utilised small sample sizes ($N < 100$ patients) and reported errors in 57% to 89% of discharge summaries. Relatively small sample sizes provide imprecise estimates of the true proportion of errors and this alone may explain the differences seen. Additionally, with a small number of discharge summaries it is possible for one highly trained individual to review them all and to spend a substantial amount of time doing so. Consequently they are more likely to identify errors and provide a more accurate and reliable error rate. However they may include every small deficiency which could inflate the error rate unnecessarily.

A range of categories to classify the type of errors identified were adopted. Some (50, 60, 62) used or adapted definitions from Dean *et al.*'s study defining a prescribing error (59), whilst the remaining devised their own categories for the purpose of the study. All studies identified omission from the discharge summary or medicine order as a separate category of error. Omissions were widespread and were reported as the most common type of error at discharge across all studies reviewed. Two physicians in Perren *et al.* (62) differentiated between intentional omissions, which were justified by a potential and documented contraindication, and those where the omission was not justified and therefore constituted an error. They found 58% of the identified omissions to be unintentional based on the lack of a documented rationale for the omission. The authors proposed that poor documentation of prescribing rationale in the medical record however may have over-estimated the observed omission rate.

Vira *et al.* (66) differentiated between unintentional and intentional discrepancies by consulting with the attending physician on discovery of the discrepancy. McMillan *et al.* (63) used a panel consisting of a pharmacology registrar, a pharmacologist and a pharmacist to identify whether any differences observed between medicines prescribed and listed on the discharge summary constituted an error. Others (50, 65) counted all observed differences, where no documentation explained the difference, as errors. With no method for distinguishing between intentional and non-intentional differences this may have over-estimated the level of inaccuracy at discharge, as some discrepancies may have in effect been intentional differences.

Data were collected by either a pharmacy team (50, 60, 63), researchers of unknown profession (65), or by physicians (62). It was not made clear in these studies whether discharge summaries were routinely checked for accuracy by a pharmacist, or what the current level of pharmacy input into the discharge summary was, although Callen *et al.*(65) and Grimes *et al.* (60) make recommendations for the checking of summaries by a pharmacist to improve accuracy. In Gilbert *et al.* (64) pharmacists produced their own brief document at discharge specifically for communicating information about medicines to the next care provider(s). This document was faxed to the GP and community pharmacist before the full discharge summary, prepared by a doctor, followed at a later stage. However, it was not made clear by authors whether pharmacists had any input into the preparation of the full discharge summaries.

Study	Country	Method	Data collection		Summary type		Sample	Error definition	Error identified By		Accuracy	Most common error type
			Prospective	Retrospective	Handwritten	Electronic			pharmacist	Other		
Grimes et al. (60) 2008	UK	Medicine orders at discharge	X		X		139 cardiology patients; 1046 medicine orders	All documents listing medication were assessed for congruency of details. Omission of medication prescribed on an as required basis during inpatient stay was not recorded as an inconsistency	X		10.8% medicine orders erroneous (95% CI 9.0-12.0%); 65.5% patients affected	Omission of drug (20.9% of DS)
Abdel-Qader et al. (50) 2011	UK	Medicine orders at discharge		X		X	1038 patients, 7712 medicine orders	Definition as by Dean <i>et al.</i> except failure to adhere to standards was not considered an error where these reflected accepted practice.	X		8.4% medicine orders erroneous (95% CI 7.8-9.0%); 20.4% patients affected	Omission (31% of errors)
Callen et al. (65) 2010	Australia	Completed discharge summaries		X	X	X	Handwritten: 966 patient DS; Electronic: 842 patient DS	Medicine omission; Correct medicine transcribed but dose or frequency omitted; Correct medicine transcribed but with different dose or frequency; Additional medicine		X	Handwritten: 12.1% DS erroneous; 12.1% patients affected Electronic: 13.3% DS erroneous; 13.3% patients affected	Omission (7.6% and 8.1% of hand and electronic DS respectively)
Gilbert et al. (64) 2012	Australia	Completed discharge summaries		X		X	61 patient DS	Wrong dose, wrong medicine, wrong strength, wrong dose frequency or wrong dose form, omissions		X	89% DS (not stated if pharmacy checked) erroneous; 89% patients affected 8% MIFT erroneous (pharmacy checked, not full DS, meds only)	Omission (54% of patients)
Vira et al. (66) 2006	Canada	Discharge medicine orders	X				56 patients	The patients' discharge medications were compared with the patients' preadmission medications and the medication administration records just before discharge. Any differences were considered to be discharge medication variances.	X		60% patient discharge medicine orders contained unintentional variances (95% CI 48 to 72%); 60% patients affected	Omission of medicine (45% of errors)

McMilan et al. (63) 2006	New Zealand	Completed discharge summaries		X		X	98 surgical patient DS; 100 medical patient DS	Any differences between the medicines prescribed in hospital and those listed on the discharge summary		X	Surgical: 43% DS erroneous; 43% patients affected Medical: 57% DS erroneous; 57% patients affected	'Common' but value not stated
Perren et al. (62) 2011	Switzerland	Discharge summaries	X				577 patients	Omitted medication; Defendable omission; Undefendable omission; Potentially harmful omission; Unjustified medication; Potentially harmful unjustified medication; Harmless unjustified medication.		X	66% DS erroneous; 66% patients affected	Omission (393 drug omissions, 228 undefendable)

Table 1.4: Summary of literature investigating accuracy of discharge summaries

1.5.10 Clinical significance of discharge errors

Whilst the frequency of medicine prescribing errors at discharge provides valuable information for quantifying the magnitude of the problem, it does not address the clinical significance or impact of those errors on patient care or clinical practice. Classifying errors according to type, such as dosage, product choice or omission, can provide an indication of how important the error may be, but the extent of its actual clinical significance is fundamentally dependent on other patient and non-patient factors, such as the medicine involved, the disease state, other medical complications, and whether the error actually reached the patient and had an effect. Without having a clear patient outcome that occurred as the result of the error, the significance can only be predicted with some uncertainty. Similarly, the longitudinal nature of collecting errors means that there are likely to be other outside influences and factors which may influence the errors that occur over a period of time. Errors may occur as a result of certain factors on one day, which may not be present on another day.

Measurement of an error's severity is therefore challenging, which is reflected in the literature: only 58% of studies examining hospital prescribing errors identified in a 2013 systematic review of 60 UK and international studies by Garfield *et al.* also measured the severity of errors (67). The reduction of medicine errors causing harm has been identified as an improvement area in the NHS Outcomes Framework (68), and is therefore increasingly important for researchers to quantify.

In 1999, Dean *et al.* (69) developed a validated and reliable method of scoring the severity of medicine errors, which involved judges individually assessing error severity using a Visual Analogue Scale of 0 to 10. Dean *et al.* found that to achieve a generalisability coefficient of more than 0.8 (denoting acceptable reliability) at least four judges were required to review each medicine error, and that a mean score should be used as the severity indicator. Actual patient outcomes were known for 16 of the 50 error examples presented to the judges, and resulting scores were found to reflect these.

Despite the existence of validated tools for exploring potential clinical significance of medicine errors, a variety of other scales and tools have continued to be employed in the literature. In the 60 studies of prescribing errors examined by Garfield *et al.* (67) a total of 40 different tools or variations of existing tools for measuring severity existed, of which 18 tools had been designed for the individual studies. Of the studies examined, 40 (67%) had

used original or adapted versions of four previously established tools (58, 69-71), which are described and compared in Table 1.5. Tools were largely constructed as ordinal Likert scales, with only Dean *et al.*'s model using a Visual Analogue scale to measure severity. Measurement of inter-rater reliability and validity were reported for 17 (43.0%) and 5 (12.5%) tools respectively.

Study	Error reviewer	Error categories / scale	Category definitions	Reliability / validity testing
Folli <i>et al.</i> (71), 1987	One medical practitioner and two clinical pharmacists	Significant, Severe, Lethal	Significant: incorrect lab tests, route or IV fluids, underdose Severe: incorrect route causing adverse reaction, under/overdose 4-10 times usual dose, dose error causing narrow therapeutic index alteration, misspelling Lethal: severe toxicity range, error causing adverse reaction causing anaphylaxis, error causing cardiopulmonary arrest, under dose if life-saving drug, overdose 10 times usual dose	Not stated
Dean <i>et al.</i> (69), 1999	Expert panel of at least 4, profession irrelevant	0 to 10 VAS. Mean score used as severity indicator	0 = no harm 10 = death	Generalisability coefficient
NCC MERP Index (70), 2001	Not stated	No error, Error, no harm Error, harm Error, death	Harm: Impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting there from.	Not stated
NPSA Safety in doses (58), 2007	Not stated	No harm, Low harm, Moderate harm, Severe harm, Death	No harm: no harm occurred to the person(s) (receiving NHS-funded care). Low: required extra observation or minor treatment, and caused minimal harm to the person(s) Moderate: moderate increase in treatment, and which caused significant but not permanent harm to the person(s) Severe: resulted in permanent harm to the person(s) Death: directly resulted in the death of the person(s)	Not stated

Table 1.5: Comparison of four most frequently adopted severity assessment tools, identified by Garfield *et al.*

The review concluded that only tools by Dean *et al.* and Forrey *et al.* (72) gave acceptable validity and reliability values, and that Dean's tool may be preferable for use in research due to it having been tested on a large sample and the continuous nature of the severity scale allowing superior statistical analysis.

In 2010, Abdel-Qader *et al.* (50) modified a two-dimensional scale by Overhage and Lukes (73) (originally developed in 1999 to classify pharmacist clinical activities) to assess severity of prescribing errors at discharge across UK hospitals. This combined a severity rating based on deviation from standard practice, and potential impact rating, based on impact on patient care. Very high inter-rater reliability values were observed: (range $\kappa=0.7-0.72$), possibly a result of the reviewers all being pharmacists by profession. Whilst the addition of an alternative healthcare professional into the panel may have altered these results Dean *et al* found that it was the number of judges which was important for reliability of severity rating and not their profession (69).

1.6 Strategies to improve care transfer

1.6.1 Medicines Reconciliation

The process of identifying prescribing errors and medicine discrepancies during patient transfer between care settings is heavily reliant on the process of MR, which can be defined as *“the process of identifying the most accurate list of a patient’s medicines and comparing them to the current list in use, recognising discrepancies, and documenting any changes”* (74). MR ensures that accurate and current information about the medicines a patient is prescribed is made available to the healthcare professionals caring for that patient. In 2008, the NPC published implementation guidance (17), good practice measures and a suggested minimum dataset required for effective MR, describing the process as being one of the *“basic principles of good medicines management”*.

In addition to a list of regularly prescribed oral medicines, the use of non-oral preparations including creams, eye drops, inhalers; recent antibiotic courses; recently stopped medicines; use of herbal or homeopathic medicines; and regularly used ‘over the counter’ medicines are all investigated during MR, as well as known allergies, previous adverse drug reactions and level of adherence (75). Commonly used sources of information for reconciliation include the patient, the patient’s own medicines, a multi-dosage system from the patient’s community pharmacy, care home Medicine Administration Records, or a recent repeat list of medicines from their GP surgery.

Responsibility for MR is often shared between healthcare professionals and varies according to the interface of patient transfer involved. For example, on admission to hospital, some NHS trusts in the UK have ward-based pharmacists who perform MR by taking patients' medicine histories, but across other care pathways, this is often carried out by doctors.

A UK-based systematic review of studies relating to MR reported that medicine histories are more accurate and thorough when obtained by a pharmacist rather than a doctor or nurse (74) and consequently NPSA, together with the National Institute for Care Excellence, have recommended that pharmacists are involved in the process as soon as possible after a patient is admitted to hospital (76). Whilst this is largely directed at admissions to hospital, the guidance states that MR involving a pharmacist has a role in the discharge process, and that the roles of the pharmacist should be clearly defined, but will vary according to clinical area.

1.6.2 Involvement of pharmacists at discharge

Clinical pharmacy services have become an established part of UK hospital healthcare (77), and hospital pharmacists play a key role in the discharge process by counselling patients on any new medicines, and checking the clinical accuracy of the medicines prescribed on discharge. Through effective screening of discharge summaries, pharmacists are able to intercept and correct errors before they reach patients, and as a result there is evidence that junior doctors rely heavily on pharmacists to identify their prescribing mistakes at discharge (44, 78). In the EQUIP study one doctor reported knowingly writing incorrect prescriptions for controlled drugs because he considered it '*a minor error that would be corrected by pharmacy*', and with reference to incorrect prescribing of antibiotics, another doctor said "*it's the kind of thing that you just think will be picked up by somebody else...*" (44).

Whilst it is acknowledged in the literature that pharmacists should be involved at discharge, their exact role and the extent to which they are involved varies greatly across individual care organisations and local health boards. It has been suggested that involving a primary care pharmacist in the discharge process could reduce adverse events relating to medicines following discharge, and improve the quality of GP prescribing. Examples of initiatives involving a primary care pharmacist include sending a copy of discharge communications to the patient's community or practice-based pharmacist (79), and a

practice-based pharmacist conducting the reconciliation of discharge summaries or a post-discharge medicine review (80-82).

Internationally, the extended role of the pharmacist in relation to improving accuracy and fluency in post-discharge care has been found to reduce medicine errors on discharge summaries. In the USA, Walker *et al.* in 2009 (83) investigated a pharmacist-facilitated discharge program involving one pharmacist carrying out MR, adherence screening, patient counseling, education and post discharge follow-up, and compared it to normal service over alternate months. Significantly fewer discrepancies were identified in the pharmacist-facilitated group. Similarly in Sweden, Bergkvist *et al.* (84) found participation in ward rounds, screening discharge summaries and feeding back to doctors medicine errors, and pharmaceutical care planning by a pharmacist reduced the number of medicine errors per patient.

1.6.3 Reconciliation in primary care

Upon receipt of discharge summaries in primary care, the content of discharge summaries should be processed, reviewed and incorporated into patient records, allowing any changes to the patient's regularly prescribed medicines during their admission to be continued. However, little research exists which explores the reconciliation of information provided at discharge in primary care, and so little is known about the processes used, except that there appears to be variation across different GP practices: in 2009, the CQC reported that "*GP practices are not operating to an agreed protocol for reconciliation*" (19). In the UK in 2009, GPs conducted the reconciliation of discharge summaries in 76% (212/280) of practices. However, in 17% (47/280) of practices, this role was delegated to managerial or clerical staff (19). The NPC guide for implementing MR states that professionals who carry out reconciliation must possess effective communication skills, technical knowledge of relevant medicines management processes, and therapeutic knowledge; and recommends that because of the clinical judgement required when reconciling medicines, non-clinical staff should only undertake the administrative aspects of the process (17).

In the UK, one recent study by Akham *et al.* (85) investigated implementation of discharge information into the primary care patient record. Of the 166 discharge summaries examined, 80% were processed in primary care within seven days and 93% within 14 days of discharge, taking a mean of four to nine days to be acted upon. The majority of discharge

summaries were processed by a healthcare professional, but 10% were processed solely by administrative staff.

Changes to medicine are commonly made during a hospital admission: of 37 UK hospital inpatients who received medicines reconciliation at hospital discharge (who were studied in detail as part of a larger evaluation of errors in primary care), 97% of patients experienced a difference between the medicines taken before admission and those listed in the discharge summary (86). Failure to complete accurate reconciliation in primary care could therefore lead to prescribing of discontinued medicines, omission of new medicines, duplications, and interactions between medicines; all of which could result in patient harm. The CQC highlights repeat prescribing as an area of risk for patient harm after discharge, whereby reduced contact with the GP due to the patient holding prescription copies could lead to outdated prescription being dispensed (19).

1.6.4 IT innovations

The NHS Information Authority was formed in 1999, joining four major organisations specialising in IT. It was responsible for developing and delivering IT in healthcare and developed systems such as NHSnet. This coincided with the Government's White Paper plan in 2000 that every hospital and GP surgery would have modern IT systems in place (87). The NHS Information Authority was abolished in 2004 when the Government launched Connecting for Health, as part of the Department of Health's informatics directorate.

Connecting for Health, together with the ten Strategic Health Authorities, was responsible for delivering the NHS National Programme for IT. This is an £11.4 billion project (88) consisting of a number of initiatives involving the use of IT within healthcare, and whose overall aim is to construct and develop a fully integrated electronic care records system. This is intended to connect GPs and community workers with hospitals and other secondary care organisations in the UK, allowing easy access to current and accurate patient information in a timely manner.

Within the system, each patient will have a Detailed Care Record and a Summary Care Record. The Detailed Care Record will contain full details of the patient's medical history, which will be accessible only to local healthcare providers, such as the patient's registered GP, and local primary and secondary care services. The Summary Care Record will contain

only key patient information, such as allergies, which will be available nationally across England to NHS staff involved in the patient's care. The Detailed Care Record will be used in instances where a patient is admitted routinely to their local hospital, and the Summary Care Record's role will be specifically for use in urgent or unscheduled care.

Since its formation, there have been concerns raised both in the media and by Government bodies about the cost effectiveness and the progress being made by Connecting for Health, which is reported to be significantly behind schedule with a number of its initiatives (89, 90). In May 2011 the National Audit Office reported that *"the rate at which electronic care records systems are being put in place across the NHS under the National Programme for IT is falling far below expectations, and the core aim that every patient should have an electronic care record under the Programme will not now be achieved"* (88). In March 2011, only 10% of GP practices had Summary Care Record systems ready to use, with some 5.8 million Summary Care Records created out of a possible 54 million (88).

Concerns have been raised during the development of electronic care records about who will be able to access the patient sensitive information they will contain, highlighting potential ethical issues with data protection and confidentiality. The most recent Care Record Guarantee, published by The National Information Governance Board for Health and Social Care in 2011 (91) assures service users and patients of safe data protection practices. The Care Record Guarantee details how information will be protected through the use of smartcards and passcodes to grant access based on the healthcare professional's role and level of involvement in a patient's care; audit trails and records of access, will be used to monitor who has accessed the care records; and secure transfer over the network and NHS mail systems, which were developed purposively to transfer data from electronic care records. These networks are also used for the electronic transfer of patient information during processes such as patient discharge.

1.6.4.1 Electronic discharge in the UK

"While UK hospitals have been waiting for a national electronic prescribing solution from Connecting for Health, many UK hospitals have sought to develop interim electronic solutions for managing the discharge process" reports Goundrey-Smith in his book 'Principles of Electronic Prescribing' (92). In 2001, electronic discharge summaries (EDS) were first established in Salford (93), and since then, have been developed and are now widespread across secondary care organisations throughout the UK.

Electronic discharge documents, whereby the discharge summary is written and sent electronically directly to the GP practice, have been introduced to hospitals over the last decade with the aim of improving legibility of discharge summaries and the timeliness of information transfer.

Such development in electronic discharge has, however, led to variation in the structure, format and content of the discharge summaries which are sent from secondary care organisations in the UK. As a result, in August 2010, the Clinical Data Standards Assurance programme began a project to deliver a national, standardised EDS, which will be compatible with the electronic patient record system currently under development by Connecting for Health. The project is based on the key headings suggested by the Royal College of Physicians and Academy of Medical Royal Colleges in their guidance for the structuring of medical records (18) (see Table 1.2), and will enable standardization of the discharge information sent throughout the UK. Fields within the standardised templates can be rendered mandatory for completion (94), which can help to improve the completeness and quality of information which is sent on discharge summaries.

1.6.4.2 Advantages of EDS

EDS are able to be sent instantaneously, if emailed directly to the GP via a secure email account, which enables them to arrive safely and in a timely manner. Composing the discharge summary electronically is also quicker than hand writing a summary or typing from dictation (95). In the USA, the mean time from patient discharge to completion of a discharge summary fell from 4 to 0.5 days with the introduction of an electronic discharge system, whilst the proportion of discharge summaries completed on the day of discharge increased from 38% to 77% (96).

Electronic discharge systems permit an audit trail of the discharge process, allowing discharge information to be accessed and reviewed retrospectively; often providing a record of who has accessed or annotated information provided in the discharge summary. Electronic discharge systems allow other healthcare professionals to easily access the discharge summary, from different locations in hospital, who may need to contribute or make amendments to the discharge summary, for example, pharmacists. Lastly, the hospital formulary can be embedded within the electronic discharge system to restrict product choice and so facilitate cost effective prescribing (94).

1.6.4.3 Limitations of EDS

EDS can introduce their own types of errors, which either relate to the software itself, or the way in which the software is used by individuals (94). In the UK, an observational study by Abdel-Qader *et al.* (50) investigated prescribing errors at hospital discharge using an electronic discharge system. This discharge system was a component of an electronic prescribing system, but which was not fully functioning for inpatient prescribing at the time of the study. The study identified 279 (44.3%) errors as being 'computer related' on 630 erroneous discharge medicine orders. These included selection of the wrong medicine from a drop-down list, omissions from the discharge summary due to non-selection of option to make the medicine a discharge medicine, and duplication due to a previous medicine order being active within the system. These were, however, found to be significantly less severe than 'non-computer related' errors, which included performing calculations incorrectly and errors relating to slips or lapses. Consistent with existing literature on accuracy, unintentional omission was the most frequently observed type of prescribing error (31.0%). However, this was closely followed by error in drug selection, which accounted for 129 (29.4%) errors. The availability of multiple oral formulations of the same medicine was a significant predictor for error occurrence. Additionally, 31 (4.9%) medication orders were made from the wrong patient, which is again likely to have been associated with using IT to select or search for patient by hospital number or name.

Similarly, in Australia in 2008, an evaluation of the quality of documentation in electronic and handwritten discharge summaries found EDS to omit more information than the handwritten (52). The discharge summaries for 245 patients (electronic; n = 151, and handwritten; n = 94) were examined prior to discharge, and reviewed for documentation and inclusion of the following key information: discharge date; additional diagnoses; summary of progress, including treatment; follow-up requirements; and discharge medicines, which were chosen based on their citing as being of importance in existing literature. 12.6% EDS had omitted or incorrectly documented discharge medicines, compared to 6.4% of handwritten discharge summaries. A retrospective review of discharge summaries in 2010 in which medicine related information had either been transcribed from the inpatient chart onto the discharge summary by hand onto a paper summary or typed into an EDS, found that "*the manual process of medicine transcription negates the hypothesised improvements in the quality of electronic discharge summaries*" (65). Elimination of the transcription phase, using an electronic system which automatically populates the discharge summary from the chart or inpatient prescription, was

recommended. This would also avoid medicine omissions being made; the most frequent error type detected across the handwritten and electronic summaries.

Lastly, whilst individual discharge systems may operate successfully in localised hospital settings, most are unable to function so that they communicate with other systems, such as those which record blood or test results and those used in UK GP practices. The systems used in UK GP surgeries are currently not compatible with those in operation at secondary care organisations, and so it is not possible to directly populate data from the hospital into the GP system. As a result, although the summary is received electronically, it must be manually transcribed into the GP system, which is not only time-consuming but can lead to the introduction of new errors.

1.7 Summary of existing research and research gaps

Discharge summaries have a high level of inaccuracy and GPs have reported dissatisfaction with their quality. Discharge processes currently include a number of defences, such as pharmacists conducting MR between the patient's previous regimen and their prescription at discharge, and nurses checking the bag of medicines against the discharge summary, but these remain open to human error. Consequently it is necessary to improve the current discharge process. The introduction of IT systems may be of benefit; however, existing evidence of their effectiveness and impact on accuracy have found such systems are accompanied by an additional risk of introducing certain types of errors.

National guidance for discharge summaries is available but is not evidence-based and its implementation has not been extensively tested. There is no evidence for the current national target for the transmission of discharge information to primary care within 24 hours, which may be increasing error rates due to pressure on secondary care staff to produce discharge information promptly.

Better understanding of the reconciliation processes conducted both in secondary and primary care may help to design discharge systems more effectively. Similarly, understanding the expectations and experiences of practitioners working at either side of the interface may help to inform guidance and improve systems.

1.8 Thesis aims and objectives

Four key objectives of this thesis were identified from the literature review and are investigated and addressed within the following chapters. The objectives of this thesis were to:-

- Assess the effectiveness of the electronic discharge system operated at a UK district general hospital in terms of the timeliness, accuracy and quality of EDS produced.
- Investigate the information available to junior doctors for the purpose of preparing EDS
- Understand junior doctor experiences of discharge summary preparation; to explore where information for discharge summaries is sourced, how it is interpreted and the training and experience which facilitates this process.
- Explore and understand the needs of GPs with respect to the content and properties of discharge summaries

The overall aim of this thesis was to determine approaches to improving the current medicines reconciliation system at discharge by considering the process and drivers from both a secondary care and primary care perspective.

1.9 Brief summary of thesis structure

This thesis is reported over nine chapters, including this first chapter exploring the literature on transfer of care and discharge summaries. Chapters 2 to 4 report three individual projects relating to the evaluation of a discharge system, the information used to complete discharge summaries and the experiences of junior doctors preparing discharge summaries. Chapters 5 to 8 report the last and largest of the thesis projects: a Discrete Choice Experiment to estimate the relative value of components of a discharge summary. Chapter 9 is an overall discussion of the thesis work conducted and resulting conclusions.

1.9.1 A note on thesis narrative style

Rowan Yemm (RY), the author of this thesis, primarily conducted the work reported within this PhD. The majority of the chapters are written in the passive voice, as is common in

scientific research. However, in some instances, particularly where qualitative work was carried out, the first person is used to report some of the methodological considerations and processes. The rationale for this is to permit research decisions to be adequately and accurately described.

Chapter 2: An audit of an electronic discharge system

2.0 Chapter overview

In this chapter, the results of an audit of the quality, accuracy and timeliness of information sent to primary care on EDS from Colchester Hospital University NHS Foundation Trust (CHUFT) are reported. This was the first study carried out as part of this PhD thesis, and was intended to familiarise the PhD research team with the electronic discharge system operated by CHUFT and identify the areas of current practice where further research may be necessary to improve practice.

2.1 Setting the scene

CHUFT is a UK-based district general hospital serving a community of 370,000 patients in North East Essex, which became an NHS Foundation Trust in May 2008. An electronic discharge system has been in operation at the hospital since April 2008, whereby electronic discharge summaries (EDS) are composed by medical practitioners in secondary care and sent electronically to the patient's GP practice. One paper copy remains in the medical notes and one is given to the patient. Preparation of discharge summaries is primarily the responsibility of junior doctors (see Section 1.5.5)

Although no in-house Standard Operating Procedures currently exist for the purpose of checking electronic discharge summaries, the system operates via three main pathways, which are summarised in Figure 2.1.

In the first pathway, the summary is electronically written by hospital doctors prior to a patient being discharged; a hospital pharmacist checks the summary for accuracy by comparing the medicine listed on the drug chart to those included on the discharge summary; and the nursing staff check the patient's physical medicines against the discharge summary for consistency before the patient leaves the ward. The ward clerk then authorises the electronic release of the document to the GP surgery, during which the summary is sent via email to the respective GP practice.

However in practice, via a second pathway, a pharmacist often does not check and approve the release of the EDS until after the patient has been discharged. This is because at CHUFT, pharmacists are not ward-based and so are not always present on wards when discharges occur. The pharmacy service is currently operated on a Monday to Friday, 9am to 5pm basis, with on-call pharmacy workers in the dispensary at weekends. Where the release of discharge summaries is held pending an accuracy check by a pharmacist, there is delay in the GP receiving the discharge summary. Often when the decision to discharge a patient is made, they are unable to wait on the ward, and so an unchecked copy of the discharge summary is used by nurses to check the medicines, and an unchecked copy is given to the patient. The discharge summary is then checked retrospectively, after the patient has left the ward, with the pharmacist sending an addendum to the GP if any

inaccuracies are identified. Alternatively, in a third pathway, the summary is not checked at all by a pharmacist.

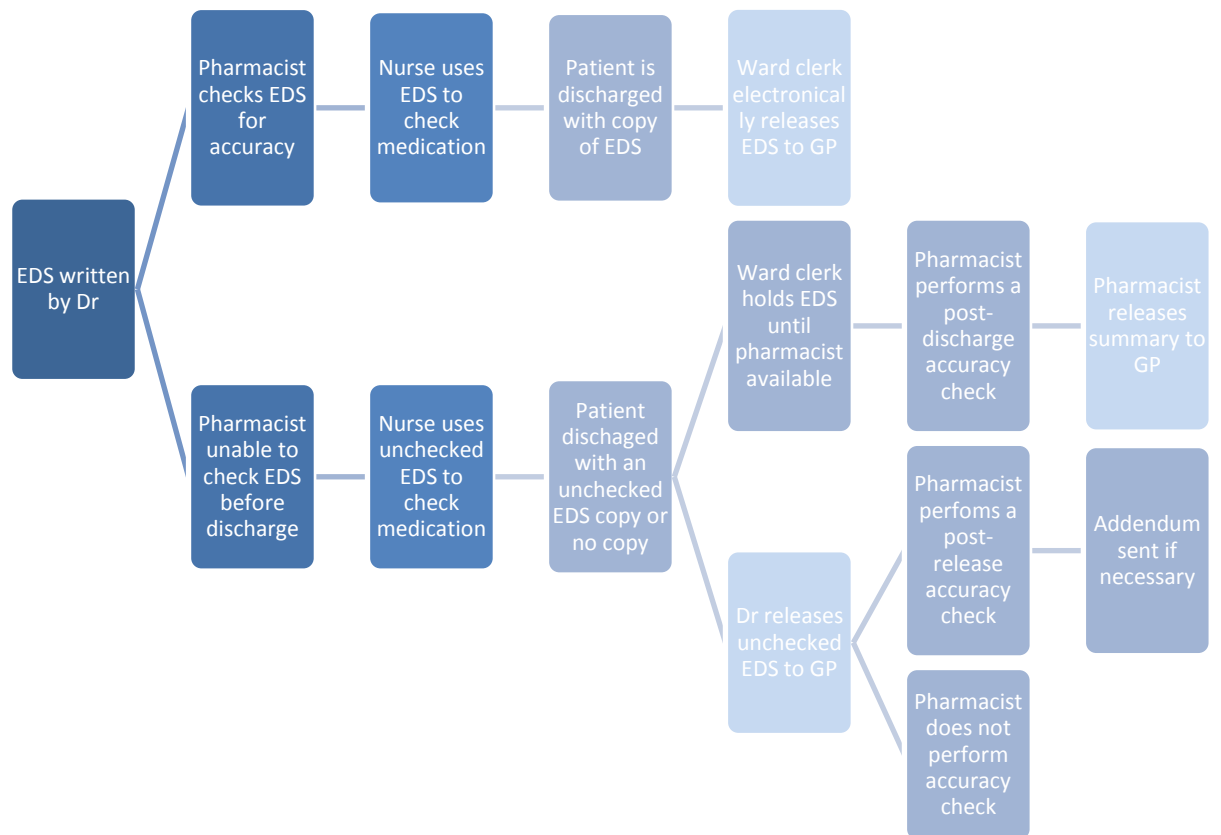


Figure 2.1: Flow chart to show the three possible pathways of EDS checking and release at CHUFT

NHS-funded hospitals are contractually obliged to share discharge summaries with GPs within 24 hours of discharge. This should include a summary of diagnoses and medicines prescribed on discharge (97). At CHUFT, this is locally contracted by NHS North East Essex to be within 24 hours of discharge. In recent years there has been increased pressure for the trust to meet this 24 hour target, with financial penalties introduced to incentivise. In order to achieve these targets, the final check of the discharge summary by a pharmacist prior to release to the GP is being increasingly bypassed.

A pharmacist check enables the accuracy and quality of content of EDS to be verified, but may reduce the timeliness of its electronic release to primary care, because pharmacists are not always available on wards to check the summary as the discharge occurs.

2.1.1 Defining 'errors' at discharge

Preparation of discharge summaries predominantly consists of transcribing medicines listed on the inpatient medicine chart into the discharge summary. In essence, copying of another doctor's prescribing decisions made during the admission. Consequently, the discrepancies that were detected in this study were largely transcription errors.

2.2 Aims and Objectives

The overall aim of this study was to provide a baseline view of the current status of the electronic discharge system operated at CHUFT, with particular emphasis on the investigation of timeliness and accuracy of the discharge information sent to primary care, and the roles of healthcare professionals in the process.

The primary objectives of this study therefore were to:-

- Investigate the quality, timeliness and accuracy of discharge summaries sent from CHUFT to primary care.
- Identify any discrepancies made on discharge summaries, and to assess the nature, severity and predictors for discrepancies observed.

Secondary objectives were to:-

- Investigate the pharmacists' current role in the discharge process; to determine the proportion of EDS that are checked by a pharmacist and at what stage within the discharge process.
- Compare the quality, timeliness and accuracy of summaries which had been checked by a pharmacist with those which had not.
- Compare the nature and severity of discrepancies found on summaries which had been checked by a pharmacist with those which had not.

2.3 Method

In order to gain an understanding of the content, accuracy and timeliness of discharge summaries sent from CHUFT, it was necessary to employ a method whereby the summaries could be examined and compared to the inpatient chart and notes. It was decided that this should be carried out prospectively, where possible, at the point of patient discharge, in order that corrections made by pharmacists to errors on discharge summaries could be captured.

2.3.1 Study structure

Data were collected over a two-week period in March 2011. RY was responsible for the collection and analysis of all data.

2.3.2 Ethical Approval

As this study was an audit, NHS Research Ethics Committee approval was not required. The audit was registered with CHUFT's clinical audit department in April 2011 (Appendix 2.1).

2.3.3 Ward identification

Data were collected for patients discharged from six wards, comprising two general medicine, two elderly care and two surgical wards (elective and non-elective). These were chosen to provide a representative view of the hospital's discharge workload. Current hospital policy is that all wards receive pharmacy input into discharge summaries with the exception of surgical wards, where at the time of this audit, discharge summaries were not routinely checked by a pharmacist at any stage. It was decided to exclude paediatric, high dependency and maternity wards due to their specialist nature and their use of a different format of inpatient medicine chart.

2.3.4 Sample size

An audit tool was piloted over four working days during which the number of patients that were expected to be recruited was estimated. Existing studies have reported an error rate on discharge summaries of between 10.8-42.0% (60, 61, 63, 65, 84, 98, 99). Therefore, based on an expected error rate of 25%, recruitment of 50 patients from each of the six wards would provide an estimated accuracy of +/-12% for each ward, and +/-5% in total for the total 300 patients. A sample size of 300, with 100 patients from each type of ward,

would allow a 13-15% difference in error rate to be detected with 80% power assuming significance at the 0.05 level.

2.3.5 Defining accuracy

As discharging is not the same as prescribing, it was necessary to use a definition which encompassed both omissions of medicines on discharge summaries, and transcription errors made during the process of composing the discharge summary using the notes and inpatient medicine chart for information. The following definition of a discharge discrepancy was therefore used:-

“Any difference between those medicines on the patient’s inpatient drug chart and those on the discharge summary, where no reason for the difference could be identified by the pharmacist from the patient’s notes and available clinical information”

This adapted definition also accounts for treatment which is newly initiated for the purpose of discharge, which otherwise may be incorrectly labelled as an error as it may not be present on both the drug chart and discharge summary.

2.3.6 Classification of discrepancies

Discrepancies were further categorised into five different types: omission, dosing, form, allergy and other, which are described in detail in Table 2.1.

These were adapted from those used by Dean *et al.* in order to make them more specific to discharge. ‘Omissions’ and ‘dosing’ were included as categories to encompass some of the examples of prescribing error scenarios described by Dean *et al.* (59). Existing studies have reported omissions as accounting for a large proportion of errors seen at discharge (62). ‘Form’ was included because the process used to select medicines using the electronic discharge system at CHUFT from a drop-down list may result in the wrong formulation of a medicine being selected and prescribed (50). Similarly, ‘allergy’ errors were included as a category as the allergy status of a patient is not automatically populated on EDS at CHUFT so needs to be manually entered by the discharging doctor.

Error type	Examples from Dean <i>et al.</i> (59)	Adapted definition	Inclusion/exclusion criteria
Omission	<ul style="list-style-type: none"> - Unintentionally not prescribing a drug for a clinical condition for which a medicine is indicated - Unintentionally not prescribing a drug that the patient was taking before admission 	Omission of any medicines listed on the inpatient drug chart and/or patient's medicine history which are intended to continue after discharge from the discharge summary	Includes:- - omitted medicines Does not include:- - omitted strengths, dose, allergy status
Dosing	<ul style="list-style-type: none"> - Prescribing a drug or dose that is not intended - Writing mg when mcg was intended - Prescribing "one tablet" of a drug that is available in more than one strength of tablet 	Discrepancy between the medicine strength, dosing frequency or other dose-related instructions listed on the inpatient drug chart and the discharge summary	Includes:- - omitted strengths, doses, instructions - incorrect dosing instructions
Allergy	<ul style="list-style-type: none"> - Prescription of a drug to which the patient has a documented clinically significant allergy 	Discrepancy between the allergy status listed on inpatient chart and the discharge summary, or the absence of an allergy status from the discharge summary	Includes:- - absent allergy status - incorrect allergy status - inappropriate allergy status (e.g. side effect)
Form	<ul style="list-style-type: none"> - Prescribing a drug to be given by intravenous infusion in a diluent that is incompatible with the drug prescribed - Omission of the route of administration for a drug that can be given by more than one route 	Discrepancy between the medicine formulation listed on the inpatient chart and the discharge summary	Includes:- - incorrect formulation - incorrect route of administration - incorrect brand
Other		All other discrepancies between the inpatient chart and the discharge summary which do not fall into any of the above four categories	

Table 2.1: Classification of discrepancy type adopted

2.3.7 Discrepancy identification

Data collection to assess accuracy was divided into two parts: prospective data collection, where EDS were reviewed before the patient's discharge alongside the final pharmacy check; and retrospective data collection, where EDS were reviewed after the patient's discharge, where a pharmacy check was not carried out.

2.3.8 Inclusion criteria

EDS for patients satisfying the inclusion criteria were included in the study. This comprised all patients discharged from study wards into a primary care setting with prescribed medicines.

2.3.9 Prospective data collection

RY accompanied the ward pharmacists on their daily visits to the six included wards to identify summaries and observe the process of checking patient EDS for accuracy.

After having identified the discharge summaries on the ward which could be included in the study, RY observed the pharmacist carrying out their final accuracy check of discharge summaries against the patient's medical chart and clinical notes. The pharmacist was asked to vocalise any discrepancies between the two that they identified, which were then recorded. RY also recorded whether the pharmacy check of the summary had been carried out prior to or following patient discharge.

2.3.9.1 Intervention

Using RY's clinical knowledge as a pharmacist, if whilst observing the ward pharmacist RY was able to identify a potential discrepancy that the ward pharmacist had not, it was decided that RY would be ethically obliged to intervene and state what was believed to be a discrepancy, and discuss this with the ward pharmacist for concurrence. The discrepancy was then recorded in the same manner as above.

2.3.10 Retrospective data collection

In order to enable this study to include those discharges in which a pharmacist did not provide a final accuracy check, an EDS spreadsheet produced by CHUFT was used. This spreadsheet was collated weekly by the IT department at CHUFT and consisted of data on patient discharge summary status including when it was written, released and whether it was pharmacy checked. This spreadsheet allowed identification of patients who had been discharged from the study wards during the data collection period, but who had not been recruited via the prospective data collection route.

The medical notes for patients who satisfied the same inclusion criteria for the prospective data collection approach were requested from medical records. The EDS was then compared with the patient's medical chart and notes, in order to identify discrepancies between the two retrospectively. Any discrepancies were recorded in the same manner as before.

Prior to undertaking this stage, RY was validated to undertake error detection by a senior clinical pharmacist within the department. Using a sample of 10 medical notes for patients recruited into the pilot study, RY compared medicine listed on the drug chart to the most recent EDS (accessed on Bedweb, the electronic system operated at CHUFT) and recorded any discrepancies between the two. A senior clinical pharmacist then repeated the process and compared RY's findings with theirs for consistency.

2.3.11 Summary of data collection phases

A summary of the methods adopted to identify errors on EDS that are captured by pharmacists and which are undetected, and so reach primary care, is displayed in Figure 2.2.

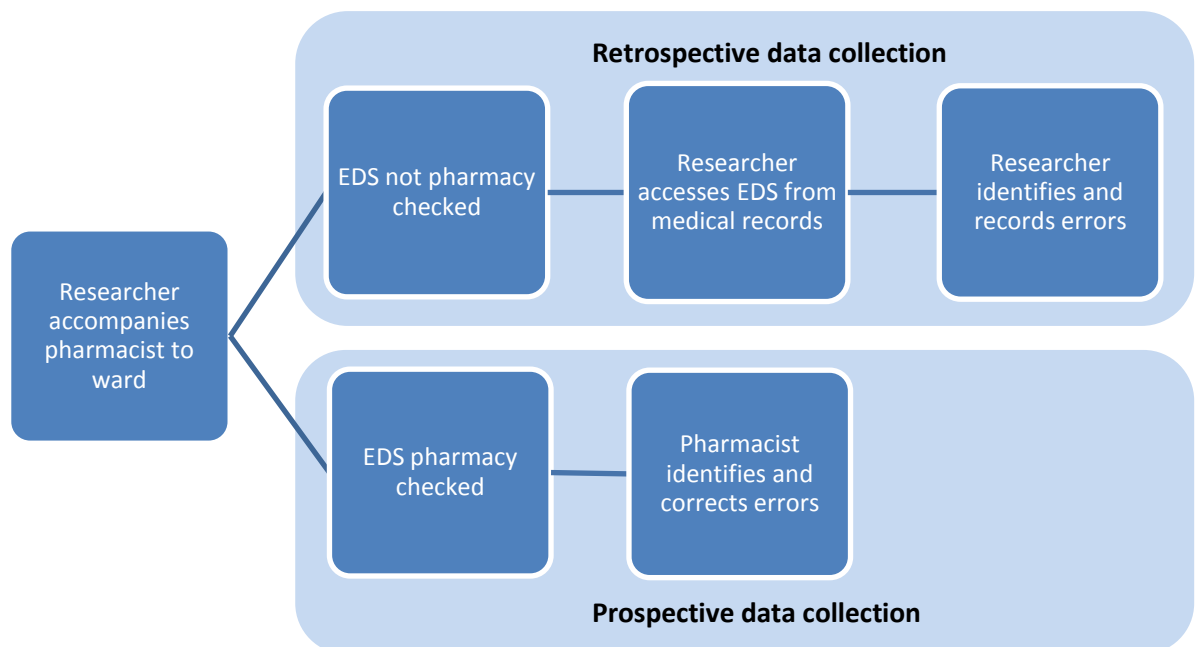


Figure 2.2: Diagrammatic representation of data collection process

2.3.12 Clinical significance

This study adopted the validated and reliable method of scoring medicine error severity developed by Dean et al. [18] which involves four judges individually assessing error severity using a Visual Analogue Scale (VAS). Two senior clinical pharmacists and two physicians from CHUFT were approached via email and invited to act as judges (Appendix 2.2).

A sample of 30 discrepancies which had been identified were selected randomly using a random number generator. Judges were individually sent a list of the 30 discrepancies (Appendix 2.3), with a brief description for each one, and were asked to rate them in terms of their clinical significance using an 11 point VAS of 0 to 10 (where 0 = no effect, and 10 = death). Discrepancies with a score of less than 3 were considered minor, those with a score from 3 to 7 were moderate, and those with a score greater than 7 were severe (86). Responses were anonymously returned via a designated postal box at the hospital. Responses were pooled to produce a mean severity score for each medicine discrepancy reviewed.

2.3.13 Quality and timeliness assessment

The EDS for each patient included in the study was accessed by the researcher via the in-house electronic discharge system and reviewed. Information was collected on patients' demographics, to include age and gender, length of hospital stay, number of medicines prescribed on discharge, and seniority of doctor who authored the summary. The date the summary was written, the date of patient discharge and date and time of release of the document to the GP practice were also recorded.

The EDS were reviewed for quality, using the NPC's recommended minimum dataset for medicines reconciliation as a 'gold standard' (17). The standards comprise:-

- Complete patient details;
- Diagnosis and co-morbidities;
- Procedures carried out during admission;
- A complete list of medicines prescribed on discharge;
- The dose, frequency, form and route of all medicines;
- Details of medicines stopped and started during admission, and
- Known allergies and hypersensitivities.

It was decided to exclude three of the NPC standards: duration, details of increasing/decreasing regimens and additional patient information from the study following a pilot of the method, as this information was not routinely recorded on the EDS, or was required only in certain clinical circumstances. The merits and constraints of doing so are discussed in section 2.52 of this chapter.

2.3.14 Data analysis

Data was collated using Microsoft Excel and analysed using SPSS for Windows version 18. Independent reviewers were assessed for inter-rater reliability using Kappa (κ) analysis. A Kappa value of less than 0.4 was considered poor; 0.4 to 0.59 moderate; 0.6 to 0.79 substantial; and more than 0.8 to be outstanding (72). Logistic regression analysis was performed to determine the association of any observed patient factors with errors on the discharge summary. Presence of errors was treated as a dichotomous variable: error(s) present or error(s) absent. Logistic regression analysis was used to generate Odds ratios and therefore predictors of discharge medication errors. Further detail of the design and logistic regression report can be found in Appendix 2.3. Mann Whitney U-Test was used to compare the pharmacy checking status of EDS to patient length of stay. Fisher's exact test was used to compare EDS sent on weekends and weekdays, and differences between types of discrepancy observed on EDS which had been checked or not checked by a pharmacist.

2.4 Results

2.4.1 Sample characteristics

During the data collection period, 386 patient discharges took place across the six wards. Of these, 349 (90.4%) patients had an EDS written and sent to their GP. EDS for 49 patients were excluded on grounds of the patient dying ($n=18$) whilst in hospital, or being transferred to another hospital setting ($n=31$), leaving 300 eligible EDS. EDS for 148 patients in total were recruited into the audit across the three wards. Data collection is summarised in Figure 2.3.

No instances were identified in which RY was obliged to intervene during the pharmacist checking process.

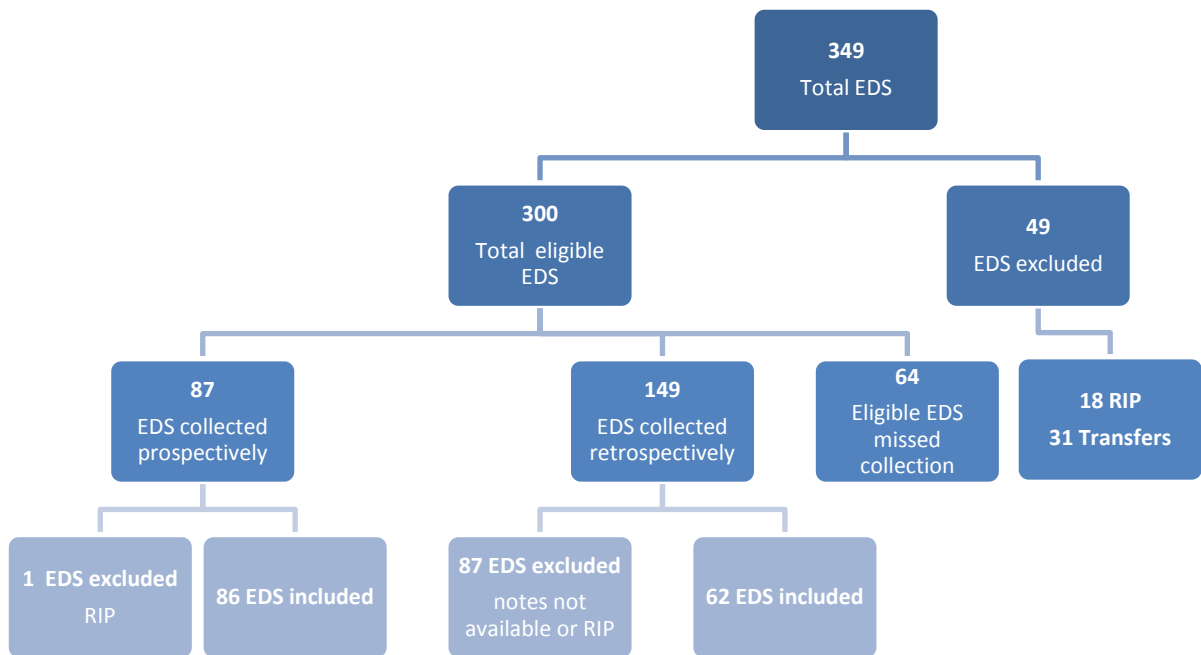


Figure 2.3: Data collection flow chart

2.4.1.1 Sample demographics

Table 2.2 displays the demographics of the patients whose EDS were recruited into the study, according to ward of discharge.

Measure	Medical	Elderly Care	Surgical	Total
Number of patients	67	29	52	148
Number (%) female patients	32 (47.8)	22 (75.9)	29 (55.8)	73 (49)
Mean (SD) age	61.6 (15.9)	87.5 (4.9)	59.3 (19.1)	
Mean (SD) length of stay	8.5 (7.0)	11.7 (11.4)	3.6 (2.7)	
Mean (SD) number of meds	8.4 (4.8)	8.5 (3.8)	4.7 (2.4)	
Number (%) weekday discharges	61 (91.0)	28 (96.6)	46 (88.5)	135 (91)
Number (%) charts collected prospectively	60 (69.8)	26 (30.2)	0 (0)	86 (58)
Number (%) charts collected retrospectively	7 (11.3)	3 (4.8)	52 (83.9)	62 (42)
Number (%) EDS checked by pharmacy in advance	27 (64.3)	15 (35.7)	0 (0)	42 (28)
Number (%) EDS checked by pharmacy retrospectively	33 (75.0)	11 (25.0)	0 (0)	44 (30)
Number (%) EDS not checked by pharmacy	7 (11.3)	3 (4.8)	52 (83.9)	62 (42)

Table 2.2: Sample demographics by ward of discharge

2.4.1.2 Summary of quality

In total, 13 (8.8%) EDS fully adhered to the seven NPC minimum dataset standards, of which 4 (13.8%) were from elderly care, 7 (10.4%) from general medicine and 2 (3.8%) from surgical wards. Patient details and diagnoses were fully documented in all summaries. The most frequently omitted information was medicines started or stopped during admission, which was absent in 115 (77.7%) EDS in total. The patient's allergy status was absent in 24 (16.2%) EDS. EDS for 49 (33.1%) patients recorded 'no changes' in the medicines box instead of a list of medicines.

Information on grade of the doctor who completed the EDS was available for 82 (55.4%) EDS. Of these, 68 (82.9%) were written by junior doctors.

2.4.1.3 Summary of timeliness

Information regarding time of release into primary care was available for 140 EDS. Of these, 76 (54.3%) were released on the same day as patient discharge, and 44 (31.4%) the next day; therefore 120 (85.7%) were released within the 24 hour target. EDS for 20 (14.3%) patients were released more than two days following discharge, the greatest of which was 22 days.

The sample included 13 weekend discharges for which five (38.5%) EDS were sent within the 24 hour target (the same or next day following discharge). Weekday discharges were significantly more likely to achieve target (Fisher's exact test, $p < 0.001$) with 115 of the 135 (85.2%) EDS being sent within 24 hours.

2.4.1.4 Summary of accuracy

In total, 151 discrepancies were observed across 88 of the 148 EDS examined, with 60 (40.5%) EDS not containing any discrepancies. A total of 950 medicines were prescribed across the EDS reviewed, equating to an error occurring on every 6th medicine prescribed on EDS. The median (IQ) number of discrepancies per EDS was 1 (0, 2). Of the 135 EDS sent on weekdays, 81 (60.0%) contained errors, compared to seven of the 13 (53.8%) sent at the weekend (Fisher's exact test, $p = 0.44$).

2.4.1.5 Summary of discrepancy type

Of the 136 discrepancies which involved a single medicine, 30 (22.1%) were involving drugs listed in the BNF chapter relating to central nervous system, and 23 (16.9%) from the BNF

chapter relating to infections. Figure 2.4 displays the types of discrepancy observed across all EDS.

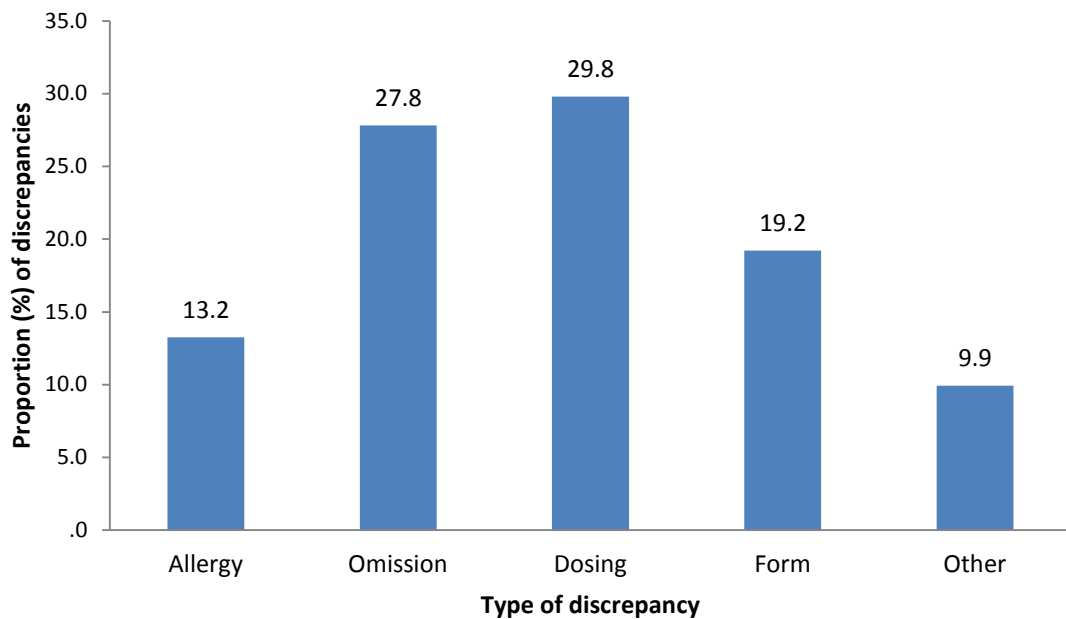


Figure 2.4: Frequency of discrepancy types observed across all EDS

Discrepancies relating to allergies were most common on surgical wards, accounting for 13 of the 37 discrepancies observed (35%), but were less frequently seen on medical or elderly care summaries, accounting for 7.9% and 2.6% of discrepancies respectively.

2.4.1.6 Summary of clinical significance

A random sample of 30 discrepancies, including EDS summaries which either had or had not been pharmacy checked were presented separately to four expert individuals. The overall median (IQ) severity score given on the VAS was 2.5 (1, 6). Minor discrepancies accounted for 11 (37%) discrepancies (scored between 0 and 3), 18 (60%) moderate (3 to 7) and 1 (3%) severe (over 7).

One judge scored notably higher than the others, giving the discrepancies a median score of 7.5. Kappa analysis showed inter-rater reliability scores of less than 0.24. Table 2.3 shows three examples of discrepancies presented to the judges for scoring, and the corresponding scores given. The three examples demonstrate instances where the judges scored consistently, where one judge scored more severely than the others, and where there was a range of scores across all four.

Discrepancy example	Judge 1 score	Judge 2 score	Judge 3 score	Judge 4 score
Regularly taken paracetamol omitted from EDS	0	0	1	1
Known allergy to penicillin (causing rash and swelling) omitted from EDS. 'NKDA' recorded on EDS. No penicillins were prescribed	1	0	3	9
Prednisolone 30mg daily prescribed on EDS in error. This should have been a tapering dose down to a maintenance dose of 5mg daily.	1	3	7	9

Table 2.3: Examples of discrepancies reviewed by expert judges

2.4.2 Pharmacy involvement

In total, 86 (58.1%) EDS were checked by pharmacy (including those checked both before and after discharge). Whilst none of the summaries from surgical wards were pharmacy checked, 89.5% of summaries originating from both elderly care and medical wards were. The proportion of summaries checked by pharmacy is displayed in Table 2.2.

The median (IQ) length of stay for patients whose discharge summaries were checked by a pharmacist before discharge was 9 days (5, 15.25), compared to 6.5 days (3, 11) for those that were checked after discharge (Mann Whitney U test, $p=0.008$). The median (IQ) time between when the summary was written to when it was pharmacy checked was 14.4 (1.6, 22.0) hours.

2.4.2.1 Comparison of quality

Overall percentage adherence of EDS to NPC standards in relation to pharmacy checking status of the discharge summary is displayed in Figure 2.5. EDS which were checked by a pharmacist had statistically significantly better adherence to NPC standards for allergy status, complete list of medicines, dose, form and route of medicines and medicines started and stopped than those which had not been checked.

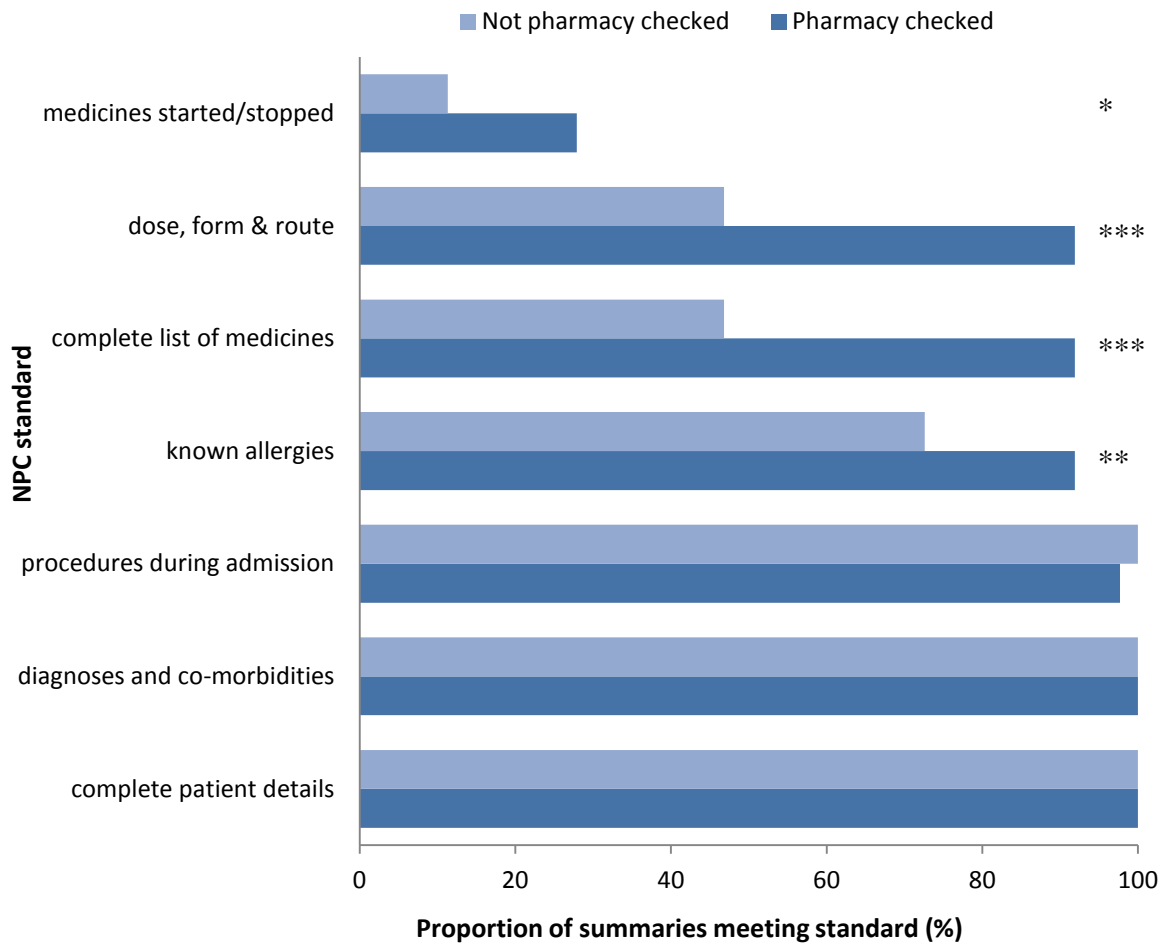


Figure 2.5: Comparison of adherence to NPC standards between EDS and pharmacy checking status. Fisher's Exact test, * $p=0.015$, ** $p=0.003$ * $p<0.001$**

2.4.2.2 Comparison of timeliness

Figure 2.6 displays the timeliness with which summaries were released in relation to pharmacy checking status. Summaries which were not pharmacy checked were sent significantly quicker than those which were, with 73% unchecked EDS being sent on the same day as discharge compared to 42% of checked summaries (chi squared, $p=0.01$).

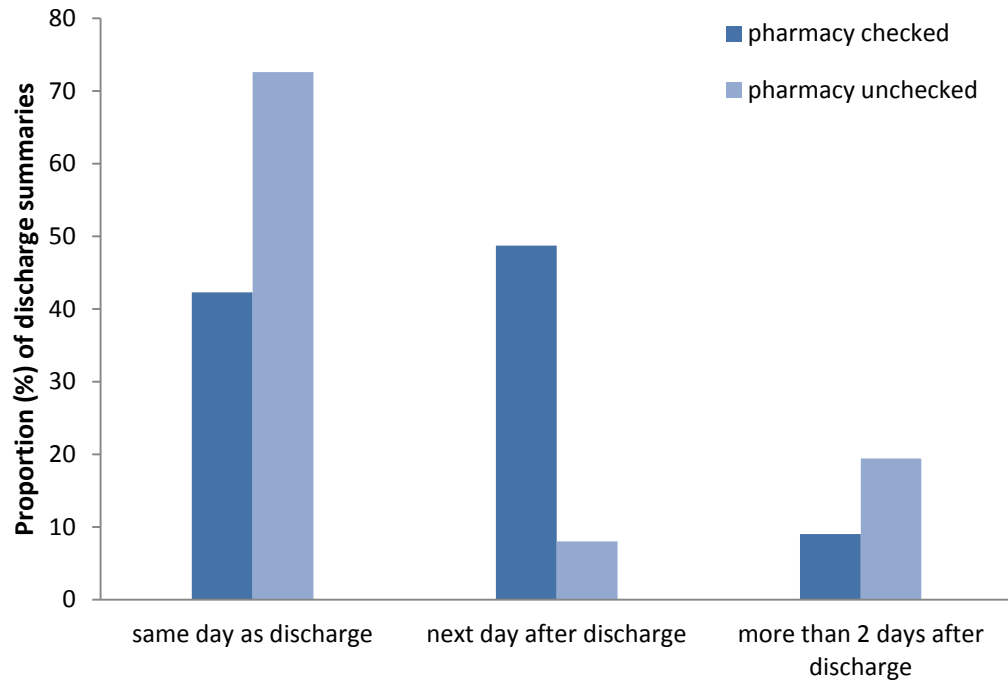


Figure 2.6: Timeliness of EDS release to primary care for pharmacy checked and unchecked discharge summaries

2.4.2.3 Comparison of accuracy

In the prospective data collection phase, 109 (72%) EDS discrepancies were identified and corrected by pharmacy before being sent to primary care. The remaining 42 (28%) discrepancies were on EDS that did not receive a pharmacy check, and so were released into primary care. The proportions of discrepancies observed are displayed in Table 2.4.

Pharmacy checking status	No. of discrepancies	No. (%) erroneous EDS	Median (IQ) no. discrepancies per summary	No. discrepancies Intercepted by pharmacy		No. (%) discrepancies reaching primary care
				Before Discharge	After discharge	
Identified in pharmacy check	109	59 (67%)	1 (0, 2)	53	56	0 (0%)
Unidentified (no pharmacy check)	42	29 (33%)	0 (0, 1)	0	0	42 (100%)
All EDS	151	88 (59%)	1 (0, 2)	53	56	42 (28%)

Table 2.4: Accuracy of EDS with respect to pharmacy checking status

2.4.2.4 Comparison of discrepancy type

Table 2.5 lists a comparison between examples of discrepancy types observed on summaries which either had or had not been pharmacy checked. Discrepancies involving patient allergies were more commonly observed on discharge summaries which had not been checked by a pharmacist (Fisher's Exact test, $p < 0.001$).

Error type	Detected in pharmacy check		Undetected (no pharmacy check)	
	N (%)	Examples	N (%)	Examples
Allergy	5 (4%)	'Antibiotics' recorded in allergy box - no allergy recorded anywhere else in notes	15 (36%)	Allergy to latex and Sinemet not documented on summary
		No allergies documented on chart – 'NIACRANDAL' (nicorandil) written on summary		'Asthmatic' written in allergy box
				Allergy status absent - patient has documented allergy to flu vaccine
Omission	29 (26%)	Trimethoprim 100mg daily at night for UTI prophylaxis absent	13 (31%)	Regular citalopram 10mg daily for depression absent.
		Fresubin feed twice daily absent		Regular simvastatin 40mg daily for cholesterol reduction absent
				Course of co-amoxiclav absent
Dosing	36 (33%)	Buprenorphine patch dose recoded as 1mcg instead of 10mcg	9 (21%)	Insulin novomix 30 evening dose of 28 units absent, morning dose of 26 units present only.
		Sodium Valproate dosing times had been incorrectly adjusted		Clonidine dose written as 50mg instead of 50mcg
				ISMN m/r 25mg tabs prescribed on chart, ISMN normal release 20mg tabs on summary
Form	26 (24%)	Wrong forms of all meds listed; needed to be administered via PEG	3 (7%)	Seretide - no indication of evo or accuhaler on drug chart. Accuhaler on summary
		Adcal D3 effervescent instead of caplets		Novomix cartridge written instead of a flexpen
Other	14 (13%)	Summary completed for wrong patient	2 (5%)	Dihydrocodeine prescribed on summary but had been on codeine phosphate as an inpatient
		Interaction between simvastatin and clarithromycin – statin should be withheld during antibiotic course		Summary says no changes to meds, but notes and chart indicate alfusoin xl 10mg daily added as a new medicine

Table 2.5 Discrepancies by type against pharmacy checking status

2.4.2.5 Comparison of clinical significance

Table 2.6 displays the clinical severity scores allocated to discrepancies which occurred on summaries which had and had not been checked by a pharmacist. Discrepancies observed on summaries which had not been checked by a pharmacist had a higher median severity than those which were identified during pharmacy checks, though this was not significant (Mann Whitney U test, $p=0.414$)

Measure	Detected in pharmacy check	Undetected errors
N	21	9
Minimum score	0.50	0.75
Maximum score	7.50	5.75
Median	3.50	4.25
IQ	(1.50, 4.75)	(2.75, 5.00)
N (%) minor	9 (43%)	2 (22%)
N (%) moderate	11 (52%)	7 (78%)
N (%) severe	1 (5%)	0 (0%)

Table 2.6: Clinical significance of discrepancies by pharmacy checking status

2.4.3 Discrepancy analysis

Weak positive correlations (Pearson's correlation, p value) were observed between the number of discrepancies observed on EDS and the number of medicines (0.440; $p<0.001$), length of stay (0.379; $p<0.001$) and age of the patient (0.241; $p=0.003$). These relationships are displayed graphically in Figures 2.7 to 2.9 in Appendix 2.3.

2.4.3.1 Discrepancy predictors

Full results of the logistic regression analysis are provided in Appendix 2.4. The number of medicines was found to be independently a significant predictor (Odds Ratio [OR] 1.129; 95% CI 1.014 to 1.257; $p=0.026$) for the occurrence of a medicine discrepancy. Patients who were prescribed six medicines or more were two and a half times more likely to experience a medicine discrepancy at discharge than those who were prescribed less than six (OR 2.49; 95% CI 1.203 to 5.174; $p=0.014$).

Patients staying in hospital for three days or longer were three times more likely to experience a medicine discrepancy on their discharge summary than those who stayed for

less than 3 days (OR 3.67; 95% CI 1.725 to 7.810; $p=0.001$), and those staying for seven days or longer were four times more likely to experience a medicine discrepancy (OR 4.45; 95% CI 2.111 to 9.378; $p<0.001$).

For every additional day's increase in length of stay in hospital, a patient is 1.1 times more likely to encounter a discrepancy at discharge (OR 1.131; 95% CI 1.051 to 1.217; $p=0.001$). For every 1 additional medicine that a patient is prescribed, they are 1.2 times more likely to encounter a discrepancy at discharge (OR 1.161; 1.048 to 1.286; $p=0.004$)

2.5 Discussion

2.5.1 Main findings

The demographics of the sample were largely as expected for the ward type, with elderly care patients having a longer admission and being older, and surgical patients being prescribed fewer medicines. More discharges were made from medical wards during the data collection period, where there is a higher turnover of patients. EDS for 86% of patients were sent within 24 hours of discharge from hospital.

Only 9% of the discharge summaries observed fully adhered to NPC standards for minimum dataset. The most poorly documented standard was details of medicines started and stopped during admission. Adherence to NPC standards was significantly higher on discharge summaries which had been checked by a pharmacist.

Discrepancies were observed on 60% of the EDS examined. Discrepancies involving omissions and dosing were the most commonly observed type of discrepancy across all EDS. Less than half of the EDS examined were checked by a pharmacist before discharge. Discrepancies involving allergies were the most common discrepancy type on EDS which were not checked by pharmacy. The majority (72%) of discrepancies existed on EDS which were checked by pharmacy, however 28% discrepancies occurred on EDS that did not receive a pharmacy check, and so were released undetected into primary care. The median severity score was higher for discrepancies which occurred on unchecked discharge summaries than summaries which received a pharmacy check.

2.5.2 Strengths and limitations

This audit, though relatively small, has provided interesting insight into the properties of summaries produced using an established electronic discharge system at a UK-based NHS district general hospital.

Retrieving medical notes from medical records to view in the retrospective phase proved lengthy and difficult, with many sets of notes being unavailable, and unforeseeable staff absences considerably slowing down the process. Data collection was conducted by a single researcher, limited to working hours, Monday to Friday, resulting in some eligible discharges during the study period not being captured. This led to a smaller sample size than anticipated. Data collection may have been more efficient with more researchers to assist collection.

Data was collected over a specified time period, and as a result the distribution of patients across the wards was uneven, with many more surgical patients recruited than from elderly care or general medicine. This is, however, still representative of a hospital's usual discharge workload over a two week period, as some wards have a higher patient turnover. For example, elderly care patients had a mean hospital stay of 11.7 days, compared to 8.5 and 3.6 days in general medicine and surgery respectively. In order to have recruited even numbers from each of the wards it would have been necessary to carry out data collection not over a specified time period, but rather continually until the required numbers were reached, or to stratify sampling according to turnover rate of wards to yield a more even representation.

Three of the NPC minimum dataset standards – duration, details of increasing/decreasing regimens and additional patient information - were excluded from audit standards, as these were deemed applicable only to certain patients, which may have led to overestimation of the quality of summaries reviewed.

For the sake of this audit, summaries released the same day or next day after patient discharge were classed as being within '24 hours', as exact times of patient discharge were not available. This may have meant that some summaries were counted incorrectly as being sent inside the 24 hour window.

A discrepancy in this study was defined as where a difference, inexplicable from the patient's clinical notes and drug chart, exists between the medical chart and the discharge summary, and this may have made the detection overly sensitive to errors. The opinion of an expert panel could have been utilised to confirm the validity of identified discrepancies (63, 66). The classification system of discrepancies used to describe those observed was adapted from Dean's paper defining a prescribing error (59). However, differentiating further to distinguish between those errors in terms of human performance of the doctor writing the summary (knowledge-based, skill-based or rule-based errors) or types of active failures (slips, lapses and mistakes), may have been beneficial. Also, differentiation between a decision-making error (where an incorrect dosage is selected), a transcription error (where the item is copied incorrectly from the medical chart), or 'mispick' (whereby completely the wrong product was selected from the drop-down list on the electronic system) may have added depth to the analysis.

This definition may also have led to intentional additions to medicine regimens being counted as unintentional errors. Such additions to treatment regimens were usually easily identifiable to the ward pharmacist and the researcher (also a pharmacist) who were able to use their clinical judgement to assess whether or not the discrepancy between the chart and EDS was intentional, for example, the inclusion of short-term laxatives or painkillers, prescribed for post-discharge care, or the information provided by the discharging doctor in the free text of the summary. This may however have introduced ambiguity, as the identification of these additions as intentional rather than actual errors may be subjective according to the pharmacist's experience and competency, and reliance on the documentation of instructions in the patient's notes and availability of clinical information.

It was more difficult to differentiate between discrepancies which were intentional or unintentional in the retrospective phase of the study, where the researcher alone reviewed the clinical notes and charts for discrepancies, unlike in the prospective phase where they were discussed with the ward pharmacist, who would then clarify any discrepancies with a member of the medical team if necessary. This may have led to a higher proportion of discrepancies being recorded in the retrospective phase.

The 'Hawthorne effect' (100) of being accompanied by a researcher may have led to pharmacists either being extra vigilant in their accuracy checking, or missing points due to the distraction of having a researcher present. In order to avoid this happening, an

alternative method could have been to ask the ward pharmacists to record any discrepancies they identified themselves. However this relies on accuracy of recording on their part, and self-recording of errors is prone to selection bias (101).

2.5.3 Main discussion

2.5.3.1 Quality

The most poorly documented standard was details of medicines started and stopped during admission. One reason for this might be a lack of available information about medicine changes, although details of medicines reconciliation found on the inpatient medical chart would be an obvious source for this. This information is likely to be less available for those patients who have had a longer stay in hospital, where multiple medical charts exist, and where medicines have changed on numerous occasions during an admission. Another reason might be lack of knowledge of the individual patient by the doctor completing the summary, causing them to omit certain patient-specific information of which they are unsure, or which is unavailable to them.

One strategy to reduce omissions from a system-based approach could include ward-based electronic prescribing, which would enable details of patient medicine to be populated automatically into the discharge summary as prescribed on the ward, thereby reducing the opportunity for omissions or incomplete details provided in the discharge summary. Another strategy could be to improve discharging doctors' access to information about medicine through the provision of prompts or additional information on drug charts. From a human-based approach, further guidance and training of junior doctors may assist with emphasising the importance of completeness and quality in the summaries they compose. Further work to investigate documentation of medicine changes on discharge summaries and the potential effectiveness of these strategies was therefore warranted and was investigated further during this PhD thesis.

The hospital's current policy is that 'no changes' may be included in the discharge summary as an alternative to writing a full list of medicines, only where a patient has been admitted for less than 48 hours. Many summaries, particularly those from surgical wards, documented 'no changes' in the medicine field, or documented only the new medicines added since admission (simple analgesia and antibiotics most frequently) rather than a full

list. Although this minimises the likelihood of a transcription error or an omission occurring, in a number of instances where 'no changes' was written, it was observed that new medicines had been added to the medicines list. The number of summaries without an allergy status documented is of particular concern, and the pharmacy department at CHUFT have since adapted the electronic template on their discharge summary structure in order to make the allergy status field mandatory.

2.5.3.1.1 Pharmacy and quality

Adherence to four of the seven NPC standards (allergy, medicine changes, dose, form and route and complete list of medicines) was significantly higher on discharge summaries which had been checked by a pharmacist, indicating that pharmacists represent an effective system-based approach to preventing errors.

2.5.3.1.2 Pharmacy and timeliness

Where patients were discharged over the weekend, summaries were significantly slower to be released into primary care than when discharges occurred on weekdays. This is likely due to a lack of clerical staff being present on wards over the weekend in order to coordinate the release of summaries, and a lack of regular ward pharmacy staff to check summaries.

Whilst over 80% of summaries were sent within the '24 hours', less than half of summaries were checked by a pharmacist before discharge, indicating that summaries are released into primary care prematurely, in order to meet the target required by the hospital. This rushing to provide discharge information in time might explain the high number of discrepancies observed (45).

Unfortunately, whilst pharmacy remains a '9 to 5' service within the hospital, the accuracy checking of 100% of discharge summaries by a pharmacist within the 24 hour deadline before the summary needs to be released into primary care is unfeasible, and post-discharge checking of summaries will continue. Development of a system whereby summaries that should be checked by a pharmacist, based on certain risk factors, are identified and prioritised may aid ability to achieve the 24 hour target. This would maximise the efficiency of the pharmacy resources which are presently available.

2.5.3.2 Accuracy

Discrepancies involving medicine dosing and omissions were the most commonly observed type of discrepancy across all wards, however surgical wards saw a majority of discrepancies involving allergies. Due to the limited pharmacy input on surgical wards, infrequent undertaking of medicines reconciliation may have resulted in less frequent investigation into or recording of allergy status. Discharge summaries from elderly care wards had a higher number of discrepancies involving pharmaceutical formulations, which might be due to the number of patients with swallowing or administration difficulties, and so the need to provide alternative formulations or administration instructions with prescribed medicine.

Our findings are consistent with the literature, which have reported omissions to be the most common type of discrepancy observed when a patient is discharged from hospital (50, 60, 62, 63, 65, 66). The EQUIP study investigated prescribing errors across secondary care, and reported that errors involving dosing and omissions accounted for the six most common types of error observed: omission on admission; under dose; over dose; dose/strength missing; incorrect dosing instructions; and omissions on TTA (discharge summary prescription), which accounted for 6.2% errors (44). Also consistent with the EQUIP study was the proportion of discrepancies reported to involve medicines acting on the central nervous system and infections. Although these cover a broad spectrum of medicines, discrepancies involving analgesics and antibiotics were especially common.

2.5.3.2.1 Pharmacy and accuracy

No EDS recruited from surgical wards received a pharmacy check. Surgical wards at CHUFT currently receive minimal pharmacy input as they are deemed to involve mostly simple discharges, where the patient's usual medicines are not altered except from the addition of short-term post-operative care medicines. Our findings that a higher number of discrepancies were detected on medical and elderly care wards than on surgical wards, and that patients taking less than 6 medicines and staying in hospital for less than 3 days are at a lower risk of a medicine discrepancy occurring, are supportive of this practice. However, half of the surgical discharge summaries did contain discrepancies, and so expansion of pharmacy role to surgical wards or targeting specific surgical patients as part of a systems-based approach to improvement may be justified.

The majority of discharges from elderly care and medical wards received a pharmacy check, although over half of these were after the patient had left the ward. Patients who stayed in hospital for longer were more likely to receive a pharmacy check. This might be because a longer admission requires more discharge planning, and so allows more time for the summary to be written and the pharmacist to provide an accuracy check, or, more complicated medicine changes which have occurred during the admission require pharmacy to be involved.

The finding that almost 60% of discharge summaries are written erroneously before being checked by pharmacy is higher than recorded in previous literature (60, 63, 65, 66). Studies which rely on professionals to report errors rather than researchers identifying errors themselves may lead to a lower recorded error rate due to poor reporting and selection bias. However, in 2009 Abdel-Qadar *et al.* (50) asked pharmacists to record the interventions they had made for errors on discharge medicine orders on an electronic prescribing system in a UK hospital. The resulting error rate observed was, like ours, higher than others seen in the literature indicating that pharmacists may be, because of their professional knowledge of the implication of discrepancies with medicines, better placed to identify errors at discharge than other healthcare professionals or researchers.

2.5.3.3 Clinical significance

Overall, discrepancies observed on EDS were judged to be of a low clinical significance, however, a number of serious discrepancies were observed which in the absence of a pharmacy check would have reached primary care and had potentially serious clinical consequences to patient wellbeing. Unchecked summaries mainly originated from surgical wards, where a higher proportion of discrepancies involving recorded allergies to medicines were observed. Poor or incomplete recording of allergies might be due to the high-turnover of patients on surgical wards, where ward staff may be less concerned with optimising medication, and more focused on the provision acute surgical care. Additionally, unless the allergy was newly identified during the admission, there is less relevance to the GP, as this information will already be recorded in the primary care record.

Findings for clinical significance are comparable with the literature: one study which also employed Dean's method for classifying prescribing errors, but instead in a primary care setting, found 42.4% errors to be minor, 54% moderate and 3.6% severe in nature (86). Additionally, in an inpatient setting, existing studies using alternative methods have

reported similar clinical significance, with the majority of errors identified being minor or moderate in nature, and severe errors occurring less frequently (64, 102).

2.5.3.3.1 Pharmacy and clinical significance

Discrepancies which were sent to primary care undetected (i.e. occurred on summaries which were not checked by a pharmacist) had a higher median clinical significance than those detected and rectified by pharmacy. This may have been due to the high proportion of discrepancies involving allergy status which existed on unchecked discharge summaries from surgical wards. The range of severity scores allocated was higher in those summaries which were checked by a pharmacist, which included the maximum severity score allocated of 7.5 on the Visual Analogue Scale. This may have been because more discrepancies were observed from the checked group of summaries than from the unchecked, although randomly allocated, which may have led to a wider sample with more variation in discrepancy type and clinical significance. Alternatively, discrepancies identified in the retrospective group of EDS were only checked for accuracy by RY, therefore discrepancies may possibly have been missed from collection.

2.5.3.4 Error predictors

The number of medicines a patient is prescribed and the length of their hospital stay were identified as significant predictive factors that can lead to a medicine discrepancy occurring at discharge. Age of the patient is generally positively associated with the number of medicines that a patient takes, and the presence of multiple disease states, which therefore may have caused a positive correlation due to association rather than cause. Patients who are prescribed six or more regular medicines, and those that are admitted for three days or longer can therefore be considered as being at a higher risk of a discrepancy occurring on their EDS. Consequently, the hospital should ensure that such patients receive pharmacy input into their EDS before releasing to primary care.

2.5.3.5 Practice implications

The results of the audit have allowed recommendations to be made as to which patients pose a higher risk of having a medicine discrepancy at discharge, which can potentially assist towards allocation of resources in this respect. Since the results of this study, CHUFT has begun piloting a traffic light sticker system on drug charts, which identify those patients with error risk factors and who are also taking high risk medicines such as warfarin and

insulin, and help to ensure that these discharge summaries are seen by a pharmacist before being released to primary care.

2.6 Conclusion

Despite the perceived benefits of an electronic system, investigation of the quality of discharge summary content has highlighted that key information on the summary is still lacking, and in particular, information about the changes to medicine which had occurred during admission. However, discharge summaries which had been checked by a pharmacist were of higher quality in terms of adherence to NPC standards, including provision of details of medicine changes which had occurred during admission.

Exploration into the frequency, type and severity of medicine discrepancies occurring at discharge has highlighted the importance of the role that pharmacists play in their interception. Without a pharmacy final check, a number of clinically significant erroneous summaries are being released into primary care, even with an electronic discharge system in place.

Chapter 3: RPS inpatient chart project

3.0 Chapter overview

In this chapter, the results of a 6-month project undertaken in conjunction with the Royal Pharmaceutical Society (RPS) are reported. The project aimed to apply to practice the RPS recently published guidance on transfer of information about medicines when patients move between care settings. Together with the research team at CHUFT, RY attended a series of meetings as part of a user group to help design and refine this guidance, including the minimum dataset and core principles relating to the safe and accurate transfer of information. The guidance is described in further detail below.

3.1 Background

3.1.1 RPS guidance

In July 2011 the RPS published guidance *“Keeping patients safe when they transfer between care providers – getting the medicines right”* (20) which identified the key principles to enable accurate communication of information about medicines when patients transfer between care settings. The good practice guidance comprises a set of core principles for making a safe transfer, and a recommended minimum dataset of medicines information that should accompany a patient when making the transition between care settings.

Whilst the new RPS guidance is largely directed at the interface between secondary and primary care, it was designed to be applicable across all interfaces, and was constructed with collaborative work advice from over 150 patients and professionals across both health and social care settings. The guidance is endorsed by the Royal College of Physicians, Royal College of Nursing and Royal College of General Practitioners.

This guidance builds on existing guidance published in 2005 by the then Royal Pharmaceutical Society of Great Britain (16) which advised on the information that should be provided at discharge for medical and elderly patients. Similarly in 2008, the NPC published implementation tools for MR (17), advising on the minimum information that should be provided to healthcare professionals when patients are transferred between care settings.

The new guidance aimed to amalgamate the crucial elements and important values of the older guidance to provide a *“common framework and clear expectations concerning good practice”* regarding the transfer of medicines when a patient moves between care settings.

3.1.1.1 Rationale for new guidance

The new guidance comes as recent evidence from the Care Quality Commission in their 2009 national report demonstrated that transfer of patient care is a continual high risk area for patient safety (19). Similarly, achieving a reduction in medicine errors causing harm has been identified as an improvement area in the NHS Outcomes Framework (68), the development of systems to support the safe transfer of information about medicines is considered a high priority.

3.1.2 Early Adopter Site programme

In order to help launch the guidance and to assess its impact in practice and assess its success, the RPS organised an Early Adopter Site programme, whereby around 40 trusts and organisations used aspects of the guidelines to make changes to their practice, and comment on their findings following 6-month project work. Alongside the research team at UEA, CHUFT volunteered to participate in this programme, using the 6-month project window as an opportunity to conduct a project to contribute towards this PhD.

3.1.2.1 Rationale for Early Adopter Site project

As reported in Chapter 2, audit work investigating the quality of discharge summaries sent by CHUFT has shown that details of medicine changes made during hospitalisation were documented in only 22% of summaries, and of those 32% did not document a reason for the change. It was thus decided to pursue the aspect of the guidance which recommends that medicine changes be included in the core content of records for medicines when patients transfer care providers, including details of medicines started, stopped, dosage changes and the rationale for those changes.

3.1.2.2 EAS project

The Early Adopter Site programme consisted of a series of meetings with other stakeholders and programme participants, in which there were opportunities to network and share good practice and experiences with other healthcare professionals. A senior clinical pharmacist at East Lancashire Hospitals NHS Trust had presented a copy of the inpatient medicine charts recently introduced into their trust. These had been designed as an aid for healthcare professionals documenting medicine changes and medicine the patient was taking regularly prior to admission to hospital. A blank copy of this chart is included in Appendix 3.1.

In subsequent discussions with the research team it was suggested that this chart design could be replicated at CHUFT to record medicine changes more clearly. When writing discharge summaries, doctors look through the inpatient chart to compile a list of current medicine. Our hypothesis was therefore that having medicine changes recorded more clearly on charts may help to improve the documentation of medicine changes on discharge summaries through improving the line of defence and attempting to minimise human error. This hypothesis was tested during this project.

3.1.2.3 EAS project design

For the purpose of the RPS programme, it was necessary to design a project which could be implemented, and which was capable of producing some meaningful data, within the 6-month timeframe. As such, it was decided to conduct a before-and-after study whereby data were collected at three time points: before the arrival of the new charts, and at two and four months following their implementation. Although the new charts were intended to be ultimately used across the trust, it was decided to use them initially on medical wards and the Emergency Admissions Unit (EAU), from which patients are often transferred to other hospital wards, thereby aiding their dissemination through the hospital. Two medical wards with a high patient turnover were selected for data collection in order to maximise the eligible discharges to recruit into the study.

3.2 Aims and objectives

The overall aims of this 6-month project were to:-

- Explore the population of new drug chart fields with details of medicine changes, by type of medicine change (new, stopped or changed medicines).
- Investigate the potential effect of improved annotation of medicine changes on drug charts on the recording of medicine changes and their rationale on EDS.
- Investigate compliance between medicines listed on EDS and the most recent medicines list obtained from primary care at four weeks following patient discharge.

3.3 Method

3.3.1 Ethical approval

This project was reviewed by the UEA Faculty of Medicine and Health Research Ethics Committee on 15th November 2011 (Appendix 3.2) and verified as a service evaluation, therefore NHS Research Ethics Committee approval was not required.

3.3.4 Requirements for new chart completion

Table 3.1 below lists the changes to practice which accompanied the introduction of new charts. Changes to practice consisted of checking the relevant tick box to indicate the type of medicine change, and providing a rationale or further information on the chart for medicines which have been discontinued or changed.

Requirements for documenting changes on new charts
<ul style="list-style-type: none"> • The corresponding tick box should be checked for each medicine prescribed on the inpatient drug chart to indicate whether the medicine has been changed (i.e. started or dose changed) or if it was taken prior to the patient's admission (i.e. patient came in on it). • Where medicines have been discontinued, there is no tick box to complete, but the medicine should be scored through on the chart.
Requirement for documenting rationales on new charts
<ul style="list-style-type: none"> • For medicines which have been discontinued, the healthcare professional authorising that cessation should document a brief reason for the cessation. • Where a medicine is changed, the nature of the change should be annotated on the chart: for example, an arrow in the changes box to indicate an increase in dose. • These annotations should be initialled, dated and include a bleep number so that the amendment is attributable to a specific person.

Table 3.1: Requirements for new chart completion

3.3.5 Dissemination of changes

Coinciding with the introduction of new charts, a bulletin from the chief of medicine detailing the changes to practice across the hospital was circulated to all hospital doctors (Appendix 3.4), and a presentation was given during a monthly education seminar for doctors. Posters detailing the changes and contact details of project team members were displayed on all wards (Appendix 3.5). All pharmacy staff were made aware of the project through departmental emails and introduced to the chart changes during their monthly pharmacy forum session. Pharmacy staff were briefed as to how the new charts should be used, and were thus able to provide support to prescribing staff on their respective wards. A bulletin was sent to GPs within North East Essex via NHS North East Essex (now North East Essex CCG) to inform them of the project (Appendix 3.6).

3.3.6 Data collection

Data were collected before arrival of the new charts, and at two further points following their implementation. Coinciding with the start of the RPS transfer of care programme, over three one-week periods in November 2011, March 2012 and May 2012, discharge summaries for patients being discharged from two medical wards (the same medical wards that were studied in Chapter 2) were recruited. At these three time points the new charts had not yet been introduced, and then had been in place for two and four months respectively.

Discharge summaries were excluded where the patients:-

- Were transferred to other wards within the hospital
- Were transferred to other secondary care settings
- Had died whilst in hospital.

All remaining discharge summaries originating from study wards where the patient is discharged home and to the care of their GP were included. Eligible patients were identified daily on the included wards.

3.3.7 Review of drug charts

A photocopy of the inpatient drug chart(s) was taken, and any information relevant to the patient's regular medicines prior to and during admission in the medical notes was also identified and photocopied.

The drug charts were reviewed, and any medicine changes which had occurred during the admission were identified. These were identified by reviewing the medicines currently and previously prescribed, using the MR sheet at the front of the drug chart, those prescribed on the chart, and any annotations made to the medicines on the chart. Medicine changes were then recorded, alongside a brief description of each change.

3.3.8 Review of EDS

Corresponding discharge summaries for the charts collected were then accessed and reviewed using the hospital's electronic discharge system. Patient demographics, including the patient's age, length of stay, and registered GP practice, were extracted from this system.

The corresponding discharge summaries were reviewed, and medicines listed on the drug chart compared with the medicines listed on the EDS. On EDS, the medicine change was deemed 'present' if explicit reference to the medicine having been changed was included on the EDS. In the case of a stopped medicine, where the medicine was simply absent from the list without reference to it having been stopped, this was considered to be 'not present'.

3.3.9 Review of GP-held medicines list

One month following recruitment of the discharge summaries, the GP surgeries of recruited patients were contacted by telephone to request an anonymised, faxed copy of the patient's most recent medicines. This list was compared to the medicines listed on the patient's recent EDS to identify whether changes made during admission had been translated to the GP's held medicines list.

3.3.10 Sample size calculation

A sample size of 52 patients at each stage was required with 80% power to detect a 25% improvement in performance, assuming that the baseline proportion of EDS with medicine changes present was 22% (Chapter 2).

3.3.11 Data analysis

A record was made of the proportion of charts that were endorsed appropriately according to the new protocol, and the proportion of EDS on which medicine changes and their rationale were documented. Chi-squared statistic (X^2) was used to compare frequencies of medicine changes recorded on charts, EDS and GP lists. Comments informally received from pharmacy staff during the study were recorded and reported using simple thematic analysis (103).

For the purposes of analysis, medicines prescribed were identified as being long-term or a short-term change. Long-term changes were changes to regular medication which would be expected to continue in primary care. Short-term changes were those which were prescribed only for a set period after discharge and which would not be expected to be continued long-term in primary care.

3.4 Results

3.4.1 Sample demographics

Table 3.2 displays the demographics of the patients whose charts were recruited before and after implementation of the new charts.

Demographic	Measure	Months post implementation of new charts		
		-2 months	2 months	4 months
No. of patients	N	49	37	42
Female patients	N (%)	24 (48)	22 (59.5)	19 (46.5)
Age	Mean (SD)	57.4 (18.3)	61.4 (17.4)	58.5 (18.8)
Days in hospital	Median (IQ)	6 (4, 9.5)	7 (4.5, 12.5)	5 (3, 11.25)
Total medicines at discharge	N	391	296	307
EDS medicines per patient	Mean (SD)	8.15 (5.8)	8.0 (4.9)	7.8 (5.7)
Total medicine changes	N	68	63	92
Changes per patient	Mean (SD)	1.4 (1.1)	1.7 (1.3)	2.1 (1.5)

Table 3.2: Sample demographics

3.4.1.1 Medicine changes

A total of 223 medicine changes were identified across 108 of the 128 patient drug charts recruited into the study's three groups. Considerably more medicine changes were identified in the post-4 month group.

Short-term changes, which would not necessarily have been uploaded into the GP's medicine list as they would not have been intended for repeat, accounted for 31 (14%) changes observed. Examples of short-term changes include the addition of antibiotics or a short course of corticosteroids. A breakdown of medicine changes observed by type is displayed in Figure 3.2.

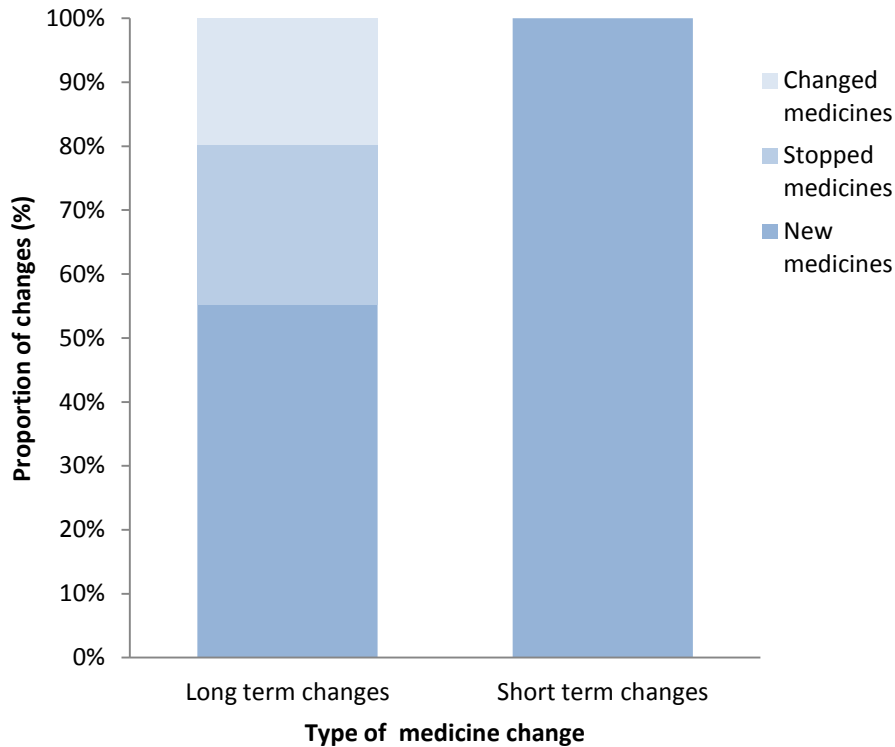


Figure 3.2: Type of medicine changes observed

Of the 192 remaining long-term medicine changes, 106 (48%) changes observed were the addition of new medicines, 38 (17%) were medicine stoppages and 48 (22%) were changes made to medicines. Medicine changes most frequently involved drugs acting on the cardiovascular system (27%) and the central nervous system (20%). Of the 31 short-term changes, 17 (55%) were from BNF chapter 5 (infections), representing short courses of antibiotics ($n=15$) and the addition of anti-malarial treatments ($n=2$).

Twenty (16%) patients did not experience any medicine changes during their admission, and a further 12 (9%) experienced only short-term changes.

3.4.2 Completion of new chart fields

MR was undertaken for 123 (96%) of the 128 charts observed. The proportion of charts which were annotated with previously taken medicines ('DHx' or 'came in on it') increased from 69% to 90% with the introduction of the new charts (Fisher's exact test, $p=0.035$)

Pharmacists made the majority of chart annotations across all study groups, responsible for 96% of annotations on old charts, and 91% and 90% of annotations at 2 and 4 months of new charts respectively.

Medicine changes occurred on 108 of the 128 (84%) inpatient drug charts collected. With the addition of new charts, the proportion of charts for which at least one medicine change had been annotated was identified as 71% at the start and 74% at the end of the study period. The proportion of charts for which all medicine changes were annotated was identified as 58% at the start and 56% at the end of the study period following the addition of new charts.

On old charts, 10 (42%) of 24 new medicines were documented, whilst on new charts (at 2 and 4 months) 58 (71%) of 82 new medicines were documented (Fisher's exact test, $p=0.015$). However, 7 (35%) of 20 stopped medicines were documented on old charts, with 8 (29%) of 28 on new charts (Fisher's exact test, $p=0.755$), and 13 (93%) of 14 changed medicines were documented on the old charts, with only 15 (63%) of 24 on new charts (Fisher's exact test, $p=0.059$).

3.4.3 Comparison between drug charts and EDS

Table 3.3 displays the proportion of medicine changes on charts and on EDS. It can be observed that the proportion of changes documented on charts in accordance with the new practice requirements was 52% at the start and 63% at the end of the study period. Overall, 61% of medicine changes were explicitly stated on EDS, and 43% of medicine changes also had their rationale stated.

Study phase	Proportion of changes on charts	Proportion of changes on EDS	Proportion of rationales for changes on EDS
Old charts	30/58 (52%)	38/58 (66%)	30/58 (52%)
New charts (2 months)	32/56 (57%)	31/56 (55%)	22/56 (39%)
New charts (4 months)	49/78 (63%)	49/78 (63%)	30/78 (39%)
Total	111/192 (58%)	118/192 (61%)	82/192 (43%)

Table 3.3: Comparison between proportion of medicine changes on charts and on EDS

Overall, 69 (65%) of the 106 changes involving newly started medicines were stated on EDS. Thirty (63%) of the 48 changes involving stopped medicines and 19 (50%) of the 38 changes involving changed medicines were also stated. Examples of changes which were or

were not stated on EDS, by therapeutic area (as listed in BNF chapters) of the medicines involved are listed in Table 3.4. There was no significant change in the proportion of charts for which at least one medication change had been annotated.

Therapeutic area of medicine change (by BNF chapter)	N (%) of changes on EDS	Example of change	N (%) of changes not on EDS	Example of change
Gastro-intestinal system	9 (7.7%)	Lansoprazole started	10 (13.3%)	Omeprazole stopped
Cardiovascular system	39 (33.3%)	Warfarin started	22 (29.3%)	Ramipril dose changed
Respiratory system	11 (9.4%)	Beclamethasone started	10 (13.3%)	Atrovent stopped
Central nervous system	27 (23.1%)	Diazepam started	16 (21.3%)	Buprenorphine dose changed
Infections	5 (4.3%)	Amoxicillin started	2 (2.7%)	Trimethoprim dose changed
Endocrine system	13 (11.1%)	Insulin (Levemir) stopped	8 (10.7%)	Prednisolone dose changed
Obstetrics, gynae and urinary tract	0 (0.0%)	n/a	1 (1.3%)	Solifenacin stopped
Nutrition and blood	7 (6.0%)	Vitamin B started	5 (6.7%)	Adcal started
Musculoskeletal system	5 (4.3%)	Diclofenac stopped	1 (1.3%)	Ibuprofen gel stopped
Feeds	1 (0.9%)	Fresubin drink started	0 (0.0%)	n/a
Total	117(100%)		78 (100%)	

Table 3.4: Examples of changes present and absent from discharge summaries

The proportions of medicine changes being either stated, or not stated, on the EDS were largely consistent across different therapeutic areas of the medicine involved. Although not significant, a lower proportion of changes involving gastrointestinal (BNF chapter 1) and respiratory drugs (BNF chapter 3) were explicitly stated on the discharge summary.

3.4.3.1 Pharmacy involvement

Of the EDS recruited, 102 (80%) were checked by a pharmacist before their release into primary care. Where medicine changes had occurred, 59 (58%) of the 90 EDS which had been checked by a pharmacist explicitly stated the changes and 38 (42%) stated the rationale for changes. Of the 18 EDS where changes had occurred which had not been pharmacy checked, 11 (61%) explicitly stated the changes and 8 (44%) stated the rationale.

3.4.4 Comparison between EDS and GP-held medicine list

GP practices were contacted for 128 patients during the data collection period, from which 77 recent patient medicine lists were sourced. Across these 77 patients, 146 medicine changes were experienced, of which 127 were long-term changes. Four patients had died during the one-month period following their discharge.

Table 3.5 displays the proportion of changes on EDS compared to those on the GP medicine list. Overall, 73 of the 127 (57%) medicine changes which occurred during admission were recorded on the GP medicine list post-discharge.

Study phase	Proportion of changes stated on EDS	Proportion of reasons stated on EDS	Proportion of changes recorded on GP list	Mean (95% CI) proportion of changes stated on EDS (%)	Mean (95% CI) proportion of changes translated onto GP list (%)
Old charts	38/58 (66%)	30/58 (52%)	25/42 (60%)	72.5 (60.4 – 84.0)	51.1 (34.6 – 67.6)
New charts (2 months)	31/56 (55%)	22/56 (39%)	14/27 (52%)	64.9 (49.8 – 80.0)	40.8 (21.6 – 59.2)
New charts (4 months)	49/78 (63%)	30/78 (39%)	34/58 (59%)	71.9 (60.2 – 83.6)	57.7 (41.8 – 73.6)
Total	118/192 (61%)	82/192 (43%)	73/127* (57%)		

*77 GP lists were available, which represented 127 long term medicine changes

Table 3.5: Changes on EDS compared to changes on GP medicine list

Table 3.6 shows examples of medicine changes which were either present, or not present, on the GP list according to therapeutic area (and BNF chapter) of the medicine involved. Although not significant, a lower proportion of medicine changes involving drugs acting on the central nervous, endocrine and musculoskeletal systems (BNF chapters 4, 6 and 10) were translated onto the GP lists post-discharge.

Therapeutic area of medicine change (by BNF chapter)	N (%) of changes on GP list	Example of change	N (%) of changes not on GP list	Example of change
Gastro-intestinal system	9 (12.2%)	Lansoprazole dose changed	5(9.4%)	Furosemide dose changed
Cardiovascular system	24 (32.4%)	Warfarin new	14 (26.4%)	Bisoprolol stopped
Respiratory system	7 (9.5%)	Terbutaline new	4 (7.5%)	Carbocysteine dose changed
Central nervous system	16 (21.6%)	Citalopram dose reduction	16 (36.2%)	Gabapentin new
Infections	1 (1.4%)	Doxycycline new	2 (3.8%)	Rifampicin stopped
Endocrine system	7 (9.5%)	Levothyroxine dose changed	7 (13.2%)	Insulin brand changed
Nutrition and blood	7 (9.5%)	Folic acid new	2 (3.8%)	Thiamine new
Musculoskeletal system	2 (2.7%)	Ibuprofen stopped	3 (5.2%)	Diclofenac stopped
Feeds	1 (1.4%)	Fresubin drink new	0 (0.0%)	n/a
Total	74 (100%)		53 (100%)	

Table 3.6: Examples of changes translated to, or omitted from, the GP-held medicine list post patient discharge, grouped by BNF chapter of medicine changed

A total of six medicine changes involved warfarin. Of these, all were explicitly stated on EDS and translated onto the GP list. A total of five medicine changes involved insulin. Of these, all were explicitly stated on EDS and only one medicine was not translated onto the GP list. This involved a change in brand name of insulin prescribed, which may have been made due to available brands in the hospital formulary.

A total of 16 medicine changes involved prednisolone (BNF chapter 6.3, Corticosteroids), of which 10 were short-term changes. Of the 6 remaining long-term changes, however, only 1 was explicitly stated on EDS and translated onto the GP-list.

3.4.5 Transfer of medicine changes across the interface

In terms of type of medicine change, 41 (60%) changes involving new medicines, 20 (57%) changes involving stopped medicines, and 12 (50%) changes involving changed medicines were translated onto GP-held medicine lists.

Figure 3.3 displays the overall mean proportion of medicine changes which were visible on charts, EDS and the GP-held medicine list. The increase in the mean proportion of changes annotated on charts over the data collection period can be observed. The presence of changes on the GP-held medicine list appeared to mirror the presence of changes on the EDS. However, there was no overall trend observed in presence of changes on EDS or GP-held medicine list during data collection.

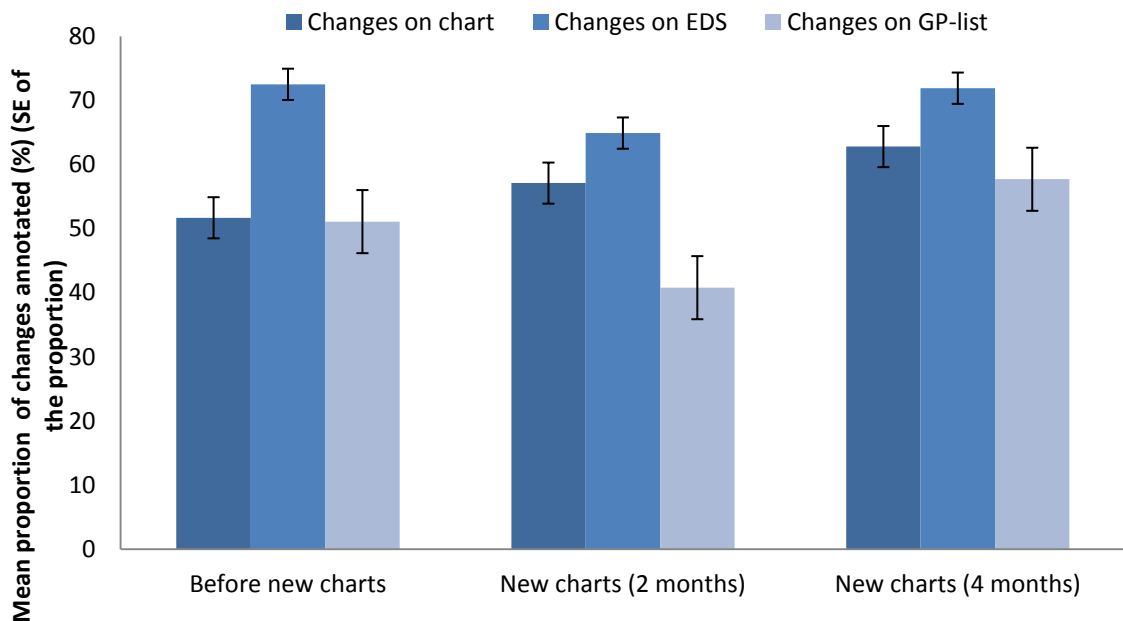


Figure 3.3: Mean proportion of medicine changes present on charts (n=128, 192 medication changes), EDS (n=128, 192 medication changes) and GP-held lists (n=77, 127 medication changes).

Of the long-term changes, 18 (14.2%) made a complete documented journey through discharge, i.e. the medicine change was visible on the chart, stated on EDS, and translated onto the GP list. Table 3.7 displays the proportion of changes transferred by type of change. 2 (10.5%) of the 19 changes deemed as short-term medicine changes (for which GP information was available) made a complete journey and were uploaded into the patient's GP-held medicine list.

Type of medicine change	Old charts	New charts (2 months)	New charts (4 months)
New	3/28 (11%)	2/17 (12%)	5/23 (22%)
Stopped	2/9 (22%)	2/12 (17%)	1/14 (7%)
Changed	2/5 (40%)	1/9 (11%)	0/10 (0%)
Total changes	7/42 (17%)	5/38 (13%)	6/47 (13%)

Table 3.7: Proportion of long-term changes making a full documented journey through discharge

3.4.6 Comments from pharmacy staff

Comments received from pharmacy staff at CHUFT indicate that the new inpatient charts have been well received and are highly valued by the staff who use them, as with:-

“The tick boxes on the side of the drug chart are really useful - I don't know how we got by without them! They are especially useful on discharge when explaining to patients what is new and what has been changed etc.” (Ward pharmacist 1)

And,

“For me, they've made a POSITIVE impact, most definitely” (Ward pharmacist 2)

However, it would appear that the charts have been seen more as an assistive tool for pharmacists to document their findings from medicines reconciliation, or comments and amendments, rather than as a reference source for doctors, as with:-

“Boxes are used frequently by pharmacy staff and occasionally by doctors, although this will be double ticked by pharmacy as verification” (Pharmacy technician)

And,

“It's mainly the pharmacy staff who use them” (Ward pharmacist 1)

3.5 Discussion

3.5.1 Main findings

Introduction of the new charts, which provided a designated space to annotate medicine changes, appeared to improve the overall proportion of medicine changes which were recorded on charts. Significant improvements were observed in annotation of charts with new medicines and previously taken medicines. However, the newly introduced requirement to annotate the rationale for medicines that were stopped or changed on new charts was not well adhered to by medical or pharmacy staff.

Despite 80% of summaries being checked by a pharmacist before patient discharge, the proportion of changes explicitly stated on EDS for new medicines (65%), stopped medicines (63%) and changed medicines (50%) was sub-optimal.

Of the changes to medicines made by the hospital, 57% of were translated onto the GP-held medicine list. Only 14% of medicine changes were documented at all stages through discharge, i.e. on the chart, stated on EDS, and translated onto the GP list.

3.5.2 Strengths and limitations

This before-and-after study provides insight into the relationship between the forms of medical documentation used in the discharge process, and through exploration of the effect of chart changes on discharge summaries, has generated key questions about how discharge summaries are composed, and how the importance of communicating changes to medicines are perceived and embedded within this. Being involved with the RPS for this highly topical transfer of care initiative has enabled the sharing of ideas, research objectives, and good discharge practice between pharmacists and other workers from a variety of different care settings.

However, as a before-and-after study it is difficult to differentiate the effect of changing the charts from introducing the new charts, which may in itself have highlighted the need to pay them more attention. A short study such as this may not have allowed sufficient time for the changes to practice to be fully adopted, or for the charts to be used to their full potential. Re-auditing of the charts at 6 or 12 months after their implementation would

have been worthwhile in order to explore the relationship between inpatient charts and EDS content over a longer timescale.

Patients in the post 4-month group were found to experience significantly more medicine changes. This may be indicative of documentation of medicine changes on the new charts being clearer with time, and so these were more easily identifiable to the researcher during the data collection process. However, whilst more changes were identified it was not the case that more charts were correctly endorsed with those changes.

This study did not investigate the process by which information about medicine changes following an admission were reconciled into the patient record at the GP surgery, and whether it is dependent on the patient having visited the doctor since their discharge. It is also unknown whether, in this study area, it is the GP or the practice administrative staff who are responsible for performing this task. Further exploration into the journey of a discharge summary when it reaches primary care could help to understand what information on the discharge summary is of particular importance or need to the practice during the reconciliation process.

The active approach that was adopted to collect data was advantageous in allowing discharges to be identified as they occurred, meaning that the patient notes, chart and discharge summary were all readily available. However, as data was being collected by a single researcher, it prevented large numbers of patients from being identified and recruited. As a result, the study has limited power to distinguish true differences from random variation, and thus it was not possible to differentiate between the effect of the new charts and random error. Additionally, in the interests of time, this study was limited to two medical wards and data was collected from a single site, and as a result may not be representative of other settings. Medical wards may have differed from other hospital wards in terms of their higher pharmacy input, which may have resulted in better completion of chart fields, and higher number of medicine changes experienced by patients due to them being acutely unwell and requiring optimising of treatment.

In comparing the EDS to the GP-held medicine list, two areas where non-compliance between the EDS and GP list could be considered as intentional. Firstly, where the GP had added a new, regular medicine to the medicine list since the patient's discharge which is likely to have been unrelated to the patient's admission; and secondly where medicines for

short-term use only, such as antibiotics and post-operative painkillers, were prescribed at discharge and so were present on the EDS. Short-term medicine changes were excluded from the analysis of medicine changes and their journey through discharge, as they would not have been expected to be present on the GP medicine list for continuation in primary care. However, it was not possible to identify new medicines which were added by the GP intentionally post-discharge, which may have caused the measurement of non-compliance to be oversensitive.

3.5.3 Main discussion

3.5.3.1 Annotation of charts with changes

The high proportion of new charts which were annotated with newly prescribed (74%) or previously taken (90%) medicines indicates that ward staff were confident in identifying and differentiating between new and previously taken medicines. This information is acquired during the process of MR and clearly recorded on the front of the drug chart, so is readily accessible to ward staff.

Over 90% of the annotations made in new chart fields were made by pharmacists. This may have been because pharmacists are familiar with annotating charts to optimise medicine administration or to correct inaccuracies as part of their usual working role. The project originated from the hospital's pharmacy department, and as such pharmacy staff might have been more engaged with the new charts than medical staff.

Annotations on new charts (after 4 months) were made less frequently where a medicine was discontinued (29%) or changed (63%). However, this is unsurprising as the majority of chart annotations were made by pharmacists, who have less input into prescribing decisions or decisions to change medicine, and so may not be aware of the nature or rationale for changes which are made. The reluctance of medical staff to annotate changes may be indicative of a lack of motivation to comply with changes to practice or a lack of understanding of the requirements of the change, which they may perceive to be for pharmacists' use only.

Another possibility is that medical staff were unable to complete the chart fields because they lacked knowledge about the changes which had occurred. Knowledge-based errors (38) could therefore be introduced here as a result of doctors not being aware of the

relevant patient information, through either not having been involved in the patient's care or not being privy to prescribing decisions made by other doctors in the care team. This could lead to doctors drawing inaccurate conclusions about the patient's medicine, and so passing on incorrect information to the GP practice at discharge. Literature has demonstrated that medicine changes during a hospital admission are extremely common, especially over a prolonged stay where optimisation of treatment may lead to multiple medicine changes being made (86). Where patients stay longer in hospital they are likely to have multiple drug charts (which only provide space for 14 days of medicine) and may have moved wards or between specialist teams. These factors are likely to contribute to medical staff lacking knowledge of medicine changes made during a patient's inpatient stay in hospital.

3.5.3.2 Rationale for medicine changes

The requirements set out in this study for annotations of charts were that for stopped medicines, the medicine should be crossed through with a reason written on the chart; and for changed medicines, it was expected that the nature of the change be annotated on the chart. These requirements were arguably more complicated than the requirements for recording a previously taken or new medicine, which simply required checking the relevant tick box, which may provide explanation for these annotations being made less frequently than those for new and previously taken medicines. The reluctance of prescribers to explain rather than simply state medicine changes was also apparent from the EDS reviewed, in which only 43% EDS overall contained rationale for changes made. It is likely that the details of these changes would have been more challenging for medical and pharmacy staff to acquire or deduce, unless the doctor who originally prescribed the item was the same doctor who was making the medicine change (and who was then writing the discharge summary). Reference to the nature and rationale for the change would need to have been recorded in the patient notes in order that it could be accessible and clear to other healthcare professionals involved in that patient's care.

However, the literature indicates that rationale for medicine changes is poorly documented in patient notes. Tully *et al.* (43) interviewed hospital doctors about documenting prescribing decisions and found some had "*an expectation that another doctor would instinctively understand a particular decision, based on the information that was available*". This presumption was deemed necessary by doctors who reported being subject to time constraints whilst writing in records, in order for them to work efficiently to balance the

importance of spending time completing the record with the necessity to communicate important information. With reference to medicine changes on charts and EDS, the reluctance of medical staff to report changes might indicate that they do not perceive this information to be worth spending additional time working on, and that the communication of other clinical information is valued more highly than details of changes.

Also in Tully *et al.*, doctors reported a desire to make their notes concise, as filtering through too much information, as with too little, could actually be a hindrance. However, the level of detail which has been judged as appropriate by the doctor at the time of writing in the record may retrospectively appear inadequate when the records are reviewed to justify decisions or to clarify ambiguity. At these times the reader of the record is required to make assumptions or inferences using the information available, which can potentially introduce error.

3.5.3.3 Role of the pharmacist in facilitating transfer of medicine changes

The baseline proportion of EDS with medicine changes explicitly stated (66%) was higher than previously identified in the audit described in Chapter 2, in which only 22% of EDS stated changes. Carrying out and sharing the results of the audit within CHUFT may well have increased pharmacy staff awareness of the need for medicine changes to be better documented on EDS. However, the proportion of EDS with changes stated remained sub-optimal, even with pharmacy checking.

Because of the pharmacist's role to check for accuracy, a higher quality of documentation of medicine changes in EDS which had been checked by a pharmacist would be expected, but no trend was observed between pharmacy checking status and the presence of details of changes on EDS. In terms of accuracy, pharmacists have demonstrated their value at discharge through identification of errors and interventions on discharge summaries (50). Similarly, in terms of Medicines Reconciliation and the communication of medicine changes on admission, evidence indicates that pharmacists are more effective than doctors in gathering accurate and more complete medicine histories (74). It may be reasonably assumed that pharmacists could occupy a similar role at discharge.

However, our findings that the provision of details of medicine changes are not improved on EDS when checked by a pharmacist, suggest that like discharging doctors, ward pharmacists too are limited by the information about medicine changes that is available to

them when they are reviewing a discharge summary. Furthermore, pharmacists are not routinely present on ward rounds and as such, are not always involved in prescribing decisions which are made on the ward, and their rationale. This is likely to be a disadvantage when it comes to reviewing summaries for medicine changes, unless decisions have been adequately documented in patient records and can be referred to for clarification.

3.5.3.4 Changes on GP-held medicine list

Only 57% of medicine changes were successfully translated onto GP lists in primary care. This non-compliance between the discharge summary and GP prescription is consistent with existing literature: A 2009 UK study commissioned by the General Medical Council of prescribing errors in general practice (86) reported that of 87 drugs newly prescribed by a local hospital, 28% were either not prescribed, or differed from the hospital's recommendations, on subsequent primary care prescriptions. Similarly, 35% of dose changes made to patients' previously taken medicines were not implemented by GP practices. The study identified three factors which influenced GPs' decisions to prescribe medicines recommended by hospitals: local guidance, regularity of use of the medicine in general practice and their perception of its risk to benefit ratio. These factors may have been applicable to GPs in our study, providing possible explanation for the differences observed. However, in this study the details of prescribing decisions made in secondary care were effectively communicated to the GPs, whereas in our study some discharge summaries were identified which may not have communicated this information effectively. In these instances, GPs may have made prescribing decisions based on an additional factor: inference or uncertainty arising from the discharge summaries.

3.5.3.5 Effect of medicine type

In terms of therapeutic area of medicine involved, no significant differences between the proportions of changes which were either stated, or not stated, on EDS were observed. However, changes involving cardiovascular medicines appeared to be better documented on both EDS and on the GP list. Changes involving warfarin were especially well documented on EDS, and also translated to the GP. This may have been because warfarin is a high-risk NPSA alert drug, so doctors are conscious to take more care when prescribing it. Additionally, anticoagulants are prescribed in a separate section within the inpatient drug chart (this is common across most UK hospitals) which could have facilitated clear interpretation by the discharging doctor. The same was also true for insulin – also identified

as a high-risk drug and prescribed separately. However, documentation of prednisolone was poor. This might be as a result of its often complex increasing or decreasing courses, and confusion of the discharging doctor and/or with regards to the intended duration of the course, which might indicate need for improvements in prescribing within secondary care.

Changes involving medicines for the central nervous system appeared to be less well transferred onto the GP-list. This included the addition of painkillers prescribed by the hospital, which the GP may have decided were not required or intended for long-term use in primary care. Changes involving gastrointestinal and respiratory medicines appeared to be more frequently absent from the EDS and the GP-list, highlighting potential areas for improved prescribing of these medicines in secondary care.

3.5.3.6 Implications to practice

In terms of practice implications, the charts themselves appear to have had little impact on the recording of medicine changes on EDS, and instead have had increased time implications for ward staff completing them. However, the indication from comments received is that pharmacy staff have embraced the new inpatient charts and find them a useful tool for documenting their findings during MR. Doctors did not engage with the new charts as readily, which might explain why the presence of medicine changes on EDS (which are, of course, written by doctors) did not improve during the course of the study. It is therefore necessary to better target doctors when making changes to improve discharge practice and communications, in order to:-

- Improve doctors' perception of the importance of communicating medicine changes
- Increase doctors' awareness of the information available on charts about medicine changes
- Encourage doctors to use charts to document their own findings and knowledge of medicine changes, so that these may be made available to other healthcare professionals.

Similarly, pharmacists should be encouraged to check for medicine changes on discharge summaries, including the rationale for changes made, and to actively seek out information on changes where they have not been provided.

3.6 Conclusion

Work carried out in this chapter aimed to address system errors in the discharge process by modifying in the inpatient chart design and therefore alter the latent conditions in which a hospital discharge is made. In doing so, information about medicine changes was increasingly annotated clearly on inpatient charts at CHUFT. This study has however shown that over the four month period after introducing the new charts, better documentation of changes on charts has not corresponded with better recording of changes on EDS. This may be because of the study design being underpowered, and conducted over a short timeframe. Furthermore, if information about medicine changes is not known to start with by hospital staff, then the chart improvements can make little difference. Alternatively, doctors may also rely on other sources of information than charts when composing discharge summaries, or doctors may not perceive medicine changes as being important information to communicate at discharge. Further work is warranted to explore these two possibilities, which may provide better insight into the documentation of changes on EDS.

3.7 Chapter reflection

This chapter has provided some valuable learning points through the experience and subsequent recognition of some of the pitfalls associated with before and after studies and making interventions in a healthcare setting, which include allowing time for interventions to be embedded in practice, and the question of whether the intervention itself is directly causing any differences observed or whether there are other confounding factors. One key flawed assumption we (practitioners and researchers) made was to identify a possible solution (new drug chart) to the results observed in Chapter 2 without having firstly fully understood the underpinning causes. I have also learned that an intervention which had been reportedly successful in one institution would not necessarily have the same effect in another setting and this is due to the different environmental conditions and multiple factors which are related to the likelihood of errors.

In Chapter 4, the aim was to investigate the problem of discharge from the perspective of healthcare professionals involved in the discharge process. The present chapter could in hindsight have generated more meaningful results with a more effective intervention had it been conducted following on from Chapter 4 and being informed by these findings.

Chapter 4: Understanding experiences of junior doctors at discharge

4.0 Chapter overview

Having investigated errors from a systems perspective in Chapters 2 and 3, this chapter aims to address the human element of discharge errors. This chapter reports the design and results of a qualitative study involving junior hospital doctors at CHUFT. Up to this point in the thesis, the focus has been on the systems involved in discharge: exploring discharge from the primary care standpoint, quantifying medicine errors and medicines reconciliation at discharge. In this chapter, discharge is explored from the other side of the interface between primary and secondary care by interviewing junior hospital doctors, to understand and explain some of the issues at discharge that have been identified in Chapters 2 and 3 from a ‘human’ perspective.

The study design was a modified focused ethnography comprising interviews with observations and “think aloud” technique. Junior doctors were invited to participate in ethnographic interviews whilst writing discharge summaries on wards at CHUFT. The aim was to witness, explore and understand the attitudes and experiences of junior doctors, and to identify processes, barriers and facilitators involved in discharge summary composition.

4.1 Background

Much prescribing involves replicating the decision of another doctor, but these decisions can often be inaccurately transcribed when care is transferred between settings or between healthcare professionals, particularly at hospital discharge (104). It had been expected by the research team that the additional chart fields on inpatient drug charts investigated in Chapter 3 would allow doctors to access information about medicine changes more readily when writing discharge summaries, and that this, in turn, would lead to better quality EDS, providing richer detail regarding medicine changes being sent to primary care.

However, the proportion of EDS that provided full and accurate details of medicine changes was not found to significantly increase following the introduction of the new charts, and there was no statistically significant relationship observed between the use of the chart fields and EDS with medicine changes documented (105). This led the research team to question whether doctors are actually using the newly-added fields on the inpatient chart when composing a discharge summary, and if not, what other features they relied upon; and if not the charts, from what other sources they sought details about medicine changes.

4.1.1 Junior doctors

In the UK, preparing discharge summaries is primarily the responsibility of junior doctors (44). However, both junior doctors and medical students have reported receiving inadequate guidance and training on how to write discharge summaries (47, 48), and it is recognised that priority is often given to more immediately important tasks (46), such as diagnostic testing, clinical procedures and responding to medical emergencies. Currently, each NHS trust uses its own unique prescribing system, so that training junior doctors in this area is difficult to standardise, with in-house training often being relied upon.

Literature indicates that GPs consider details of medicine changes which occurred during hospitalisation to be important information to be included on a discharge summary (22). Yet in spite of this, medicine changes are often poorly documented by hospital doctors on discharge summaries (106), and GPs are often dissatisfied with the quality and amount of information provided on other aspects within the discharge summary (19, 29, 107). These findings show that junior doctors may not fully understand the needs and expectations of

GPs with respect to what information they think the hospital should provide at discharge, i.e. the ideal content of a summary for GP use. Or, indeed, junior doctors may understand, but are unable to provide, the information GPs consider ideal at discharge using the resources and processes that are available to them.

4.1.2 A question requiring qualitative study

Much of the existing research to date on errors made at discharge has aimed to quantify the number of errors present on discharge summaries, but has not focused on understanding the processes by which they are created. The processes of prescribing and transcribing at discharge, and specifically how junior doctors write discharge summaries, have not been extensively investigated in the literature. To provide novel and holistic findings about junior doctors working in this area would therefore entail using qualitative research methods to examine this important interface within the transfer of care pathway.

4.1.3 Ethnography

Ethnographic research provides data on a perspective of the nature of a group's activities through the researcher's immersion in that culture. In order to investigate the practices, routines and interactions of a group of junior doctors in a hospital setting, an ethnographic approach can be particularly suitable. This approach gathers participants' perceptions, views and experiences of the process of summary composition as it happens, enabling understanding of that process among a population of junior doctors. Focused ethnography, in which the research question is focused on exploring only certain aspects of a research field, such as situations, interactions and activities (108), is particularly suitable here to investigate the particular task of composing discharge summaries by doctors.

4.2 Method design

The data requirements for this study were to generate data from the perspective of the individuals involved in the discharge process in order to deconstruct the information gathering and composition processes, and explore the potential relationship between factors associated with poor quality discharge summaries.

In this section, possible options of approaches for collecting data to answer the key research questions are considered and critiqued for their suitability for use in this study. These include observation, think-aloud techniques and ethnographic interviews. The selection process and rationale for choosing the methods that were adopted in this study are also described.

4.2.1 Observation

For this study we hoped to understand the working environment in which junior doctors compose summaries. Observing is most commonly used as a data collection method in ethnographic research, where the emphasis is on the researcher becoming fully immersed within the cultural setting, although in other approaches observation may also be conducted from outside of the study population. Becker and Geer (109) describe observations as a yardstick by which the completeness of data gathered in other ways can be measured; in other words, they can validate partial information which can be gathered by other qualitative methods by allowing the researcher to confirm whether people act, or processes occur, in the way that they have described.

Observation can be done covertly, with the subjects unaware of being observed and without their consent, which some approaches suggest can provide a more genuine picture of the subject without influence from the researcher. However, it is now recognised that people routinely present themselves differently in different situations and there is no way to say that one is “truer” than the other, as all may be contextually appropriate. Covert observation can be necessary where it is impractical to obtain consent from a larger population. Overt observations where consent can be obtained are less ethically problematic, but are open to the widely recognised ‘Hawthorne effect’, whereby the subject being observed performs differently (usually aiming to be in some way “better”) under observation than they would do in the setting or environment as it is usually enacted. This might be due to an awareness of being observed, a wish to please the researcher, or because of the extra attention being given to them (100). Existing studies have adopted strategies to reduce this effect, including increasing the physical distance between the observer and subject (110), observing on repeated occasions and at different times of day (45), and triangulation with other methods and perspectives (111).

Observation is often described as the ‘gold standard’ of qualitative methods, as it provides direct prospective access to what people actually do, at every level of visual, oral, spatial

and sensory detail as they are doing it (112). However, non-interactive observations alone may not be sufficient to understand people's reasons for acting, and might result in incomplete or inaccurate interpretation of the data.

4.2.2 Think-aloud methods

Composition of discharge summaries requires decision-making by the discharging doctor regarding the inclusion of clinical and medicine-related information. As decisions may be reached following complicated thought pathways, conducting research into decision-making behaviour is often challenging. This may partly explain the current lack of health care research about how experts collect and apply their knowledge in clinical settings (113). When it is necessary to explain how participants are constructing the action that the researcher observes, as in this study, think-aloud techniques have sometimes been employed.

Emerging in the 1970s, think-aloud methods were developed from an older introspection method. This suggested that events in the consciousness could be examined in the same manner as those in the outside world (114). In think aloud methods, the research subject provides a running commentary during a process to explain their thought processes and actions, allowing the researcher to gain an insight into the knowledge and methods used in problem solving (114).

Think aloud methods have been shown to allow identification of instances where decisions are made based on intuition, which may not have been apparent through other methods not using commentary as a tool. (115, 116). It has been suggested that a combination of two data collection methods, such as observation and think-aloud, may optimise the completeness of data capture (117)

However, think-aloud methods rely on the ability of the person being studied to articulate their meanings, and in the case of writing discharge summaries, to express in words an action which is often done automatically or without conscious consideration. Ethnographic interviews include questioning by the researcher which can provide a prompt and push for further discussion or explanation where necessary, which is particularly useful in instances where the participant is not forthcoming with meaningful or relevant information.

4.2.3 Ethnographic interviews

Another aim of this study was to use questioning to establish junior doctors' perceptions and experiences in their own words. In think aloud methods, the observer has limited participation, unless where necessary to prompt the participant with their commentary. Ethnographic interviews are interactive and involve contributions from both observer and participant, allowing the observer to fully engage with the subject and uncover the meaning that they make of their experiences (118). Ethnographic interviews are usually carried out alongside observation, which again can assist with triangulating and optimising the completeness of data captured.

However, being interrupted and asked questions by the observer is a distraction which could hinder the performance of the subject in a task or setting. In the case of composing discharge summaries, this could lead to mistakes that could have clinical consequences, or the task taking longer to complete than usual, leading to increased working pressures.

An interview which contains elements of the think-aloud method could reduce the level of distraction, but still allow opportunity for the researcher to become engaged with, and interact in, the cultural setting.

4.2.4 A combined approach

It was therefore decided to design a modified ethnographic approach which combined loosely structured ethnographic interview, think aloud techniques and observations. The interviews were designed to include elements of the think aloud technique, in which the participant could be asked to provide a running commentary of actions whilst they are composing a discharge summary, in addition to semi-structured interview questions. Additionally, observations were included in the approach in order to provide confirmation, explanation and triangulation of the interview and think aloud findings. For the purpose of this study the combined approaches to collect data were referred to as combined fieldwork episodes.

This approach fits with the design rationale to observe the working environment in which doctors compose summaries. It was also desirable to include in the method some provision of a running commentary to understand the process of composing a summary, but it was also desirable for the researcher to be able to interrupt with questions as necessary in

order to clarify points, gather further detail, or to develop and build on a particular topic. Because of these reasons, the study design combining these three methods was relatively loose. A basic semi-structured interview was designed in which think aloud questions were incorporated. Observations ran parallel to the interviews and think aloud questions, providing an overall view and description of the setting of the combined fieldwork episode. The study design and method is further described in section 4.4.

4.2.5 Reflexivity

In order for me (RY), as the researcher, to engage within a cultural setting, it was first necessary to establish my own agenda and likely influence on the data being collected, as well as my interpretation of it. This is because my individuality will invariably affect the choices I have made during data collection and interpretation. Green *et al.* describe the principle of reflexivity as the need for researchers to “*subject their own research practice to the same critical analysis that they deploy when studying their topic*” (112). By analysing their own research practice and clearly displaying this to the reader, the reader is provided with a context in which to understand the interpretations made by the researcher.

Unlike quantitative research, in which the researcher continually strives to remain objective when interpreting data, qualitative research instead recognises and welcomes the subjectivity of the researcher. By its very nature, in exploring views and experiences, qualitative research is interpretative rather than strictly factual, and so by acknowledging and clearly displaying the position of the researcher to the reader, any interpretations arising from the data can be placed in context and better understood.

To include my own self-awareness in interpreting, my own views of primary care are detailed in this section, in order to allow readers of this thesis to understand the context and background from which I make my interpretations of the data. My experience of practice has been largely based in secondary care, where as a junior pharmacist I have been involved in checking discharge prescriptions for accuracy. I have worked alongside junior doctors where I have been made aware of the difficulties they face when composing summaries under time pressure. Additionally, I have three years of experience working as a locum community pharmacist, where I have observed patients transferring in and out of hospital, the resulting effect on their regular medicines and the confusion and problems

that can arise from inadequate information about medicines provided when a patient is discharged from hospital.

In the case of this study, it was necessary to recognise early on in the research process that my dual role of being a pharmacist and a researcher might on occasion lead to a conflict of interest between acting as a healthcare professional and a researcher (119). As a pharmacist with experience working in the hospital setting, I already had preconceptions about discharge practices and the role of junior doctors in these processes.

Being aware of my background may have affected the willingness of the doctor being studied to be fully honest about their feelings and processes they use, particularly if they feared that this might affect working relationships or have a negative impact on their working environment. This may have affected the reliability of the data being collected. However, an 'insider status' can be advantageous in ethnography of healthcare professionals, where the researcher can use their professional experience to make decisions about which questions to ask for effective data collection (112), and because the environment and the "*distinctive occupational subcultures*" that professions create (120) are already familiar to the researcher.

4.3 Aims and objectives

This study sought to understand the process, priorities and experiences of junior doctors composing discharge summaries in a hospital setting. The aims of this multi-method focused ethnographic study were therefore to use observations and the think aloud method within ethnographic interviews to explore:-

- The information gathering and summary composition processes adopted by junior doctors;
- The environment in which they work;
- The experiences they have had when writing discharge summaries.

The results of this study were intended to provide insight into the process of composing discharge communications from the perspective of a junior doctor, which could help to

identify any working practices at discharge where changes could be made to improve the transfer of care pathway.

4.4 Methods

4.4.1 Ethical approval

Research and Development governance and local ethical committee approval for this study was sought, and granted on 26th April 2013. (Appendix 4.1)

4.4.2 Setting

Combined fieldwork episodes were conducted on the hospital wards where the doctor was working. They were arranged for a time convenient to the potential interviewee, but to include a range of morning, afternoon, evening and weekend shifts. Interview questioning lasted a maximum of 30 minutes in duration.

I was responsible for the organisation, data collection, transcribing and analysis for all combined fieldwork episodes which took place within this study.

4.4.3 Sample size estimation and data saturation

The intention was to recruit a sample of junior doctors with varied characteristics including medical school attended, present rotations and stage of training. This would allow a range of relevant experiences of junior doctors to be explored. This type of sample is ideally achieved through purposive sampling, and in particular maximum variation sampling, in which participants are individually selected based on their characteristics (121). However, as only 74 junior doctors were employed by the study hospital at the time of data collection it was decided to approach all junior doctors (FY1 and FY2) irrespective of individual variations, in order to maximise the potential sample size.

Data saturation is reached when analysis produces no new emergent themes. As this research had a specific question rather than a complex multiple focus, it was expected that a sample of five to ten doctors would be sufficient to provide enough data to answer research questions. This was assessed by iterative comparison of interview subjects made

after each interview was transcribed. Therefore the intention was to recruit at least five junior doctors.

4.4.4 Recruitment

An invitation to participate in the study was extended to all junior doctors working at the study hospital. No exclusion criteria of junior doctors applied. At one of the weekly postgraduate teaching sessions offered by the trust for junior doctors, I gave a short presentation to junior doctors about the project, inviting them to participate in an “interview” (combined fieldwork episode). Junior doctors were encouraged to participate by being offered an Amazon® book voucher to the value of £10 in exchange for their time, which was emailed to doctors following successful participation. It was decided to incentivise junior doctors to participate, as their busy working schedule may have reduced their willingness to participate in research. During the presentation, my contact details were provided to enable doctors to gain further project information if desired.

I explained that a few days after the presentation I would be approaching the doctors on hospital wards where they were working to recruit them into the study, and gave them the opportunity to opt out of being approached on the wards if they wished.

When approached on the wards, willing participants provided their name and hospital email address, which I used to contact them directly to arrange meeting for an ‘interview’, and for sending them their voucher after participation.

4.4.5 Study information and informed consent

At the time of recruitment from wards, doctors were provided with an information sheet (see Appendix 4.2) detailing the study aims, method and what they could expect if they participated, and that they were free to withdraw their consent at any point during the study.

After considering this, when a doctor had agreed to participate they were asked to sign a written consent form (see Appendix 4.3) to allow me to observe and interview them. Signing the consent form was seen as the participant's authorisation for me to interview them, and as agreeing to the terms of the interview. Consent could be withdrawn at any time during the study, and this was stated explicitly on the consent form and participant

information sheet. One copy of the signed consent form was given to the participating junior doctors for their records, and the original retained securely at the University.

4.4.6 Format and conduct

Within the combined fieldwork episodes, participants were asked to provide a running commentary on their actions whilst being observed and informally interviewed. The interview was loosely semi-structured in format, the rationale for which being to encourage natural conversation but so that a number of key questions could be used as a backbone, building on findings from the observations, and to help steer the conversation topic if necessary.

The design aimed to make it likely that junior doctors would freely offer their views and experiences with discharge summaries, and that through me immersing myself into the ward culture, the doctor would feel at ease, so that more natural conversation would result. This would enable more reliable data to be generated. A topic guide (described below) was constructed to facilitate and guide the conversation.

4.4.7 Content

Key concepts for questions were identified in the literature, and developed into questions through discussion with the research team. A topic guide was designed using broad research questions and study aims described in section 4.3 of this chapter. Broad questions were divided in smaller, component research questions. These smaller questions were then cross-referenced against the broad research questions to ensure that they could meet the research objectives, and grouped into topic areas in order to help structure the interview. A small number of focusing questions were designed and used where a change of topic or focused discussion was necessary. Probing questions were also designed to elicit more detail or further discussion where needed. Think-aloud questions, which essentially prompted the interviewee to continue speaking and to explain the tasks they were undertaking, were also included. The topic guide is displayed in Table 4.1.

Data was collected via an iterative cycle, in which the processes of conducting the interview and transcribing were followed by reflection and subsequent alterations being made to the topic guide to reflect the new findings.

Topic	Questions
Broad research questions	<ul style="list-style-type: none"> • How do junior doctors perceive discharge? • What is the working environment in which summaries are written like? • What are the processes by which junior doctors collate the information they need to write discharge summaries? • What are their priorities in terms of content and characteristics? • Do junior doctors consider the expectations and needs of the GP when they are composing a discharge summary?
Topic 1: Process and priorities	<p>Tell me a bit about your role in discharge summary writing</p> <ul style="list-style-type: none"> • PROBE: is it your decision to discharge? If so, how do you decide if a patient is going home <p>Tell me about how you source the information you need to write a summary</p> <ul style="list-style-type: none"> • PROBE: what information sources do you use? • PROBE: how readily available is information to you? • PROBE: do you have any problems sourcing information at discharge? <p>Tell me about the processes you use to make decisions at discharge</p> <ul style="list-style-type: none"> • PROBE: How do you decide what information to include in the discharge summary? • PROBE: How important do you consider medicine changes to be at discharge? • PROBE: what action do you take if there is a problem with a summary? <p>Tell me about the working environment in which summaries are written like?</p> <ul style="list-style-type: none"> • PROBE: Do you get interrupted when writing a summary? • PROBE: What interactions with other healthcare professionals occur during this process?
	<p>THINK ALOUD</p> <ul style="list-style-type: none"> • Can you explain to me what you're doing now? • Can you talk me through this process?
Topic 2: Experience and attitudes	<p>Describe your experiences of writing discharge summaries</p> <ul style="list-style-type: none"> • PROBE: How do you find discharges as a whole? Are they enjoyable? <p>How important do you consider discharge summaries to be, compared to other aspects of your workload?</p> <ul style="list-style-type: none"> • PROBE: what tasks are more important than discharge? Why? <p>Tell me about time management of discharge summaries</p> <ul style="list-style-type: none"> • PROBE: how do you find managing discharges within your workload?
Topic 3: Interface	<p>What is your understanding of the needs of GPs following discharge?</p> <ul style="list-style-type: none"> • PROBE: what do you think GPs need to know at discharge? Why?
Topic 4: Education and support	<p>Have you received any guidance for writing discharge summaries?</p> <ul style="list-style-type: none"> • PROBE: what did the guidance tell you? • PROBE: was there anything missing from the guidance which could have helped you? <p>How do you feel about the level of support you receive in writing discharge summaries?</p> <ul style="list-style-type: none"> • PROBE: if there is a problem with a summary, who do you speak to?

Table 4.1: Topic guide for junior doctor ethnographic interviews

4.4.8 Observational fieldwork plan

Observational note-taking was undertaken during the combined fieldwork episodes, and immediately before and after the ethnographic interviews, whilst I was spending time on the wards waiting for or arranging meetings with junior doctors. The times of day when observations were made therefore reflected the context in which ethnographic interviews were conducted. Observations were taken whilst sitting at the nurses' station in the centre of the ward and whilst walking around the ward area, including patient bays, side rooms and doctors' rooms.

Observations were made on the following points relating to the research objectives:-

- Where a doctor looks for information to be entered on the summary (for example the BNF, patient's inpatient chart, patient's medical notes, the ward pharmacist, other doctors)
- What course of action was taken by a doctor when information relating to medicines couldn't be found
- Time spent working on the different elements of the discharge summary and performing different tasks involved in composition
- Working environment within which the summaries were composed, including pressures and constraints that apply to writing discharge summaries
- Frequency and nature of interruptions that occur during the process.

Observations on the ward were carried out openly, but unobtrusively, with the researcher refraining from 'interfering' in the setting (118). However, observations which were conducted during ethnographic interviews were more interactive, with questioning and explanation from the doctor participant during the summary composition process. Observational notes were recorded using a data collection form (Appendix 4.4) in order to structure notes and act as a reminder.

4.4.9 Researcher preparation

Prior to conducting this study I undertook a qualitative skills training course provided by the University of East Anglia which consisted of taught sessions and a group qualitative project consisting of semi-structured interviews with colleagues to develop and practice interviewing techniques. I also undertook a training course provided by Oxford University Health Economics Research Centre on qualitative analysis of data to prepare me for data collection, processing and analysis.

4.4.10 Accuracy interventions

This study focused on the process of writing a discharge summary from the perspective of junior doctors, and it was not my intention to identify or quantify medicine errors made on discharge summaries. The content of discharge summaries written by doctors during combined fieldwork episodes was not reviewed, and patient information would not be collected. Investigation of the accuracy of discharge summaries is beyond the scope of this chapter.

If, however, a medicine-related inaccuracy in the discharge summary being written was identified during the course of a combined fieldwork episode, then it was decided that I would speak to the doctor at the end of the fieldwork episode (or before the summary was finalised and sent to primary care) to inform them of the inaccuracy and leave them to address and rectify the issue as they saw fit. This was necessary as a professional requirement of the researcher being a qualified pharmacist. However, no inaccuracies were encountered during the fieldwork episodes.

4.4.11 Confidentiality

All data collected was processed and stored anonymously, in accordance with Cauldicott guidelines, with all identifying information relating to junior doctors removed. For the purpose of the study, junior doctors were allocated a unique study reference number, which was used when processing and analysing their interview data. Transcripts of interviews were made available to the participating junior doctors on request.

4.4.12 Data analysis

Dialogue and think aloud commentary provided by the participant was recorded using a digital electronic voice recording device (Olympus[®] WS-100 Digital Voice Recorder), and whilst this was occurring, I recorded my observations and field notes by hand.

Data recordings were transcribed verbatim. Thematic analysis (103) was used to identify emergent themes. Findings were grouped according to large general themes and then by smaller specific sub-themes for ease of interpretations and further discussion. Although I was responsible for the decision-making relating to analysis, and all interpretations made from the data, themes were presented to an experienced qualitative researcher in the research team at UEA for discussion and refinement where necessary.

4.4.13 Trustworthiness

Trustworthiness is a measure of the quality of research undertaken. It is important in evaluating the worth of the research in the field to which it is intended to contribute, and in turn, the extent to which it can be relied upon to make practical recommendations to improve practice. Lincoln and Guba [28] describe four criteria for establishing trustworthiness: credibility, transferability, dependability and confirmability. Credibility means establishing that the results obtained are credible or believable. To ensure credibility here, the interview findings were later triangulated with the results of a survey to junior doctors (chapter 6) in order to confirm that the most important concepts have been identified. 'Thick' description of the junior doctor participants and their environment, provided through detailed observational field notes, helped to achieve external validity (122), and can enable the conclusions drawn to be transferable to other settings, situations, and healthcare professionals. Confirmability describes the extent to which the results are 'neutral', and not biased by the preconceptions or views that I hold. To ensure this, I kept a research diary for the duration of the study in which to record decisions made and the rationale. This included a reflexive account of the research progress in terms of my thoughts and feelings, professional judgments, values and research interests. Dependability (the consistency of the findings and capability for the study to be repeated) was addressed through frequent assessment by the academic supervisors within the research team.

4.5 Results

4.5.1 Combined fieldwork episodes

Seven junior doctors (four FY1 and three FY2 doctors) were recruited into the study, whose demographic characteristics are summarised in Table 4.2. The combined fieldwork episodes took place in the location where the discharge summary was being written, which was either on the ward itself, at a computer station (usually the nurses' station), or in a side room off the main ward, also known as the doctors' room. Interview transcripts are included in Appendix 4.5.

Doctor reference	Grade of doctor	Specialty/ward	Time of interview	Location of interview
JD1E	FY1	Elderly care	Weekday, morning	Ward
JD2S	FY1	Surgical	Weekday, afternoon	Ward
JD3E	FY1	Elderly care	Weekday, afternoon	Ward side room
JD4E	FY2	Stroke	Weekday, afternoon	Ward side room
JD5M	FY1	Medical	Weekend, afternoon	Ward
JD6M	FY2	EAU	Weekend, morning	Ward
JD7E	FY2	Elderly care	Weekday, morning	Ward side room

Table 4.2: characteristics of junior doctor participants

4.5.2 General ward impressions

During my immersion on the wards I gained impressions and observed a range of interactions to give an overview of the ward environments summed up as “general ward observations”. Specific observations relating to information sources, problem resolution, the working environment and nature of interruptions will be examined in terms of the themes discussed below.

In terms of general observations, surgical wards tended to be quiet, in terms of noise volume and number of patients, which meant fewer ward staff were present, and those that were working had smaller, manageable workloads. As a result they seemed to appear organised and calm environments. According to surgical staff, junior doctors did not remain based on one individual surgical ward but instead rotated between the wards where their surgical patients were residing, and responding to surgical bleeps, which they answer “*in their own time*” according to one of the surgical nurses. Surgical wards were predominantly staffed by nurses, with very few medical professionals based there; creating a sense of organisation by being managed by only one team, rather than having multiple input from others.

My impression of organisation on surgical wards made a sharp comparison to the medical wards, which appeared much more chaotic in terms of the multiple demands on the limited working space made by the sheer number of staff, visiting staff, patients and visitors present on the wards. On medical wards, the nurses’ station which housed most of the computers was always occupied by nursing and medical staff. Staff on medical wards were

generally non-communicative to each other, 'keeping their heads down'. The environment itself was generally noisy with patients crying, beeps going off and phones ringing.

On medical wards, pharmacists did not seem to be well-immersed within the ward culture. Pharmacists were not always known by the ward staff or referred to by name, which gave the researcher an unfriendly impression of the relationships between pharmacy and ward-based staff. Often, therefore, pharmacists would spend their brief time on the wards in checking discharge summaries with minimal interaction with medical or nursing staff. The inter-professional interactions that were observed were largely with clerical ward staff in relation to logistics of discharge summary release. This may have been due to the frequent rotation of both ward and pharmacy staff as there was not always a regular pharmacist allocated to each ward, or perhaps because pharmacists were primarily based outside of the ward in the pharmacy department and generally spending less time being physically present on the ward. Prescribing on surgical wards especially had little input from pharmacy, except where patients were on high-risk or complicated medicines at discharge.

On elderly care wards, junior doctors are likely to spend more of their working day in collaboration with ward staff, as their patients have longer admissions and often require more complex post-discharge arrangements, leading to stronger communication and working relationships with ward staff. Pharmacists were also more involved with the medicines of patients on elderly care wards, especially where swallowing or compliance difficulties existed, and seemed to be embedded well within the ward team.

4.5.3 Building research relationships on wards

I initially recruited doctors for interviews by approaching them on wards for an informal discussion and arranging an interview if they were willing to participate. However, doctors were not always easily located, tending to congregate in side rooms or be found with the patients. Nursing and administrative staff were located in more central areas on the ward.

On medical wards the continual influx of visitors and healthcare professionals gave me the impression of a general lack of organisation and made the environment seem hostile and staff unapproachable for the purpose of doctor recruitment or to discuss my research. On reflection, it was rather that the chaos of busy medical wards was intimidating for a researcher to enter and to attempt to build relationships to assist with research. Conversely, staff working on care of the elderly wards were friendlier and welcoming

towards me, and more willing to engage in conversation and taking an interest in the study. This was perhaps because the wards were quieter, and staff were less busy with patients and as a result able to give more time to non-clinical activities. As a visitor to elderly care wards, I was identified as a newcomer immediately by the ward clerk or sister, and introduced by name to other ward staff, which made conducting observations and approaching junior doctors easier and more comfortable. Elderly care staff were also generally more aware of the identity and likely location of junior doctors, which helped me to locate them for combined fieldwork episodes. This was not the case on surgical or medical wards, where ward staff often did not know where the doctors could be located.

4.5.4 Thematic analysis

Five broad themes and multiple sub-themes arising from the interview data are described and considered in the following sub-sections:-

- Theme 1: Perception of roles in discharge
- Theme 2: Process of writing a discharge summary
- Theme 3: Barriers
- Theme 4: Facilitators
- Theme 5: Perceptions of care continuity

4.5.4.1 Theme 1: Perception of roles in discharge

The theme of “perception of roles in discharge” was organised around junior doctors’ perceptions of their role in the discharge process, their attitudes towards the summary composition process and responsibility and accountability for information included in summaries. Sub-themes in this theme included:-

- Perception of roles
- Ownership and responsibility
- Decision-making
- Prioritising discharge and workload

4.5.4.1.1 Perception of roles

The sub-theme “perceptions of roles” links references made by junior doctors as to how they perceive their role in the discharge process. Junior doctors reported spending much of their working day involved in preparing discharge summaries, and see it as a recognised part of their every day role as a junior hospital doctor:-

“It [discharge summary preparation] always falls to a junior doctor. We kind of split the ward into different areas and... just if it comes in the area you’re doing then you do the discharge” [JD3E]

This comment indicates that task allocation is a team decision among the medical staff, based on a fair split of ward area rather than other factors such as speciality, number of patients, or complexity of patient conditions. Doctors alluded to the preparation of discharge summaries being seen as an undesirable task to complete, giving the impression that junior doctors are often ‘lumbered’ with doing it. JD7E’s comments contrasted with those above of JD3E.

“Usually... you’re with a junior [doctor] as well who can do the discharge while you do the more... the other jobs really” [JD7E]

This comment instead indicates that discharge tasks are allocated based on seniority of doctor, with the most junior doctor completing the discharge summary whilst the other doctors within the ward team focus on other tasks.

Nonetheless, one doctor described a sense of solidarity and team spirit among the juniors to work together to ‘get the job done’, as with:-

“Everybody should have to do [a discharge summary] and I don’t believe it should be an F1 job. I think at the end of the day you just all muck in and you do it. I don’t think the registrar should have to do it, because they’re busy with other things, but I do believe you just share them out” [JD7E]

The analogy of ‘mucking in’ indicates that the preparation of discharge summaries is not seen as one of the attractive roles of doctors, and perhaps because of its perceived unimportance, there is an apparent immunity of senior doctors from involvement - as in the above quotation, which implies senior doctors are too busy to have to spend their time writing discharge summaries.

4.5.4.1.2 Ownership and responsibility

The sub-theme of “ownership and responsibility” includes concepts of responsibility for discharge summary writing and other tasks relating to discharge as identified by junior

doctors. The junior doctors interviewed all described feeling responsible for the information which is contained within discharge summaries they write, as with:-

“At the end of the day it’s our name at the bottom of it, so we’re responsible”
[JD7E]

This quote highlights how this doctor sees this responsibility as a necessary and inevitable part of their role. The comments of most participants indicated that this is a concept with which doctors are familiar, as very early in their career they learn to take responsibility for conducting clinical procedures and making prescribing decisions. Doctors also take the overall responsibility for care during a patient’s admission, something which would have been reiterated and continually emphasised to doctors during the course of their training.

However, one junior doctor describes the responsibility for discharge summaries as being shared between those who have previously documented the information which is then used by the authoring doctor for the discharge summary:-

“I think the responsibility lies with you and the clerking doctor, but at the end of the day your name goes on... it, so whatever’s on there... lies with yourself, the responsibility, unfortunately” [JD6M]

By describing responsibility here as “unfortunate”, this doctor again highlights that this responsibility may not necessarily be welcomed by junior doctors. Also, doctors appear to feel uncomfortable with relying on information from others at discharge, which they then take ownership of by signing their name at the bottom of the discharge summary.

One doctor felt particularly strongly about asserting her responsibility at discharge, preferring to write summaries for her patients herself so as to ensure that the important content was relayed to GPs:-

“Some discharges I like doing, because if they’re a complex patient I feel better when I’ve done it. Then I myself know that it’s on the discharge summary” [JD7E]

This highlights an issue of trust and mistrust in other healthcare professionals, or processes involved in discharge, by choosing to complete the task themselves rather than to delegate.

This doctor's view may possibly reflect their experience of errors resulting from trust being placed on others in the past.

Another doctor acknowledges the possible limitations of relying on others, and the subsequent potential for errors:-

“What I do as well... just to be on the safe side, if someone has mentioned something about a small bleed; if the doctor in the middle of the night is very tired; if it's 5am in the morning - they might miss something relatively important on there - so I always just double check that” [JD6M]

This doctor acknowledges the limitations of others in relation to working capacities and abilities to perform under stressful circumstances, and tries to compensate by conducting extra checks to ensure good quality. This enables them to take responsibility for the summary.

However, where the doctor did not know the patient for whom they were writing the summary, or where they had not been involved in their treatment during the admission, they indicated their reluctance to take ownership of the summary, often attempting to compensate for this by including a statement for the GP to that effect, as with:-

“Often I write at the beginning of the discharge summary that if there's any questions [from the GP], don't direct them towards me... because I won't be able to answer them, and for the medical team who usually looked after the patient to do that” [JD5M]

This doctor is directing responsibility for the summary content away from themselves as a result of limited patient knowledge. Doctors who make a statement to this effect could be seen as 'covering their backs' in relation to any discharge information that may be incorrect or missing from the summary, by providing GPs with an excuse for why they have produced a lower quality summary, and by admitting the limitations of their knowledge and level of involvement with the admission. However, one doctor argued that she had been told by a senior doctor that writing when a patient was not known to the authoring doctor was inadvisable as it reflected badly on the hospital:-

“I was told to put at the start [of the discharge summary] ‘I do not know this patient’ or ‘unfortunately I don’t know this patient’ and apparently that’s frowned upon, but at the end of the day it’s my signature going on that TTO, and I find that really unfair that consultants encourage you not to do that - because it looks bad - but at the end of the day you don’t know that patient” [JD1E]

This doctor identifies unfairness in the instruction by senior doctors that she should not write an excuse for the quality of her written summary, because the senior doctor believes it will undermine the GP’s trust in the hospital by the junior doctor admitting doubt or uncertainty.

4.5.4.1.3 Decision-making

The sub-theme of “decision-making” linked references made by junior doctors to taking responsibility for decisions at discharge. This doctor describes making a decision when there is limited information available to them at discharge, and the questions which are outstanding as a result:-

“If they [the consultants] haven’t written ‘follow up’, does this person need a follow up? That’s when it gets difficult” [JD2S]

The difference between having a follow-up appointment requested or not could be clinically significant for this patient. This decision is therefore important and understandably described as difficult to make by the junior doctor.

Another doctor describes the questions he asks himself when deciding on a course of action for a patient, focusing particularly on the potential benefit that will result from taking that action:-

“Shall I go and ask [the patient] his past medical history? How much of a benefit would it be to the patient? And to the GP?” [JD6M]

This doctor, who was at the time of interviewing conscious of time and having to produce the discharge summary quickly, makes a decision regarding information gathering in order to prioritise his time.

4.5.4.1.4 Prioritising discharge and workload

The sub-theme around “prioritising discharge and workload” addresses how junior doctors identify how discharge summaries may or may not fit into their workload and how they manage tasks within their role.

Whilst the importance of discharge summaries was acknowledged by junior doctors, when prioritising their workload, doctors described the writing of discharge summaries often being demoted as a priority in favour of “more pressing” clinical tasks, which could include being asked to see newly-admitted patients and being expected to treat acutely unwell patients:-

“If there’s [someone who is] acutely sick... that obviously comes first, because that’s something that needs doing then and there” [JD3E]

This doctor identifies first and foremost that their prioritisation of workload is based around the treatment of unwell patients, indicating that they are considered to be more important than the production of discharge summaries. Another doctor recognises the importance of addressing unfinished weekend work and seeing new patients:-

“I think it’s difficult in terms of workload, especially on a Monday morning when you’ve got new patients and you’ve got patients that have... been highlighted by the weekend on call doctors as unwell... You would prioritise seeing those patients rather than writing a discharge” [JD7E]

Prioritising workload for this junior doctor is based around actively treating patients rather than focusing on discharge summary writing. However, some junior doctors did describe prioritising discharge summaries in situations where patient transport was booked, where the nurses required the bed space on the ward, or where the patient was eager to go home, as with:-

“TTOs is quite high [a priority] for a number of reasons. Number one, the patients are keen to go home so you have to... respect their wishes, and they want to go home” [JD6M]

This doctor implies that the basis for prioritising workload should be centred around the patient's wishes. However, no junior doctors acknowledged the importance to the GP of discharge summaries being completed quickly, which may indicate their lack of insight into care continuity following discharge. This is further discussed in Theme 5 further on in this chapter.

4.5.4.2 Theme 2: Process of writing a discharge summary

The theme relating to the "process of writing a discharge summary" groups together the processes observed and reported by junior doctors as contributing to their composing discharge summaries, including what information was included, where information was sought, and how problems were resolved. Sub-themes covered within this theme include:-

- Information sources
- Content selection
- Using written information
- Reliance on others
- Medicine changes

4.5.4.2.1 Information sources

The sub-theme "information sources" includes findings on the types of reference sources used by junior doctors when seeking and gathering information for discharge summaries. Table 4.3 displays a summary of the observations and notes made on the wards during interviews about where doctors gathered information for the discharge summary and to solve problems they encountered during the summary composition.

This table shows the wide diversity of reference sources consulted by junior doctors when composing discharge summaries and resolving problems on discharge summaries. This variety may indicate lack of guidance or standard procedure they could refer to when carrying out these processes. Some doctors referred to letters from the GP where available, but most commonly-used sources were the inpatient drug charts, patient notes, the doctor's own knowledge of the patient and nursing notes.

Doctor reference	Reference sources used	Problems encountered	Resolution / sources of help
JD1E	<ul style="list-style-type: none"> • Other doctors • Patient notes 	<ul style="list-style-type: none"> • Unable to read doctor's handwriting 	<ul style="list-style-type: none"> • Refer to consultant
JD2S	<ul style="list-style-type: none"> • Patient notes • Drug chart • GP referral letter • Nurses 	<ul style="list-style-type: none"> • Dose of clexane needed to be calculated 	<ul style="list-style-type: none"> • Use known formula and calculated on phone • Ask nurses
JD3E	<ul style="list-style-type: none"> • Patient notes • Laboratory tests • Drug chart 	<ul style="list-style-type: none"> • 	Speak to members of the team
JD4M	<ul style="list-style-type: none"> • n/a 	<ul style="list-style-type: none"> • n/a 	n/a
JD5M	<ul style="list-style-type: none"> • Patient notes • Drug chart • Nurses • Medicines reconciliation boxes on charts • Senior doctors 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Ask nurses Use initiative
JD6M	<ul style="list-style-type: none"> • Patient • EAU notes 	<ul style="list-style-type: none"> • Doctor unsure of whether patient lost consciousness during injury 	<ul style="list-style-type: none"> • Ask the patient
JD7E	<ul style="list-style-type: none"> • Patient notes • Own knowledge • Drug chart • Nursing notes 	<ul style="list-style-type: none"> • 	Refer to senior doctors

Table 4.3: Summary of observations of doctors' information gathering when composing discharge summaries

On surgical wards, the doctors tended to stick to forms outlining details of the surgical procedures. On medical wards doctors were reliant on more than one source, as with:-

“Depending if they [the patients] have got something like a complicated bed sore, I will look at the nursing notes if they're available [and] correct. I generally just use the notes to be honest, the drug card and my own knowledge of the patient” [JD7E]

This doctor describes employing sources for retrieving generalised information, referring to more specific sources only in more complex cases. Junior doctors generally considered the drug chart as a reliable reference source for the most up-to-date information about patient's medicines:-

“The drug chart is always better than the notes... if the pharmacists have done their work, which they usually do, you have the corrected version - you have the green [pen]”

This doctor alludes to a preference for charts, which ward pharmacists will review on a daily basis and make corrections and recommendations where necessary (in distinctive green ink), over patient notes, which pharmacists do not routinely write in or check for accuracy, and the drug chart.

When junior doctors reported deducing which changes to medicines had occurred during an admission, they also traced back the drug charts, where available as with:-

“If people have been in for months and months and months they’ve been on so many medicines, and unless you have their first drug chart and last drug chart, you don’t really know what’s changed” [JD3E]

This doctor implies that a history of medicine changes made is most clearly identified from the chart rather than the notes, where medicines reconciliation will be clearly documented (usually by a pharmacist) when the patient is admitted.

Junior doctors also referred to nurses as a source of relevant discharge information, as with:-

“So [number] one, ask the nurses if they know anything about where that [information] is” [JD5M]

However, using nurses and other healthcare professionals as reference sources was not common among the junior doctors, and was only reported by one medical and one surgical junior doctor. Only one junior doctor (based on a medical ward) described using the patient as an information source for discharge summaries, especially where the patient is not known to the junior doctor:-

“They’ve got in [the notes] here ‘no medicine’, but I ask the patient if he’s on any medicine - deliberately for the TTO, because I want to know if he’s on regular meds” [JD6M]

This implies that this doctor considers the patient a more reliable source of information than the notes, questioning the information they have on the chart and choosing to confirm the information written to the patient's answers.

This doctor's response was an exception, and most other doctors described a reluctance to delve further where information was not readily available to them, as with:-

"I personally wouldn't go sifting through old notes to see what meds he [the patient] was on" [JD2S]

And also:-

"There's no point [asking other doctors]... they're not going to remember the intricate details" [JD1E]

These doctors seemed to have chosen to 'make do' with what information they had available to them when composing a summary, largely in the interests of time and effort.

4.5.4.2.2 Content selection

The sub-theme of "content selection" includes data relating to junior doctors choosing what information to include within a summary. When selecting information which should be included within the discharge summary, all doctors expressed consciousness of the need to make their discharge communications a concise summary of the patient's admission, as with:-

"It's generally like a summarised version of the history of investigations and what we want done now... I don't think it needs to be anything more" [JD7E]

Doctors tended to draw upon their own clinical knowledge and personal experience to make decisions as to which information is important to include within the discharge summary:-

"As time's progressed I've got more and more confident with using my clinical knowledge to rule out what's important [and] what's not. It just all comes with

experience really. I think for someone who started on day one... they'll probably look at this [the discharge summary] and think 'what shall I write; what not to write', but I guess after months and months it just comes". [JD6M]

This doctor indicates a reliance on clinical knowledge to be able to make decisions as to the importance of discharge summary content, rather than being specifically taught about how this should be undertaken.

Similarly, another doctor compared their early experiences of writing summaries to now, when they have had more practical experience in the role:-

"If I'd just started... I'd want to know everything about the patient, but now you... realise what's important to put in a discharge summary" [JD2S]

Both doctors quoted above described experiencing a realisation of what information is necessary to include in the summary, which they gained through time and experience working on the wards, rather than having been taught. Doctors did not report any training in which they were advised of the necessary, or important, information to include on a discharge summary.

4.5.4.2.3 Using written communication

The sub-theme of "using written communication" relates findings relating to doctors' use of written communication as a reference source when composing summaries. Junior doctors described how they valued having access to good written communication, such as detailed documentation in the notes by hospital doctors, or having a letter from the GP on admission, for helping them in writing summaries, as with:-

"Sometimes you have to search a bit, but it depends. I think it depends who's written in the notes. If someone on a ward round has made good notes then it's quite easy" [JD3E]

This doctor implies however, that having good documentation in the patient's medical notes is not always the norm, and that information is not always readily available to the junior doctor at discharge. However, when it is present, the discharge writing task is easier for junior doctors. Similarly, where GP notes are provided, the doctors found the task to be

facilitated, especially when conducting medicines reconciliation or writing discharge medicine.

“See this gentleman here has got a recent letter with all the meds he was on from the GP, so [that] makes it more handy, but a lot of people don’t have that” [JD2S]

This example indicates if GPs have provided information to the hospital, the summary composition task is more convenient for the junior doctor, but this speaker again implies that good written communication is not consistently available.

4.5.4.2.4 Reliance on others

The sub-theme “reliance on others” covers findings relating to the interdependency between junior doctors and other healthcare professionals. Junior doctors could be seen to be very reliant on communication and documentation of decisions made during the patient’s admission in the medical notes by other doctors. Their comments described wide variation in the quality of the notes available to them, depending on the doctor who had written them, as with:-

“That’s dependent on who’s... done the notes. That’s variable... When the new patients come up, generally you’ll have a summary page of what they’ve come in with, what’s been done, what their investigations are - and that’s very useful to start the discharge summary with. Some don’t, and then you have to do your own summary” [JD7E]

This implies that this doctor feels reliant on other doctors to have contributed to the summary by documenting their own work in order that the discharging doctor has a basis on which to compose a summary. Provision of this information is helpful to the discharging doctor. Without this, the time to compose the summary is likely to be extended, and the quality of the content may be affected.

Where documented information was available, this was not always clear or legible, as with:-

“Sometimes [the notes] might not be legible, so you’re guessing at what’s on there - so you’re like ‘what shall I write?’” [JD2S]

In this instance the doctor is faced with a decision whether to make an educated guess based on the illegible notes, or to omit providing the information involved on the summary. Either way, there would be potential for misinterpretation and inaccuracy to be reflected in the discharge summary as a result.

4.5.4.2.5 Medicine changes

The sub-theme of “medicine changes” covers findings relating to the provision of medicine changes on discharge summaries. Changes made by other doctors to an individual’s medicines during the course of the admission proved particularly problematic for the junior doctors writing the discharge summary, to deduce where information was not well-documented in the notes, noted as follows:-

“The nicorandil was stopped in EAU and there’s no reason [given] for it, and even the consultant when he came up here was like ‘I don’t know why that’s been stopped’... There’s no plan... there’s no logic that we could find from it” [JD1E]

This implies that doctors see themselves as often reliant on their clinical knowledge and experience to deduce the rationale for a medicine change being made, however sometimes even this is insufficient for an explanation. Discharging doctors have reported being specifically reliant on documentation of the patient’s condition in the notes, with which they were often able to deduce the reasons for action taken, even where it was not explicitly stated. However in the example described by JD1E, they could identify “no logic” from which to extract a rationale for the change made. Additionally, saying that the senior doctor was also unable to extract a rationale implies that it is not the inexperience of the junior doctor which is hindering such deduction. Doctors reported as being more easily able to identify medicine changes where patients had been in hospital for a shorter length of time:-

“For patients who have been in for a shorter length of time, it’s quite easy to see what you’ve stopped on this admission... so then I’d usually put [details of stopped medicines] in. But... for patients who end up being here for six months... it’s quite hard to know what’s happened with their meds sometimes” [JD3E]

This doctor implies that discharge summaries for patients who have been admitted for longer stays are more complicated to produce because of the greater likelihood that

changes to medicines have been made over that time. Where patients move between wards under the care of different teams, it could be difficult for doctors to contact the other healthcare professionals who may have made changes, and in the course of a patient's admission, notes can frequently go missing. However, the reasons for making changes were sometimes judged obvious by junior doctors, and so junior doctors would not necessarily be expect them to be documented or clarified in the notes, such as:-

“With the clopidogrel, if someone's bleeding, then they just cross them off [the chart] straight away... without documenting, because I think it's obvious between doctors why they stopped it... why they don't write it” [JD6M]

Although this junior doctor thinks that it is obvious why a medicine has been stopped, what he believes is obvious might not be apparent to another doctor reading the notes. Additionally, the doctor assumes that the reason for making changes may be apparent between doctors, but does not consider whether it will be apparent to the other healthcare professionals who also read the medical notes, such as pharmacists and nurses. The omission of information from notes by one doctor, because of an assumption that other doctors will understand their own decision-making processes, is likely to introduce ambiguity and error.

4.5.4.3 Theme 3: Barriers to writing discharge summaries

The theme “barriers to writing discharge summaries” encompasses the perceptions of barriers that junior doctors identified and described experiencing when writing summaries, which include the following sub-themes:-

- Environment and interruptions
- Time
- Guidance
- Not knowing the patient

4.5.4.3.1 Environment and interruptions

The sub-theme of “environment and interruptions” brings together comments made by junior doctors about the ward environment in which they write summaries. This includes the noise level, number and nature of interruptions, and general comments relating to the workspace.

During the combined fieldwork episodes, which took place on the wards where the doctors usually work, interruptions by other members of staff were frequent. These were often trivial in nature, for example, nurses asking whether they could use the chair, but occasionally the doctors were asked to perform a clinical task, such as take some blood samples, whilst in the middle of composing a discharge summary. Table 4.4 overviews some of the types of interruptions that were witnessed by the researcher and some general comments about the ward environments in which the combined fieldwork episodes took place.

Doctor	Environment	Interruptions
JD1E	<ul style="list-style-type: none"> • Background noise • Limited computer access 	<ul style="list-style-type: none"> • Someone needing chair
JD2S	<ul style="list-style-type: none"> • Quiet, modern ward • Spaces for individual work 	<ul style="list-style-type: none"> • Nurse asking doctor to provide patient results
JD3E	<ul style="list-style-type: none"> • Quiet office • Fun, jovial atmosphere • Strong sense of team spirit • Good interactions with other HCPs 	<ul style="list-style-type: none"> • Occasional chatting from other doctors
JD4M	<ul style="list-style-type: none"> • Busy but efficient • Friendly • Good morale of staff 	<ul style="list-style-type: none"> • Occasional chatting from nurses and other doctors
JD5M	<ul style="list-style-type: none"> • Excellent rapport with nurses • Less staff, more workspace on ward • Busy weekend workload 	<ul style="list-style-type: none"> • Nurse asking about medicines • Nurse asking about when summary would be ready
JD6M	<ul style="list-style-type: none"> • Modern, large and spacious ward • Very busy • Doctor moved to quieter area to write summary • Limited information available on ward - reliant on patient 	<ul style="list-style-type: none"> • Nurse asking for stool sample
JD7E	<ul style="list-style-type: none"> • Efficient sister on ward • Well organised • Busy time of day – post ward round 	<ul style="list-style-type: none"> • Nurse asking for blood sample

Table 4.4: Observations made relating to environment and interruptions during interviews

Junior doctors complained about the lack of a quiet, private space on the ward in which discharge summaries could be written, which would allow the doctor to limit interruptions and help concentration on that task.

“Especially on the weekends when you’re at the AMU, and you’re standing at a computer that’s surrounded by lots of people... it’s not exactly an ideal situation. We don’t often have... an office or anywhere that we can go into, or anything like that” [JD5M]

However, doctors expressed awareness of the need to make themselves continuously available to ward staff, and so also suggested that removing themselves into a quiet space in order to write summaries could be potentially problematic.

“If you can’t disturb a doctor when they’re doing a TTO, then nurses can’t get their message across, and I think interruptions have to happen... we should be able to talk to a nurse then come back to a TTO” [JD6M].

4.5.4.3.2 Time

The sub-theme of “time” relates to the references made to the need for, and pressures on, time available to junior doctors to compose discharge summaries in the context of their working day.

Time spent composing discharge summaries (acquiring information and writing the text) was frequently identified by the junior doctors as a problem surrounding discharge. The summaries composed during interviews took between 12 to 35 minutes to complete, varying dependent upon patient complexity and the occurrence of interruptions. Writing a discharge summary required careful reading of notes and transcription of medicines from drug charts. One doctor acknowledged the potential effect on quality of the summary associated with a hurried summary:-

“If I had more time, I’d be able to go through the notes thoroughly and find out all the information” [JD5M]

This statement is concerning, as it implies that often notes aren’t reviewed thoroughly and information is often not identified in the interests of producing a summary quickly.

Another described the knock-on effect on time of having to step out of a ward round in order to complete a discharge summary:-

“Everyone just gets pulled from ward rounds to see a discharge summary - and then you got a hundred different jobs to do - so there literally is no time” [JD2S]

For this doctor, addressing discharge summaries has led to a conflict of priorities and subsequent burden on their already large workload.

4.5.4.3.3 Guidance

The sub-theme of “guidance” examines comments made by doctors relating to the training and guidance they have received during their medical degree, at other secondary care institutions, and whilst working at CHUFT.

Variation in the discharge summary writing practice between junior doctors was apparent through observations and interviews. Rather than receiving formal training on what constitutes a good discharge summary, junior doctors instead were left to find their own style of compiling and writing a summary through practical experience and learning by doing, as with:-

“Everyone has their own style of [doing] discharge summaries and... we’ve not really been given a tool as to [how to] do them best... I think it’s difficult to know how much information to actually put in” [JD1E]

When talking about their formal postgraduate training provided by the hospital, most junior doctors said that the training they received was solely focused on how to use the electronic discharge system, not what information should be included within the summary, how to gather that information, and what constitutes a high quality discharge summary:-

“No. I think we got [training], when I first started at the trust. We got shown how to use Bedweb and that’s it” [JD7E]

Some felt that their individual method of summary writing depended on the consultants under which they are working or had shadowed in the past. The ward specialty was also a factor, for example, they described their surgical discharge summaries as being very different in content and length to medical discharges.

“I did respiratory first, and then we did quite good discharge summaries which were quite important because they would have a lot of care in the community. But then when I was doing surgery, the discharge summaries turned into very much ‘this patient came in for an elective this, they’re well and they’ve gone home’ - that kind of thing” [JD5M]

However, it was not common for doctors to share discharge writing skills or practice between themselves. When asked if conferring with peers about discharge practice occurs, one doctor replied:-

“Not really no, I haven’t really spoken to anyone about it really. Everyone just kind of does their own thing” [JD2S]

This implies that doctors perceive ability to write summaries as an individual and individualised skill, rather than something which is standardised across the board. It may also imply that discharge summary writing is not perceived to be that important, if it is not openly discussed between doctors.

4.5.4.3.4 Not knowing the patient

The sub-theme of “not knowing the patient” emerged from the references made by junior doctors to summaries that they have written for patients where they have not been directly involved in their care and where the patient is therefore not known to them.

Doctors described often having to write summaries for patients whom they did not know, mainly when on call or working out of hours, but occasionally for other teams on their ward:-

“Sometimes I’ll know the patient when I’m doing a discharge and sometimes I won’t. If you know the patient it’s so much easier because you’ve seen them on their journey and you can remember everything that’s happened - and you produce a much safer discharge summary, I think. For example, I’ve had a patient here who’s been in with us for... 32 days, and he got sent up from stroke unit, and I’ve just met him this week and he’s going home today, and I don’t really know... what’s been going on” [JD1E]

This doctor suggested that knowing the patient provides the ability to draw on memory and personal knowledge rather than what information is stated in, or can be deduced from, the medical notes. One doctor gives an example of a positive outcome which may have prevented patient harm of writing a summary for a patient that he knew at discharge:-

“Because I was looking after her I knew that she had resolved [Atrial Fibrillation] and that’s not always documented on the notes, and so I wouldn’t have known unless I had been told when looking after the patient” [JD2S]

This example indicates that knowing the patient provides this doctor with further information which can assist with not only the process of discharge summary writing, but the quality, accuracy and safety of the information that is included. Another doctor describes writing the summary as a mechanical task:-

“For a patient I know, I’m more at peace... and it’s faster. But it’s mechanical when I’m writing for someone I don’t know. Takes longer too” [JD4E]

This doctor also suggests the speed with which the summary can be written is increased where the patient is known, indicating the extent to which junior doctors value their time, and who could potentially benefit from spending time on more pressing clinical tasks. Additionally, all junior doctors emphasise the ease of completing a discharge summary for a known patient:-

“I think it’s a lot easier, obviously if you know them, it’s a lot easier. Plus you can go into more detail rather than being vague” [JD2S]

Worryingly, junior doctors commented on their judgement of the quality of discharge summaries which they have produced for patients unknown to them as ‘poor’, describing their content as unsafe or vague, but that they had to make do with the information available, as with:-

“I’ve had to go through [the notes] the best I can... and produce a summary that I think is probably not as good as the ones I’ve done for patients that I actually know” [JD1E]

The concept of having to do the ‘best they can’ is also seen when doctors were gathering information for summaries, then finding limited, incomplete or poor quality information in the patient notes. This leaves the junior doctor, like the GPs in chapter 4, having to ‘play detective’ to deduce what has occurred during the patient’s admission and why.

4.5.4.4 Theme 4: Facilitators to writing discharge summaries

The theme of “facilitators to writing discharge summaries” examines those aspects of discharge summary writing junior doctors saw as positive; which they considered to be factors of help to them when composing summaries.

Working and communicating as a team with other healthcare professionals on the ward was also identified as being of aid to junior doctors when composing discharge summaries, as with:-

“We have a handover each morning with doctors, therapists, nurses and that’s quite good - so you usually you get an idea of which patients might be going home, try and predict who’s going to go home on what days... and generally talk about their progress... medically and with therapy” [JD3E]

This same doctor went on to comment that knowing the ward staff was also helpful to junior doctors in order to gather information:-

“If you’re in a ward based environment, you know most of the nurses, you know the team, and everything runs a bit smoother” [JD3E]

Knowing the ward staff might allow junior doctors to feel confident to ask questions or to ask for assistance with discharges, or might allow for more open working relationships and sharing of patient knowledge and progress. When composing summaries, some junior doctors (both FY2) were happy to approach senior members of staff with questions or to clarify points with them:-

“If I don’t understand... the consultants here are very approachable... I would never write something if I was unsure on the discharge summary anyway. So I’d contact Dr [removed] in the case of, say, today” [JD7E]

This doctor implies that where senior doctors were seen as being friendly and approachable, they felt confident consulting them for help. Good working relationships with other doctors could therefore be a positive facilitator to discharge processes.

However, when seeking help from senior doctors at other points in the patient's care, not just at discharge, one doctor (an FY1) was more tentative:-

“When you're on a busy post-take ward round there's no way you'd ask, 'why are you doing this' or 'why are you doing that', unless the consultant actively said”
[JD1E]

This reluctance to interrupt in order to ask a question may have been a result of the junior doctor lacking confidence to ask questions to senior members of staff in the presence of other colleagues, perhaps yet to be gained through time and experience working on the ward and within the team. Additionally, one junior doctor felt that access to senior doctors for help was limited due to their availability and limited presence on the wards:-

“They are friendly as long as they're around... it's tracking them down which is the hard thing!” [JD7E]

And another described the inability to trace back to the doctor involved in a decision based solely on signature, as with:-

“If someone's just prescribed it on [the chart] there's no way of contacting them 'cos you've got a signature but you don't know what the [prescriber's] name is”
[JD5M].

This inability to trace the prescribing doctor because of a lack of contact information on the chart may imply that whilst, in theory, help may be available to junior doctors, it is not always practicable to consult them when needed, especially in out-of-hours care situations.

The input of pharmacists through Medicines Reconciliation and checking the accuracy of prescribed medicines on the drug chart was also identified as a facilitator to doctors writing summaries, with particular reference to identification of medicine changes:-

“If they’ve been on the ward for a long time, and the pharmacist has seen them, then it’s usually quite clear what they came in on... ‘cos of all the green writing”
[JD5M]

However, pharmacists themselves weren’t identified as a reference source for the junior doctors to use for information for the discharge summary. This may be because of limited time spent on the wards by pharmacists, or a perception that they are not involved directly with patient care, as demonstrated with one junior doctor’s lack of awareness of the role of pharmacists in checking discharge summaries for accuracy:-

“I don’t know if they [the pharmacists] have a rule or something... I’m not sure how that happens but it tends to be here [on this ward] that they [the summaries] always seem to get checked by pharmacy” [JD7E]

This doctor’s limited awareness might indicate poor inter-professional collaboration on wards. Also, the failure of this doctor to engage with other professions to understand their role in discharge might indicate how this doctor prioritises discharge over their other roles.

4.5.4.5 Theme 5: Perceptions of care continuity

The theme “perceptions of care continuity” encompasses the views that junior doctors had on the role of GPs, on how discharge summaries relate to GPs, and their own experiences with care continuity between secondary and primary care.

Generally, junior doctors seemed to have a fairly limited understanding of how and why discharge summaries were of such importance to a GP, as with:-

“I think it [the discharge summary] is important so the GP has the information... I think probably communication between GPs and hospitals isn’t always great, and so I think it’s important to do a good summary [JD3E].

This uncertainty of this junior doctor as to why GPs would require good communication at discharge perhaps indicates limited insight on the part of some junior doctors into the workings of primary care and the information needed by GPs to continue care post-discharge. Their insight may be limited due to a lack of postgraduate experience working in

primary care, as junior doctors usually undertake rotations in secondary care for two years after graduation.

The exception was one junior doctor who had spent considerable time working in a GP practice, who expressed her concern where information for GP action on the discharge summary is incomplete or omitted, as with:-

“Often ‘management plan’ and ‘instructions to the GP’ is just left empty [on the summary] and... I find that a little bit unsettling” [JD1E].

And who also demonstrated insight into the potential snowball effect of providing incomplete information on summaries, especially with reference to medicine changes which occurred during admission:-

“What will happen is the patient will be discharged from the hospital and they’ll go to the GP the next day saying they’ve stopped some of my medicine. And you’ll look at the discharge summary and have no idea why. And I found that really difficult, so I try and alter my practice now” [JD1E]

This doctor’s experience in primary care implies a considerable difference between being faced with incomplete information when writing a summary, and being faced with an incomplete discharge summary when seeing a patient in primary care.

At discharge, the responsibility for the patient’s care is passed from the hospital back to the GP, alongside responsibility for follow-up care or action requested by the hospital. Later in this thesis, GPs have reported dissatisfaction with some of the requests that were made of them by the hospital, seemingly ‘passing the buck’. This was recognised by the junior doctor who had spent time in primary care, as with:-

“You can easily put ‘GP to do this, GP to do that’, and when you’re in hospital and you’re really busy you kind of forget GPs are actually really busy as well, and sometimes it’s not really fair to put the onus on them” [JD1E]

This doctor acknowledges the transfer of responsibility when a patient is discharged, and the potential for abuse of this, because the hospital doctor is able to pass on responsibilities to the GP, which this doctor regards as sometimes unfair.

The other junior doctors discussed the quantity of information to provide on discharge summaries, demonstrating a concern over providing too much information to prevent the key messages from being overlooked:-

“It’s a fine balance between putting in too much information and not enough for the GPs to read them – so... if you write paragraphs and paragraphs then it doesn’t get read, and things will get missed because they [the GPs] don’t have the time to read them” [JD7E]

This was not only the case to assist the GP, but to aid hospital doctors when patients are readmitted, in order to allow the key patient information to be identified quickly, as with:-

“You tend to try to put in the bare minimum... what you think the GP might want to know, or what the following doctor might want to know if this patient was readmitted... It’s easier to look through the ones that are more concise and to the point, rather than ones that waffle on and on” [JD2S]

4.6 Discussion

4.6.1 Themes

Figure 4.1 displays links between the themes and sub-themes identified from the findings. Continuity of care houses all other themes identified, with barriers and facilitators being specifically relevant to the process. Perception of roles is linked to both the process of summary composition and in the overall context of continuity of care.

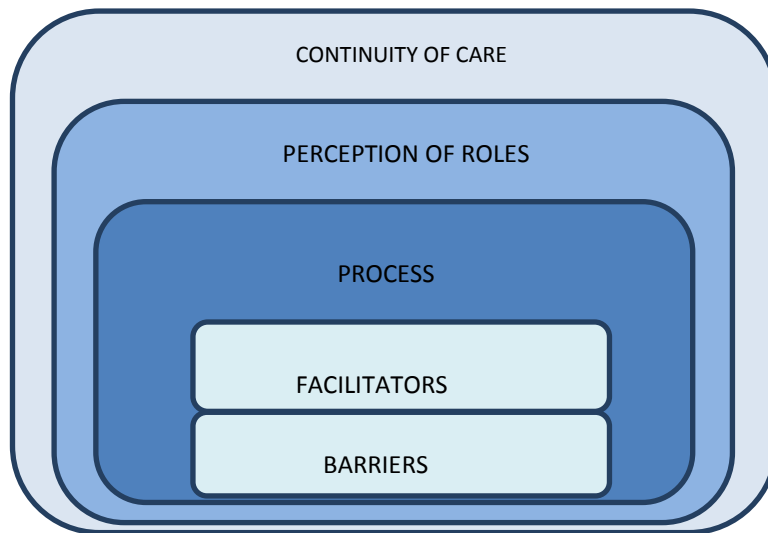


Figure 4.1: Map of emergent themes showing links between broader themes

4.6.2 Main findings

In this multi-method focused ethnographic study, the aim was to explore the process of composing discharge communications from the perspective of a junior doctor, in order to identify any working practices at discharge where changes could be made to improve the transfer of care pathway.

4.6.3 Strengths and limitations

This study was small in size, conducted at one UK site and investigated only one cohort of junior doctors. I spent limited time (2 weeks only) on wards, rather than actually working on them, and therefore found it more difficult to build those in-depth research relationships with ward staff, which may have facilitated the recruitment of more junior doctors. However, I judged that the sample of 7 junior doctors provided a wide breadth of opinion and experience, whilst remaining consistent with emergent themes generated. Junior doctors were recruited only at one hospital site, which may have meant that their experience of producing discharge summaries was different to those working at other hospital sites, and this particular sample will not also have been representative of the entire population of junior doctors in the UK. However, the sample included doctors at different stages in their careers, from a variety of backgrounds and working in different rotations, which allowed for a range of views and different experiences to be explored.

Data was collected by me, and as a pharmacist, which if participants took particular note of my professional role, may have affected the willingness of junior doctors to be completely at ease with entering into discussion about discharge summaries. This is because pharmacists, where available, have a role in the accuracy checking of medicine listed on discharge summaries, and often liaise with doctors to correct ambiguities or inaccurate information on summaries. Essentially, they act as a defence layer to prevent errors made by doctors from reaching patients, which might make doctors feel like pharmacists are there to 'catch them out' rather than help them. In particular, where discussion about discharge summaries involved making errors in prescribing or transcribing medicine at discharge, or attitudes towards or experiences of working alongside pharmacists at discharge, doctors may have felt that they could not express their true opinion for fear of being challenged or judged. I attempted to minimise this by informing participants that I was conducting the interview as an impartial and neutral researcher, but it is nonetheless a potential limitation of this study.

However, this study is novel in providing insight into junior doctor culture and their experiences specifically relating to discharge summaries. Additionally, an innovative method combining observations, think-aloud and ethnographic interviews has been designed to access this high pressure setting and the role of junior hospital doctors. Designing a study to provide such insight has enabled the identification of environmental and process factors affecting junior doctors at discharge which may be related to the poor quality in discharge summaries that is routinely observed. Strategies to improve or alleviate these factors may therefore assist in improving the quality of discharge summaries produced.

4.6.4 Main discussion

4.6.4.1 Environment

The ward environments in which summaries were written were busy and noisy, with multiple interruptions and distractions occurring during doctors' composition of summaries, which often detracted their attention away from the task. Doctors complained of a lack of a private, designated area in which to write summaries, which were often written on shared computers at the ward nurses' station. These environmental factors may well increase the risk of errors or omissions being made on discharge summaries as a result of human error (38). Implications for practice are that provision of designated quiet areas

on wards in which to work on summaries might help to alleviate this, but even where doctors chose to write summaries in private rooms, interruptions were still possible, and even desirable according to one of the doctors interviewed. The red tabard system is currently used in UK hospitals, whereby nurses who are undertaking a drugs round and administering medicines wear a red tabard to identify them to other ward staff and patients and so prevent them from being interrupted (123, 124). Adaption of the red tabard system for doctors involved in summary composition may be a system-based approach to reducing errors worth further research.

4.6.4.2 Time and quality

With respect to workload, doctors reported having limited time available to spend on discharge summaries, which they acknowledged resulted often in the quality of the summary being sub-optimal. Doctors described instances where summaries were rushed to completion where there was an immediate need, such as arranged patient transport. The 24 hour target in which to produce discharge summaries means that it is no longer possible for doctors to wait until quieter moments in their schedules to produce summaries. They are instead obliged to produce them immediately, often under pressure, having been interrupted during another task, and for patients unknown to them, due to time restraints. Relaxation of this target for timeliness might assist in providing doctors with a period of grace in which to ensure summaries are complete and of an acceptable quality before releasing to primary care.

In addition to time restrictions in which to send summaries, since August 2004 The Working Time Regulations (WTR) have also been applied to junior doctors' working patterns (125), reducing working hours from an average of 56 per week to 48 and introducing rest breaks of 11 hours per day, a day off each week (or two days off in every fortnight) and a 20 minute break every 6 hours. Whilst aiming to reduce fatigue and over-working of doctors, concerns have been raised in the literature over their alleged negative impact on continuity of care (126). A UK survey of junior and more senior surgical trainees on views of restricted working hours reported both groups felt that the level of skill of junior trainees was worsening, attributable to the introduction of shifts, the loss of the 'firm' structure and loss of patient continuity (127).

Similarly in the USA, in a survey of 189 medical residents' perceptions of the effects of American working time regulations on professionalism, 45% felt that their professionalism

was reduced, which was attributed to a lack of time for communication, to the detriment of continuity of care, and reduced accountability for care (128). The result of this, Tully *et al.* (43) argued, is an increase in doctors' dependency on written documentation, such as the medical record, for information about patient care provided by their colleagues. These restrictions indicate that re-evaluation of the discharge process and optimisation of time spent on discharge could be further investigated.

4.6.4.3 Process issues

Process issues raised by junior doctors include the gathering of relevant discharge information using written communication and other healthcare professionals, and selecting the necessary content to include from these sources. Such issues were identified from a combination of interview questions, observations, and in particular, provision of a running commentary during the summary composition process using think aloud techniques, which allowed issues to be realised as doctors were faced with them during the process.

Junior doctors reported at times struggling to gather the relevant information necessary to complete a discharge summary, often as a result of poor written communication from other doctors in the patient notes. This resulted in guesswork by the discharging doctor, attempting to put together a picture for the GP with the limited information available to them; or simply omission of the information that was not available, such as rationale for medicine started or stopped during the admission. This reliance on others to provide good quality written communication was especially relevant where the patient was unknown to the discharging doctor, as they could not then refer to their own knowledge of the patient. They were instead entirely dependent on what information had been written on the chart or in notes for content to include in the discharge summary. Doctors reported feeling discontent with having to complete summaries for unknown patients, believing it to be unfair and to result in the composition of poorer quality summaries. One doctor described preparing discharge summaries, where possible, prior to the patient being ready for discharge, and storing electronically, in order to assist the eventual discharging doctor with summary production. By populating the summary throughout the patient's admission, a last-minute scramble to gather together discharge information for the summary could be avoided. This is something which may be possible with the use of an electronic prescribing system, which is being increasingly considered and developed in practice, whereby medicines for the summary are automatically uploaded into the system as they are prescribed. Such systems also bypass the need for manual transcription of medicines from

the chart into the summary, saving time and reducing the margin for human error associated with transcribing (65).

4.6.4.4 Training and support

The key issue regarding training that emerged from the findings was that junior doctors felt inadequately prepared for and supported during the composition of discharge summaries. Reflecting findings from previous literature (48), junior doctors described a lack of guidance for writing discharge summaries and expressed a desire for more training on the ideal content to include in a discharge summary, indicating a lack of confidence in what is required from them. Training which had been received was largely focused on the use of the electronic system itself as opposed to which information should be included and how this should be structured. Surprisingly, the doctors did not routinely share or discuss discharge practices among colleagues, and instead summary writing was identified as being an individual skill which was developed with experience. Tips for summary writing were often picked up from consultants under whom the junior was working, however, feedback on discharge summaries was not routinely provided. This finding is consistent with the national survey of junior doctors' foundation training by the GMC published in 2013, in which 39% junior doctors reported rarely or never receiving informal feedback from a senior clinician on their performance (n=14,459) (129). Having a lack of experience working in primary care themselves, senior hospital doctors may not be the most appropriate practitioners to provide this.

4.6.4.5 Attitudes and care continuity

With respect to care continuity, junior doctors appeared not to fully appreciate the implications and subsequent importance of communicating discharge information to primary care practitioners. Junior doctors did not seem to see composition of discharge summaries as a high priority task in comparison to their other duties, indicated by a lack of conference with colleagues about summaries, and a lack of knowledge of the process and roles of other healthcare professionals involved in the discharge process. Existing literature implying that junior doctors perceive primary care as being inferior to hospital medicine may provide explanation for this (130). It has been suggested that greater exposure to general practice at undergraduate level could improve doctors' understanding of, and interest in pursuing careers in, primary care (131).

Junior doctors appeared to consider discharge a finite process: once the summary was sent to primary care and the care passed back to the GP, their role in the process was over, as was their responsibility. As above, there is currently no feedback given to junior doctors on the quality of their discharge summaries provided by the hospital (131) or by GPs. So, although the confidence of junior doctors in how to write summaries may increase with experience, actually they are unable to accurately judge the quality of the summaries they have produced. A survey of junior doctors in the South of England in 2012 reported 89.6% felt that they had a good idea what constitutes patient safety and 81.2% for patient satisfaction (132), however no investigation or research into the perceptions of junior doctors for GP (or other medical practitioners') satisfaction has been conducted.

The junior doctors' perception of discharge being less important than other tasks is concerning when considered in terms of patient safety. Provision of information which dictates and advises on subsequent care is arguably a high responsibility task, with major potential long and short term consequences if inaccuracies are present. It is therefore arguable that production of discharge summaries should not necessarily be a task which is entrusted to junior members of staff, who have limited experience in knowing what information needs to be communicated to the next care provider nor a working understanding of why it is needed, and who additionally are provided with no feedback and inadequate support for undertaking the task. In the medical profession it has been recognised that *"those with high professional standing retain the more desirable work, delegating the less pleasant or stigmatising work to others with less standing"* (133). Through promotion or specialisation, professionals have less time to undertake other components of their work, which may require less skill (134).

Junior doctors appeared to recognise their overall responsibility for the provision of written information at discharge. However, having not yet gained the appropriate skills and knowledge to fully manage that level of responsibility, junior doctors may be being placed out of their depth. In the 2013 GMC national training survey, 28.3% junior doctors reported that they had at some point felt forced to cope with problems beyond their competence or experience, and 10.6% felt this way on a weekly basis (n=14,459) (129).

Implications for practice may be that more emphasis on the support of junior doctors should therefore be encouraged in practice, informed by research into the specific methods needed to assist with their support. The lack of time available to junior doctors,

their clinical inexperience and the high level of inaccuracy observed on discharge summaries suggest that the appropriateness of present roles for junior doctors might also warrant review and re-evaluation, perhaps to examine the possibility of allocating responsibilities to other medical practitioners, who may be better equipped to undertake this task.

4.7 Conclusion

This qualitative study has provided insights into the culture of hospital junior doctors at discharge, which has enabled the identification of environmental and process factors associated with discharge summary composition which may in turn provide some understanding of reasons for the frequently-observed poor quality in discharge summaries.

The composition of summaries was reported as a challenging undertaking for junior doctors, demonstrated by a lack of time within their workload, a lack of training and/or experience to enable them to know what content and level of detail to include, and a lack of clinical knowledge to enable them deduce reason from poorly written notes. Similarly, the nature of junior doctors' changing rotations and working hours often resulted in them lacking a prior working knowledge of the patient they were discharging.

Strategies to improve or alleviate these factors may assist in improving the quality of discharge summaries. Findings indicate that junior doctors would benefit from protected time during their busy working schedule away from the distractions of the ward environment to focus on summary composition, requiring confirmatory research. Scope for allocating some of the discharge responsibilities to other medical or non-medical practitioners, who may be better equipped to undertake them, could be further investigated.

The findings of this study have highlighted a potential specific need to educate junior doctors on the ideal content for discharge summaries and the rationale for these inclusions in terms of their implications for care continuity and patient safety. Intra-professional education to promote further understanding of the roles of medical practitioners in other care settings may assist with this.

However, in order to provide potential recommendations for the education of junior doctors on this subject, it is necessary to further investigate the experiences of GPs in primary care, to enable understanding of their needs and expectations, and how secondary care can best adapt its processes in attempt to meet them.

Chapter 5: Theory of Discrete Choice Experiments

5.0 Chapter overview

This chapter serves as an introduction to a piece of work relating to the development and application of a Discrete Choice Experimental approach which is reported over Chapters 6 to 8. This aimed to investigate the preferences of GPs for discharge summary content and characteristics of discharge summaries. This chapter explores the rationale for such a piece of work, its theory and methodological implications, and application in existing literature.

5.1 Background

5.1.1 Research problem: practitioners' preferences at discharge

As identified in Chapter 1, existing research and guidance on transfer of care at discharge has suggested an idealistic list of requirements of GPs at discharge, but has not sought to investigate the pragmatic preferences for discharge summary characteristics under restricted resources.

Until this point in the thesis, the aim has been to investigate and describe discharge summaries being sent from secondary care. Chapter 2 explored accuracy of discharge summaries and Chapter 3 described the poor transfer of information about medicine changes at discharge. Chapter 4 explored the experiences of junior doctors producing summaries. I now proceed to exploring discharge from the perspective of the practitioners involved in the receipt of summaries, at the other side of the interface. The rationale behind this is to create a complete picture of the discharge process as it currently stands, and to triangulate our existing findings with the experiences and perceptions of the healthcare professionals working at the discharge interface.

In Chapters 2 and 3, a common theme of poor quality in the content of summaries was identified, especially in the provision of medicine changes which occurred during the patient's admission to hospital. The aim now is to explore the impact this poor quality has on primary care practitioners by investigating the requirements of GPs for the content and characteristics of a discharge summary.

No existing study appears to have investigated which qualities or characteristics of discharge communications, such as timeliness or accuracy, GPs consider most important at discharge; and no recent study has investigated the preferences of GPs for discharge summary content, such as details of medicine changes.

5.1.2 Introduction to Discrete Choice Experiments (DCEs)

In 1966, Lancaster (135) published 'A New Approach to Consumer Theory', which suggested that goods are chosen by consumers not because of what they are, but because of the properties that they possess. In other words, the characteristics or attributes of the good dictate its utility. Lancaster also stated that "*a 'good' will possess more than one*

characteristic, and many characteristics will be shared by more than one good". In the case of a discharge summary, the utility of the summary to GP recipients will therefore be dictated by its attributes.

It is this theory that has given rise to choice experiments, which have been used since the 1960s in the fields of psychology, marketing, business and health economics, to investigate consumers' decision making behaviour (136). In marketing, choice experiments have become known as conjoint analysis, identified first by Green and Rao in 1971 (137), in which each of the attributes of a service are considered jointly.

There are two approaches used to elicit consumer preference data. Revealed preference data reveals a population's preferences indirectly by studying their actions, whereas stated preference (SP) data relies on a population stating their preferences in a hypothetical situation. Whilst revealed preferences data has a higher external validity, as it consists of real-life decisions for which subjects have committed their time, money etc., stated preference data is often advantageous when considering service provision, as the choice and attributes of the goods offered can be controlled by the researcher.

Discrete Choice Experiments (DCEs) are a type of stated preference technique, which allow the relative value of the different attributes of a service to be calculated, through asking respondents to make a choice between alternative services described by their attributes. DCEs are based on the principle that all services can be described according to their attributes, and that attributes may take a range of values (or levels). DCEs are usually presented in a survey format, and describe a series of choices involving two or more services (or alternatives). The alternatives offer specific attributes at a range of differing levels. Individuals are presented with this choice set and are asked to choose their preferred alternative, given the attributes described.

The following conditions apply to DCEs: all possible alternatives must be included (even if the alternative is to choose none of the alternatives), the alternatives must be mutually exclusive (choosing one negates choosing the others), and the number of alternatives provided must be finite (138). The experiments encourage 'trade-offs' between choices in order to measure the value that an individual places on a particular attribute (139).

5.1.3 Potential benefit of using a DCE in this field

The occurrence of poor quality discharge summaries indicates that hospital doctors may have limited awareness of GP needs when a patient is discharged from their care. Currently, feedback is not routinely provided by GPs to hospital doctors on the quality or accuracy of the discharge summaries they send, and as such, may not be aware of their poor quality.

By generating preference data from GPs, communications at discharge could potentially be revolutionised through the production of discharge summaries which prioritise the preferred or necessary content required by GPs to provide care to patients after they have been discharged. By making discharge summaries more concise and focusing on the key discharge information required for effective care continuity, summaries would take less time to produce and would be able to be sent in a timelier manner. Additionally, if hospital doctors and other discharging healthcare professionals understand the needs of GPs post discharge, this could help them to produce better quality and more considerate discharge summaries, improving communication and continuity of care across the interface.

Recent spending cuts within the UK National Health Service, combined with a growing patient population, have called for more intelligent spending and allocation of resources in healthcare. Patient or consumer preference data can contribute not only to the prioritisation of resources in areas of greatest need, but to the provision of services that are likely to have a high uptake, preventing wastage of resources.

In the context of this study, a DCE would allow the content and characteristics of a discharge summary to be compared such that the relative value that GPs place on each of these components could be calculated, and the willingness of GPs to compromise on timeliness in exchange for improved content could be extracted.

No DCEs exist in the field of preferences of GPs for the information provided at discharge. Whilst the issue of transfer of care has been extensively researched, a DCE would provide a novel technique to apply to this field. By generating data on the transfer of care from another outlook, a DCE could complement and enrich understanding of some of the known issues in transfer of care, as well as providing new information on GP discharge preferences to add to the field.

5.2 Methodological considerations

5.2.1 Phases of DCE design

Ryan *et al.* (140) suggest six key stages involved in the design and analysis of a DCE:-

1. Characterising the choice decision
2. Identification of relevant attributes and levels
3. Experimental design and construction of choice set
4. Questionnaire development
5. Model estimation and data analysis
6. Policy analysis

The first four of these phases relate to the DCE choice set and questionnaire design, which are addressed in chapters 6 and 7. The latter two address the application and analysis of the DCE questionnaire and its practice and policy implications, which are found in chapter 8.

In the next few sections of this chapter some of the key methodological considerations when designing a DCE study are discussed, in line with these six recommended phases.

5.2.2 Phase 1: Characterising the choice decision

In order to develop relevant attributes and levels (Phase 2), first, the conceptualisation of the attributes of the service in question is necessary (141). Conceptualisation consists of gathering the relevant and important characteristics of a service, often in academic terms appropriate to the researcher or policy maker.

5.2.3 Phase 2: Identification of relevant attributes and levels

The importance of well researched and thorough attribute development has been highlighted in the literature (140, 142). Methods commonly adopted to identify attributes for DCEs include literature reviews, existing health outcome measures, professional recommendations, and qualitative research in the form of focus groups, interviews and surveys (141). Design of attributes and assignment of their levels are described further in section 5.5 of this chapter.

5.2.4 Phase 3: Experiment design and construction of choice set

In order for a participant to make a hypothetical choice that is most similar to the choice that they would make in a real-life situation, i.e. providing market realism, the combinations of attributes and levels (alternatives) presented should be plausible and, as far as possible, simulate a realistic choice. The choice can be between two (binary), or multiple alternatives, as shown in the example in Figure 5.1. It has been suggested that 8-16 choices are ideal for a DCE (143), and a recent randomised trial found no difference in response rate between a DCE with 16 or 8 choices (144).

5.2.4.1 Implausible profiles

Logically, out of all the different possible combinations of attributes at their varying levels, some of the profiles that result may be considered implausible or unrealistic, and these combinations are unlikely to be valuable to the research aim because they describe an unachievable scenario. Implausible profiles may be excluded from the choice set by applying constraints to the design.

5.2.5 Phase 4: Questionnaire development

Figure 5.1 displays an example Discrete Choice question taken from a DCE conducted by Tinelli *et al.* in 2009 (145), in which patients' preferences for an increased pharmacist role in the management of drug therapy were explored. In this example, the two services are either receiving repeat medicine from the doctor and then going to the pharmacist to have the medicine dispensed ('dispensing pharmacist'), or going directly to a pharmacist who would both prescribe and dispense the medicine ('prescribing and dispensing pharmacist'). Respondents are given information about a hypothetical situation in which they are asked to make a choice as to which option they would prefer.

Attributes	Levels	Variable name
Time spent travelling to and waiting in the surgery, consulting with the GP	0 min 30 min 50 min	GP time
Time spent travelling to and waiting in the pharmacy, consulting with the pharmacist	0 min 20 min 40 min	PH time
Chance of receiving the 'best' treatment	Low Medium High	Chance
The amount of money you have to spend to get the drug (clinical advice provided + medicine + travel)	£3 £7 £12 £20	Cost

Hypothetical scenario: A situation in which symptoms are due to a condition already diagnosed by your GP, for which you need long-term medicine.

	Prescribing and dispensing pharmacist	Dispensing pharmacist	
GP time	0 min	30 min	
Pharmacist's time	20 min	40 min	
Chance of receiving the best treatment	High	Low	
How much you have to pay	£7	£3	
Which situation would you prefer? (tick only ONE box)	Prescribing and dispensing pharmacist <input type="checkbox"/>	Dispensing pharmacist <input type="checkbox"/>	Current service <input type="checkbox"/>

Figure 5.1: An example DCE question, taken from Tinelli *et al.* (145) displaying the attributes and levels used to describe the choice set and the typical structure of a DCE question

5.2.5.1 Labelling of alternatives

The alternatives in a DCE may either be presented in a labelled (as in the Tinelli *et al.* example in Figure 5.1) or unlabelled manner (where the alternatives stated are unnamed, and instead called service A or B, or similar). Trading behaviour is more likely when unlabelled alternatives are presented (146), but respondents make more realistic choices with labelled alternatives, as the label itself provides them with extra information, which may be complicated by their preconceptions and existing views of or associated with that label.

In 2010, De Bekker-Grob (146) investigated the significance of conducting DCEs with labelled or unlabelled choice profiles in the field of colorectal cancer screening in the Netherlands. Two versions of the same DCE were constructed, one in which the name and type of screening tests were described, and one version where they were referred to only as 'test A' or 'test B'. One of the two versions of the questionnaire were sent by post to a sample of 2979, consisting of a mixture of patients previously screened for colorectal cancer, and randomly selected screening-naive patients within the same geographical area. The DCE with labelled choices had a higher response rate, with 1033 of 2267 (46%) responding compared to 276 of 712 (39%) for the unlabelled version. More dominant preferences were observed with the labelled version, which was significant in both the previously screened and screening naive group. The labelled choice version led to less trading behaviour; an undesirable outcome in a DCE.

5.2.5.2 Opt-out option

In a DCE questionnaire, respondents may be asked to make a choice between the alternatives presented, or, more commonly in recent years (147), the questionnaire can include an opt-out option as an additional alternative to those presented, as shown in the example above as the third alternative - 'none of these options'. Examples of opt-out alternatives include 'none of the options' or 'current service'. Inclusion of an opt-out option and can make the choice set more representative of a real-life decision, where the attributes described in either of the alternatives do not satisfy the needs or the respondent, or where the decision of the respondent to choose a service is dependent on the presence of a specific level or attribute. In healthcare, it is recognised that individuals may choose to be non-demanders (140), for example, with regards to the treatment of a condition, they might conceivably prefer to choose not to take action to treat that condition.

Failure to include an opt-out alternative may overestimate the participation (148) or potential uptake of a service. If a forced choice (no opt-out) is decided upon, inclusion of all possible attributes and levels is important in order that the options presented are exhaustive. However, the decision to include such an option should be based on whether the importance of the current service provided is relevant to the research question.

5.2.5.3 Consistency testing

In order to test consistency, two identical sets of choice combinations can be repeated within a DCE questionnaire. If the respondent answers differently in these two questions, it suggests inconsistency in their responses, and the researcher may then choose to exclude observations from such respondents from the final analysis. However, Lanscar and Louviere (142) argue that exclusion of such respondents is inappropriate, as it could remove valid preferences, which could in turn introduce bias and reduce the statistical efficiency of the design (147).

5.2.5.4 Dominance testing

In order to test dominance, the choice set can contain a combination of alternatives which is clearly superior to another. Respondents who do not choose the dominant alternative may hold strong preferences, such that they always choose an attribute at a particular level when making a choice, even when the combination of attributes and levels of the alternative scenario(s) presented is superior.

5.2.6 Phase 5: Model estimation and data analysis

5.2.6.1 Experiment design

The number of levels allocated to each attribute (n_L) multiplied to the power of the number of attributes (n_A) gives the total number of possible combinations of levels and attributes ($n_L^{n_A}$). A DCE questionnaire of this scale which offers choices for all of these possible combinations – known as a full factorial design – is usually impractical to analyse and unmanageable for respondents to complete, due to high cognitive complexity. In light of this, a model that presents a fraction of the different combinations can be generated using model estimation technology. Such models present a smaller, more manageable number of combinations of attributes at different levels, also known as profiles, which can be used as choices for the survey respondent, but retain their statistical properties such that they are still sufficient to elicit preferences between attributes (ensuring precision).

Orthogonal designs are designs which attempt to minimise the correlation between the levels of the attributes. Efficient designs, as well as being orthogonal, aim to result in data that generates parameter estimates with as small as possible standard errors. Using choice modelling software to create a design using the attributes and levels chosen permits the most efficient design possible to be created.

5.2.6.2 Utility theory

The theoretical framework which underpins DCEs is known as random utility theory, which was developed by McFadden *et al.* in 1974 (149). In a DCE question, it is assumed that respondents will choose the alternative which provides them with the higher level of utility. The principle of random utility theory is that it is impossible to observe all of the factors which may affect an individual's preferences, and that elements of their decision-making behaviour are 'random' in nature.

Utility scores are calculated using the equations in Figures 5.2 and 5.3. The utility theory equation contains two components: an explainable (systematic) component and an unexplainable (random) component. The systematic component represents a function of the attributes of the alternatives, which can be observed. The random component represents the unobserved differences in preferences which exist between individuals.

$$U_{altn} = V(\text{Att}_{altn}, \beta) + \epsilon_{altn}$$

U	Utility
<i>Alt</i>	an alternative
<i>N</i>	the individual respondent
U_{altn}	the utility of respondent <i>n</i> choosing alternative <i>alt</i>
β	regression coefficient
$V(\text{Att}_{altn}, \beta)$	explainable component of utility (function of the attributes and alternatives of individual <i>n</i> for alternative <i>alt</i>)
ϵ_{altn}	unexplainable component of utility (unobserved variations in preferences of individual <i>n</i> for alternative <i>alt</i>)

Figure 5.2: Utility theory equation

The systematic component is a representative utility function, which relates the observed attributes of the alternatives to the utility derived from alternative *alt* (U_{altn}). An attribute specific constant (ASC) captures the mean effect of the unobserved factors in the error terms for each of the alternatives (ϵ_{altn}).

$$V(\text{Att}_{altn}, \beta) = \text{ASC} + \beta_1 \text{Att}_{alt1} + \dots + \beta_k \text{Att}_{altk}$$

$V(\text{Att}_{altn}, \beta)$	explainable component (function of the attributes and alternatives of individual n for alternative alt)
β	regression coefficient
k	alternatives 1, 2, ... k
ASC	attribute specific constant for alternative alt
Att	Attribute

Figure 5.3: Breakdown of explainable utility function

The magnitude of the regression coefficients (β) represents the impact of a unit change in an attribute on the utility of switching between choices. The greater the magnitude of the coefficient the greater the impact of a unit change on the utility, and therefore the greater the preference for that attribute. The statistical significance of the β value for an attribute indicates its importance.

5.2.6.3 Choice modelling

When evaluating healthcare, it is recognised that real-life decisions are not binary in nature (140) with three or more alternative options often available to an individual. Consequently, the majority of existing DCEs have adopted a simple multi-nominal conditional model (MNL).

There are three key assumptions associated with the use of the MNL. These are:-

1. The ratio of choice probabilities of any two alternatives is unaffected by other alternatives. This implies that choice probabilities would all change proportionally if an alternative were to be added in or one removed. This is known as the independence of irrelevant alternatives (IIA) property. The IIA property can be inappropriate in situations where two services presented may be more similar to each other than the opt-out option presented, and therefore will compete with each other more intensively than they do with opting out.
2. The MNL cannot represent unobserved heterogeneity or any other unobserved variability between individuals (ϵ_{in}). It is recognised that individuals make choices based on explainable factors (such as income or education) and unexplainable (random) factors, which cannot be related to observed characteristics. Systematic

(explainable) heterogeneity can be incorporated into the MNL, but random (unexplainable) cannot.

3. The unobserved heterogeneity error terms (ϵ_{in}) are independent and identically distributed across all observations. This is known as the IID property.

5.2.6.4 Alternative models

Although the MNL is widely recognised as the simplest model to employ, and therefore the recommended starting point for any DCE experiment being designed (140), other models have developed the MNL further to attempt to lessen some of its restrictions.

Nested logit models (a type of Generalised Extreme Value model) can partially relax the IIA property by grouping (or nesting) subsets of alternatives which are similar to each other with respect to unobserved characteristics. Creation of these mutually exclusive groups allows for more flexible substitution patterns (150). Multinomial probit (MNP) models can fully relax the IIA property, as well as the other restrictions of the MNL, but as a result are complicated to estimate and consequently not widespread in the literature. Random parameters or mixed logit models are appropriate where considerable variation across the population of respondents is anticipated (151, 152), and Latent Class models are recommended where two or more groups of respondents with similar preferences are anticipated (153). Binary choice models are appropriate where dichotomous choice sets are employed (154, 155).

5.2.7 Phase 6: Policy implications

Application of cost-benefit analysis to DCE data can further enrich findings and provide results which can influence policy. Many existing DCEs have additionally performed a willingness to pay (WTP) calculation (147), in order to assess what individuals are willing to pay for the service in question, which can provide important information for service planners or providers. Additionally, use of odds-ratios and probabilities have been estimated to assess the likely uptake of new services or interventions (156-158). This is arguably as important as determining cost-benefit, which would be of little use if the intervention is then not taken-up by service users in practice (147). A framework based on Quality Assisted Life Years (QALY) can also be of use when potential benefit to the patient is being explored by the DCE (140).

Willingness of respondents to trade between attributes of a service can also be estimated by calculating the ratios between coefficients. This is known as the marginal rate of substitution, and can describe the willingness of respondents to sacrifice a unit of one property in order to gain in another (the marginal value of attributes). This is particularly useful where cost-benefit analysis is not relevant (where participants would not usually expect to pay for a service) and where the preferences of healthcare providers rather than patients are being investigated.

5.3 Applications of DCEs in healthcare literature

5.3.1 Brief history of DCEs

DCEs were first used in the context of health economics in the early 1990s, in accordance with a move towards increasing the involvement of patients in decision making in healthcare(159), and have since become increasingly popular. In 2003, Ryan and Gerard conducted a review of DCEs published between 1990 and 2000 (143), and again with De Bekker-Grob in 2010 for those published between 2001 and 2008 (147), and reported an increase in the mean number of DCEs per annum from 3 to 14. Not only are DCE methods applicable for obtaining consumer or patient data, they have also been used to elicit the preferences of healthcare providers (139).

DCEs have been adopted by health economists over the past decade (139) to investigate the preferences of both patients and healthcare professionals in terms of healthcare service uptake and provision respectively. Recent DCEs have investigated partiality of community pharmacists for extended roles (151), and patients' preferences for self-care in minor illness (160), and continuity of care within a GP consultation (152).

5.3.2 DCEs for healthcare providers

Although no studies exist in which the ideal content of discharge summaries are elicited from service users, in 2002 Ubach *et al.* (161) investigated the preferences of general practitioners and pharmacists for the technical characteristics of electronic prescribing systems. This study was conducted in the dawn of electronic prescribing systems, whereby the ideal technical properties of the system were elicited from potential service users (GPs and pharmacists working in primary care). This differs from our study, in which the

information contained within and transferred using the electronic system is explored, as opposed to the overall system properties.

Qualitative data was generated from lay people, doctors and community pharmacists, and used to inform and derive six attributes, to which computer experts were consulted to assign suitable and realistic levels. A full factorial design of 729 possible combinations was reduced down into 27 profiles (14 choice sets with one configuration repeated) which formed the basis of the DCE questionnaire. The choices provided were unlabeled (system A and system B), both being examples of electronic systems with different characteristics, and no opt-out option was provided (i.e. respondents made a forced choice between the two systems presented). In the case of the system being hypothetical, an opt-out option would have been useful in order to show preference towards the usual or current service. The property of the discharge system which was found to be of highest importance to the GPs and pharmacists (shown by the greatest magnitude of β value) was 'length of unscheduled downtime' ($\beta=-0.47$), closely followed by the 'typical response time' ($\beta=-0.44$). However when analysed separately, 'typical response time' was more important to GPs ($\beta=-0.51$) than to pharmacists ($\beta=-0.37$), indicating key differences between the working roles and therefore priorities of the two groups of healthcare professionals.

One could question the need for exploring the technical properties of a system, unless the results were going to influence how the system was then designed, but in the majority of cases for technology in a healthcare setting, it is difficult to estimate properties like frequency of downtime, which are likely to be unpredictable and dependent on the running of the system in practice. Research which instead considered the non-technical aspects of the prescribing system may have been more valuable for policy implication in practice, as they have more potential to be influenced or altered post-implementation.

5.3.3 DCEs in care continuity

Although no DCEs exist which have investigated doctors' preferences for discharge summaries and care continuity, DCEs have recently been used with patients and community pharmacists in the field of continuity of care, for the purpose of eliciting their views on the integration of care settings in order to improve continuity between settings.

In 2007, Scott *et al.* (151) investigated the preferences of community pharmacists in Scotland for existing and new roles in primary care, as a component of a larger

questionnaire investigating their job satisfaction. Scott used a random effects probit model to analyse the 914 responses, and trade-offs between attributes (marginal rate of substitution) were quantified by compensation of wage differentials. In terms of continuity of care, pharmacists were found to be willing to forgo £2183 of additional income per annum in order to work in a pharmacy with strong integration with primary and secondary care bodies, highlighting the value pharmacists place on integration and collaboration between care settings.

Also in 2007, Turner *et al.* (152) investigated the preferences of patients for continuity of care compared to other aspects of a general practice consultation. The study included relational (between patient and healthcare professional) and informational (knowledge of patient's medical condition) continuities as attributes, as well as the type of healthcare professional seen and the estimated waiting time for the consultation. Three vignettes were designed, which described the severity of symptoms the respondent was asked to imagine consulting the GP about, of which two vignettes were included in each questionnaire, so that three versions existed. It is unclear how the different versions were distributed amongst the sample, although 646 valid, completed questionnaires were received, with similar numbers represented in each vignette. 20 responses were also obtained through interviews, though the methodology for this was not described.

Respondents considered seeing a practitioner who had full details of the patient's medical history most important across all three vignettes of symptom severity, highlighting the importance to patients of primary care healthcare professionals having complete, accurate, and up to date information available to them. The study used waiting time as a currency for measuring the relative values for the other three attributes. The respondents indicated that it was preferable to wait longer for an appointment in order to achieve improved informational and relational continuity of care (i.e. to see a healthcare professional with whom they are familiar). Unlike our study, which focused on the importance to the practitioner of having adequate information about the patient before a consultation, this study identified the importance to the patient also.

5.3.4 Summary of DCE literature and research problem in transfer of care

In the field of care continuity, existing DCEs have reported that both pharmacists and patients acknowledge and value the importance of healthcare professionals working in primary care having up to date information about patients in order to provide the best

care, whether it be through the hospital sharing with the community pharmacy at discharge, or GPs being familiar with the patient's history during consultations. However, no study exists which investigates the preferences or priorities of GPs specifically for the information communicated to them during care transfer.

5.4 Overall DCE objectives

The overall objective of this study was to design and apply a DCE to investigate GP preferences for the individual attributes of electronic discharge summaries received from CHUFT. In doing so, the intention was to address the following objectives:-

- To develop attributes and levels to successfully describe the different components and characteristics of a discharge summary
- To investigate how important GPs consider the individual components and characteristics of a discharge summary
- To investigate the frequency of inaccuracies on electronic discharge summaries and how these impact on time within the GP surgery.

5.5 Developing attributes and levels for the DCE study

For the purpose of this study, we needed to develop attributes, together with their corresponding levels, that successfully described the different aspects, properties and characteristics of the electronic discharge summaries sent by the doctors working at the hospital, and which were of importance to the majority of GPs when they make a decision about their preference for the given alternatives (142).

In order for the study results to be applicable to the DCE research question, the attributes developed for this study needed to be relevant, measurable and mutually independent (136). The minimum number of attributes possible to describe the summaries should be identified, and there is a consensus that no more than eight attributes should be used within a DCE (136). However, if attributes that are significant (or relevant) to the decision-making behaviour of respondents are omitted, this could lead to inferences being wrongly made, leading to bias in the results. Data regarding the relevance and significance of the

properties of a discharge summary needed to be generated from GPs themselves, expressed in their own words, in order to ensure that all attributes significant to them are identified and included.

The levels that each attribute may take should be plausible to the respondents, and pitched such that the respondents are willing to trade between combinations of the attributes (142). They can be described quantitatively or qualitatively, depending on the attribute to which they are attached. Each attribute may take a different number of levels and intervals if necessary to describe its range of values (e.g. 24 hours, 48 hours, 72 hours) or where a binary choice is desirable (e.g. yes or no). In this study, after having identified the attributes relevant to GPs, a range of realistic values that each of these attributes may take should again be generated from GPs themselves; using their experience working with discharge summaries to describe the levels of attributes which are ideal, acceptable and unacceptable in practice.

The importance of well researched and thorough attribute development has been highlighted in the literature (140, 142). Methods commonly adopted to identify attributes for DCEs include literature reviews, existing health outcome measures, professional recommendations, and qualitative research in the form of focus groups, interviews and surveys (141) with service users or subject experts. However, the process by which attributes are developed for DCEs is often poorly reported (141), and so in the next two chapters we aim to provide a detailed description of the processes used to construct and refine attributes to be used within a DCE. Many qualitative research approaches emphasise and support the production of rich description of the processes they entail and are therefore relevant here.

5.5.1 Qualitative methods to identify attributes

Qualitative methods, such as surveys, interviews and focus groups, are of particular use in DCE attribute development because they are able to generate data from the perspective of respondents in their own words, allowing the researcher to understand how the respondents evaluate and express levels for the subject being investigated (162), and providing the ability to exclude potentially irrelevant or confounding attributes.

In 2011, Coast *et al.* (141) reviewed eight Discrete Choice studies which had used qualitative methods to identify attributes in their design, including focus groups, interviews

and meta-ethnography, and the relevance of their findings for this study are considered here. Whilst authors concluded that attributes could be most successfully identified through a combination of different qualitative techniques, in-depth interviews were considered as being particularly suitable as they allow enough time for thorough and detailed exploration of concepts. Focus groups, whilst found useful to promote discussions between participants which may uncover topics that the researcher may not have considered, were also found to allow less time for in-depth exploration and could be less appropriate where discretion or confidentiality may be desired. In the case of this study, it would have been interesting to promote discussions between different GPs practicing within the area and to hear their contrasting ideas, but because they will know each other already in a professional manner there may be dynamics within existing relationships which might steer or influence the willingness others to participate. The usefulness of meta-ethnography as a method to develop attributes is largely dependent on the extent of existing literature in the subject area, and although the transfer of patient care in general is a topic well researched quantitatively, there is little existing research on the preferences of GPs at discharge; and so would not be a suitable method for attribute development in this study.

With respect to analysis, Coast *et al.* concluded that iterative constant comparative approaches to analysis were most efficient because they allow interview questions with successive interviewees to be continually adapted in the light of the findings being generated (141, 163), which for a DCE, will allow for the attributes to be sequentially rounded and refined further as the study progresses.

5.5.2 A two-stage process

Coast *et al.* also recommended a two-stage approach to attribute development: conceptualisation of the attributes of the service in question; and refinement of attributes to convey meaning to the study participants. Conceptualisation consists of gathering the relevant and important characteristics of a service, often in academic terms appropriate to the researcher or policy maker.

The equivalent first stage in this study was a survey to GPs, which aimed to conceptualise the discharge process by asking GPs to rank a selection of components and characteristics of discharge summaries in order of importance to them.

The second stage was a qualitative study, which aimed to refine the significant characteristics of the service, in their raw state, to be shaped into attributes that convey the intended meaning to participants in a DCE. A secondary aim for this study was to further explore the perceptions of GPs on discharge from secondary care and to understand their expectations for discharge communications and why.

5.6 Conclusion

This chapter has identified DCEs as an appropriate and useful technique for investigating patient, consumer and provider preferences in healthcare settings. Application of DCE is therefore relevant to the research objective to explore GP preferences and expectations from secondary care providers at discharge. Development of attributes to describe the discharge system in an appropriate and meaningful way to GPs is necessary to ensure the DCE is valid. Similarly, levels need to be pitched at plausible values in order that the hypothetical choice presenting in a DCE is realistic to GPs. Qualitative methods have been recommended for the purpose of attribute and level development and refinement.

The next three chapters of this thesis describe the development and application of the DCE, which aimed to mirror the exploratory qualitative work conducted with junior doctors at the other side of the interface (reported in Chapter 4). The overall aim was to investigate and understand the relative value that GPs place on the individual properties of discharge communications, and consequently, to identify which aspects of discharge need to be prioritised by doctors working in secondary care in order to meet GPs' needs post discharge. Figure 5.4 below summarises the project method outline.

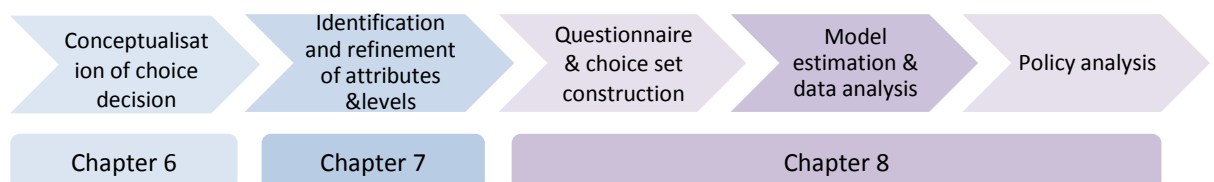


Figure 5.4: The six phases of DCE project development and location within this thesis

Chapters 6 and 7 describe the development of the DCE questionnaire using two stages: a service evaluation survey to GPs, which aimed to conceptualise the discharge process from

the perspective of GPs and to gather information on the important and relevant properties of discharge communications; and qualitative interviewing to refine and focus the concepts derived in the survey into key descriptors of discharge communications. Chapter 8 describes the design and application of the DCE questionnaire to GPs in the East of England.

Chapter 6: Surveys to junior doctors and GPs

6.0 Chapter overview

This chapter describes the first phase in the design and application of a DCE to GPs: a service evaluation survey, which aimed to gather information on the important and relevant properties of discharge communications. This survey was sent to both primary and secondary care doctors with a view to conceptualizing the discharge process from the perspective of doctors who have a working knowledge of system at both sides of the interface, and to draw a comparison between the two.

This survey study was in fact conducted before the ethnographic study of junior doctors reported in Chapter 4. The results of the survey enabled concepts relevant to junior doctors to be identified, which were used to inform the topic guide and recruit interview participants into the ethnographic interviews. The rationale for positioning this study here out of chronological order was twofold: to follow up from the lessons learnt in Chapter 3 and provide explanation for the results seen therein; and to enable the reader to clearly observe the progression and development of the DCE survey to GPs.

6.1 Objectives

The results of the DCE study are intended to provide insight into the receipt of discharge communications from the perspective of doctors working with the system, which will in turn allow identification of areas of working practices at discharge where changes could be made to improve the transfer of care pathway.

The primary objectives of the first stage of this study were therefore to investigate:-

- GPs' views on the quality of the current process, content and timeliness of electronic discharge summaries received from CHUFT
- How important GPs consider the individual components and characteristics of a discharge summary
- How important junior doctors consider the content and characteristics of discharge summaries, and to compare these to those of GPs in order to explore the difference in values between the two groups of healthcare professionals.

Secondary objectives were to investigate:-

- The frequency of inaccuracies on electronic discharge summaries and how these impact on time within the GP surgery.
- The amount and quality of training for writing discharge summaries that junior doctors have received.

6.2 Method

6.2.1 Ethical approval

A questionnaire survey to capture the opinions of both primary and secondary care doctors was undertaken post ethical approval as a service evaluation survey of NHS staff from the University of East Anglia Faculty of Medicine and Health Ethics Committee, which was granted on 21st December 2012 (Appendix 6.1) as part of the larger qualitative studies described in Chapters 4 and 7.

6.2.2 Setting

The secondary care study site was CHUFT, and the primary care site was a group of 43 GP practices caring for 325,000 patients in the one UK region served largely by the study hospital.

6.2.3 Participants and sample size estimation

At the time of study completion, 74 junior doctors were employed by the hospital and 173 GPs were located in the study GP practices. Previous surveys to GPs and junior doctors have reported response rates of around 30%.^(132, 164, 165) Based on a 30% response rate, a sample size of 46 GPs and 22 junior doctors was anticipated. For questions eliciting a response between 50% and 90%, these would provide 95% confidence intervals of 36% to 64% and 81% to 99% respectively for GPs, and 29% to 71% and 77% to 100% respectively for junior doctors.

6.2.4 Sampling methods

The survey was posted to all 153 GPs not involved in the piloting stage, and via internal mail to all 74 junior doctors employed by the hospital, together with a covering letter (Appendices 6.2 and 6.3) and survey participation card (Appendix 6.4). Each doctor contacted was allocated a unique study reference code, which was printed on a separate survey participation card and sent to doctors alongside the survey. Receipt of a completed participation card indicated a response, thus preventing follow-up, whilst allowing survey answers to remain anonymous. A follow-up copy was sent to non-respondents after two weeks. Failure to respond to the second questionnaire after a further two weeks was treated as non-participation in the study.

6.2.5 Data collection

The survey was initially informed by the existing literature, and was subsequently reviewed and refined by a multidisciplinary team in order to establish content validity. The team comprised pharmacy practice researchers and a qualitative health researcher at UEA, a health economics researcher with specialist experience in questionnaire design, and senior clinical pharmacists and the senior medical officer at the secondary care site.

The questionnaire comprised three sections, totalling 18 items, and used a combination of Likert scale, yes/no, and open responses. Different versions were prepared for GPs (Appendix 6.5) and secondary care doctors (Appendix 6.6).

From GPs, section 1 was designed to capture the following:-

- Existing timeframes within which discharge summaries are received
- Timeframe considered acceptable for discharge summary receipt
- Perceived importance of a discharge summary being checked for accuracy prior to receipt

From junior doctors, section 1 was designed to capture the following:-

- Frequency with which respondent wrote discharge summaries
- Frequency with which medicine changes were included in discharge summaries
- Frequency with which discharge summaries were checked for accuracy by a pharmacist before releasing to primary care
- Whether formal training in discharge summary writing had been received. If received, where this had taken place and perceived adequacy

Sections 2 and 3 were identical for both primary and secondary care doctors.

Section 2 cited four characteristics (timeliness, accuracy, completeness, and, spelling and grammar) and four pieces of content (full list of medicines, medicine changes, rationale for medicine changes, and medicine continuation plans) of discharge summaries, which doctors were asked to rank in order of importance on a Likert Scale of 1 to 4, where 1 is most important and 4 is least important. Doctors were asked to choose only one number per characteristic and content. The eight characteristics and contents presented in the questionnaire were determined from preparatory empirical work undertaken by the research team.

This section contained a further three questions inviting responses to the following:-

- Any discharge summary characteristics other than the four listed above perceived as important
- The one change most desired to existing discharge summaries produced at the secondary care study site

- Selection of whether details of medicines prescribed at discharge or details of medicine changes during hospitalisation is most important in a discharge summary

Section 3 requested information from the respondent about gender and number of years qualified as hospital or primary care doctor in order to characterise the respondent population.

Content and face validity were further established through piloting the questionnaire with 20 randomly selected (using a list of GP reference numbers and a random number generator) GPs based in one UK region. The questionnaires were distributed by post thus response rate was also estimated. As a result of piloting, ranking questions were changed, from asking the respondent to assign a numbered rank to each listed component (characteristic or content), to a list of ranks and components and the respondent drawing a line between them. This limited the likelihood of doctors allocating more than one rank to each listed component. Pilot responses were excluded from final analysis.

6.2.6 Data analysis

Descriptive statistics were used to report doctor responses. Fisher's exact test was used to compare the preferences of GPs and junior doctors regarding pharmacy checking and provision of information on medicine changes. Ranking choices were compared using Mann-Whitney U test. Simple thematic analysis was used to evaluate free text comments thus providing further depth to the quantitative data. Invalid responses, where the doctor had assigned more than one choice to each rank were excluded from the final analysis.

6.3 Results

6.3.1 Response rates

Of the 232 posted questionnaires (excluding the pilot), 36 (49%) junior doctors and 42 (28%) GPs returned a completed questionnaire.

Of the GPs, 18 (44%) respondents were female, and respondent GPs had been qualified for a mean (SD) of 17.9 (9.1) years. Of the junior doctors, 22 (61%) respondents were female,

20 (56%) doctors held FY1 positions and 16 (44%) FY2. Two (6%) doctors had studied at overseas medical schools; the remainder were graduates of UK-based schools.

6.3.2 Ranking questions: comparison between junior doctors and GPs

All 36 junior doctors answered both the ranking questions for the characteristics and content of discharge summaries, of which 33 (92%) and 32 (89%) responses respectively were valid. The same ranking questions were completed by 39 (93%) and 38 (91%) GPs respectively, of which 35 (90%) and 33 (87%) responses respectively were valid. Table 6.1 displays the average rankings assigned by doctors to the variables for characteristics and content. Significant differences in allocated rank between the two groups of doctors can be observed for the completeness of the discharge summary and the presence of medicine changes.

Discharge summary component	Median (IQ) rank		Mann-Whitney U test
	GP	Junior Doctor	p value
Characteristics	n=33	n=32	
Accuracy	1 (1, 2)	1 (1, 1)	0.144
Completeness	3 (2, 4)	2 (2, 3)	0.006*
Timeliness	3 (2, 3)	3 (2, 3.75)	0.132
Grammar	3 (2, 4)	4 (3, 4)	0.068
Content	n=35	n=33	
Medicine prescribed	1 (1, 3)	1 (1, 2)	0.078
Continuation plans	3 (2, 3)	3 (2, 4)	0.728
Medicine changes	2 (1, 3)	3 (2, 3)	0.009*
Rationale for changes	3 (3, 4)	3 (3, 4)	0.812

*denotes significance at the 0.05 level

Table 6.1: Median ranking by doctors of discharge summary characteristics and content

6.3.3 Characteristics and content

'Accuracy' was assigned a rank of 1 ('most important') by 24 (73%) GPs and 28 (88%) junior doctors; no GPs or junior doctors ranked 'accuracy' as 4 ('least important'). Only 3 (9%) GPs and no junior doctors ranked 'timeliness' as 'most important'. 'Medicine changes' were ranked as 'most important' by 13 (39%) GPs and 4 (12%) junior doctors.

Figure 6.1 displays the frequency with which junior doctors reported sending discharge summaries without a pharmacist accuracy check, and GPs reported noting whether a discharge summary received had been accuracy checked by a pharmacist.

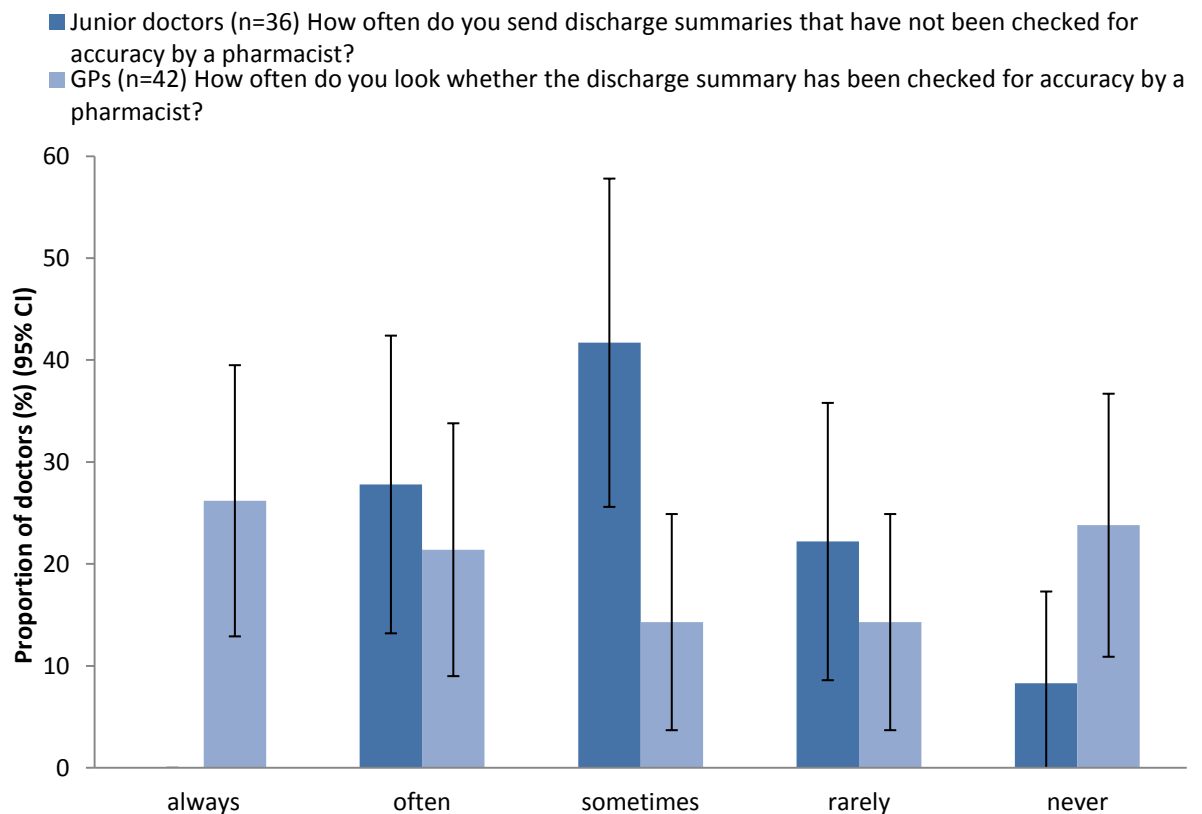


Figure 6.1: Comparison of frequency of accuracy checking between GPs (n=42) and junior doctors (n=36).

When asked how they felt about sending or receiving unchecked information at discharge, 16 (44%) junior doctors did not feel comfortable with sending unchecked information, whilst 29 (71%) GPs did not feel comfortable updating their records if the discharge summary is not checked for accuracy (Fisher's exact test, $p=0.023$).

Details of only the medicine changes on a discharge summary rather than a full list of medicines was preferred by 20 (49%) GPs compared to 10 (28%) junior doctors (Fisher's exact test, $p=0.062$).

6.3.4 GP requirements for timeliness

Across the GPs' responses, a mean (SD) of 59.1% (29.8) EDS were reported as being received within 24 hours; 75.8% (21.3) received prior to the patient's first GP appointment after discharge; and 73.3% (22.6) patient records updated before the patient's first appointment.

GP responses for the ideal, acceptable and unacceptable time (in hours post discharge) in which to receive discharge summaries are displayed in Table 6.2. 18 (48.6%) GPs responded with a timeframe (or range of values) when asked to give an unacceptable time in hours post discharge, the most frequent of which was greater than 72 hours, stated by eight GPs.

Measure	Ideal level	Acceptable level	Unacceptable level
Valid responses	38	38	19
Mean (SD)	20.8 (6.0)	44.2 (17.7)	65.3 (30.5)
Mode	24	48	72
Range	20	60	144

Table 6.2: Time to receive discharge summaries, in hours post discharge

All GPs who answered the question on ideal timeframe stated values of 24 hours or less for the ideal time in which to receive discharge summaries. However, 24 (58.5%) GPs would be willing to wait longer than 24 hours to receive a discharge summary in order to guarantee it had been checked for accuracy.

6.3.5 GP views on quality

In the section that provided space for GPs to write comments, 12 GPs stated the need for discharge summaries to provide details about follow-up plans, and specifically who will be responsible for their arrangement. This was also identified in the assessment of quality in which 18 (43.9%) GPs described the details of continuation plans and action for the GP as being 'poor' or 'very poor', and no GPs described them as 'excellent'.

25 (61.0%) GPs described details of medicine changes as being 'poor' or 'very poor'. No GPs described medicine changes as 'excellent'. However, 37 (90.2%) GPs described the prescribed medicine list as being 'good' or 'fair'. Figure 6.2 displays the rankings which GPs assigned to information provided on discharge summaries.

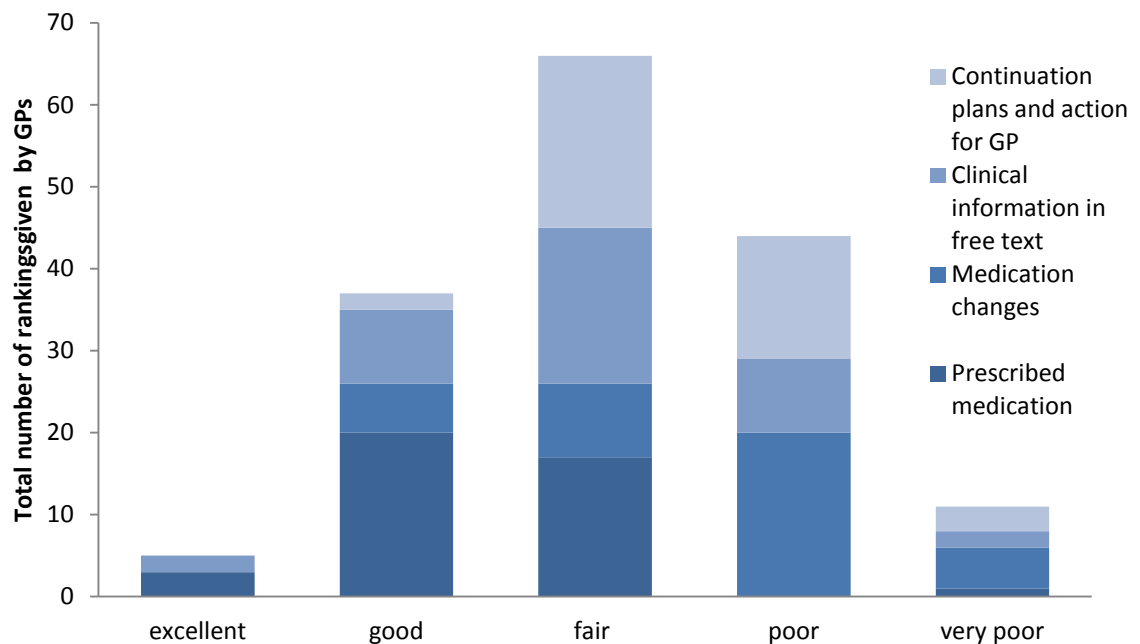


Figure 6.2: Quality rankings of information provided in discharge summaries by GPs

A median proportion of 15% (IQR 10 – 30%) of summaries received by GPs contained inaccuracies which required practice time to address, with each inaccuracy taking a median of 0.5 (IQR 0.5 – 1.0) hours to resolve.

6.3.6 Comments on ranking task

With reference to the preference of GPs for either a list of prescribed medicine or a list of medicine changes at discharge, some stated that it was *“impossible to differentiate between the two”*, because the list of prescribed medicine should allude to whether medicine changes have occurred. Some doctors stated that it was *“impossible to rank”* the content and characteristics listed, as all were seen as being important to the GPs.

6.3.7 Comments on knowledge of the patient

Neither junior doctors nor GPs reported being at ease with writing or receiving summaries where the discharging doctor had no knowledge of the patient. Five junior doctors commented that the quality of their discharge summaries would be improved if they wrote summaries for only patients whom they had treated during their admission: *“It’s difficult to write a high quality TTO for a patient that I haven’t even met”* (JD respondent 12), and *“why on earth should the discharge be completed by someone with no knowledge of what happened during this patient’s care?”* (GP respondent 15).

6.3.8 Junior doctor training

Mean (SD) time spent preparing discharge summaries reported by junior doctors was 27% (19.2) of their time. For FY1s and FY2s this was 33% (22.5) and 19% (10.2) of their time respectively.

Receipt of formal training for writing discharge summaries was reported by 28 (78%) doctors, however only 6 (19%) received this as part of their medical degree, and 13 (36%) felt that the amount received was too little. Six junior doctors raised the need for guidance and training regarding what information should be included on discharge summaries. They suggested this should be consultant or GP-led: *“It would be helpful to hear directly from GPs what they need, and what information is useful/not useful to them”* (respondent 22).

They also wanted good practice examples to be provided, as with: *“I would like to see some examples of what are considered good summaries”* (respondent 10) and, *“some idea of content expectations would help”* (respondent 8).

6.4 Development of *a priori* concepts

Table 6.3 displays key concepts relating to discharge summaries identified from the survey as being of importance to GPs. Draft levels have been assigned based on the range of values that GPs expressed as being desirable, acceptable and unacceptable. These concepts were used to inform the interview topic guide for the subsequent interviews with GPs to further explore the important aspects of discharge summaries.

Concept	Possible measures
Accuracy	<ul style="list-style-type: none"> • Number of errors on summary • Type of errors on summary • Severity of errors on summary • Time spent resolving errors
Timeliness	<ul style="list-style-type: none"> • Time taken post discharge to receive summary • Time between receiving summary and patient appointment • Is summary with GP before patient's first post-discharge appointment? I.e. did it arrive when it was needed
Medicine changes	<ul style="list-style-type: none"> • Details of changes present on the summary • Details of changes in specific place on summary • Reasons why changes have occurred
Continuation plans	<ul style="list-style-type: none"> • Details of follow-up plans provided on summary • Details of who should be responsible for implementing them
GP action	<ul style="list-style-type: none"> • Appropriateness of the action requested by the hospital for the GP to undertake

Table 6.3: Key concepts identified in survey for use in interviews

6.5 Discussion

The results suggest that there are some key differences in priorities between the two groups of doctors working at either side of the interface, however, the majority of both GP and junior doctor respondents considered accuracy the most important characteristic of discharge summaries.

Whilst junior doctors appreciate the importance of discharge information being correct, in practice, a high error rate continues to be observed on discharge summaries.(19, 60, 63) Recent research into the causes of prescribing errors by junior doctors at hospitals in the UK hospital has shown that latent conditions (e.g. organisational processes, staffing), error-producing activities (e.g. busy environment, complex patient), active failures (e.g. mistakes) and lack of defences (e.g. pharmacy check) can lead to error occurrence.(44) It may be that the environment within which doctors write summaries, the training and information resources available to them, and the human element involved in actually writing the summary prevent accuracy on discharge summaries from being consistently achieved.

6.5.1 Accuracy versus timeliness

Even though junior doctors consider accuracy more important than timeliness, discharge summaries are often sent without being checked for accuracy by a pharmacist in order to reach GPs quickly, and meet the nationally agreed target for sending discharge information within 24 hours.

Whilst a timely transfer of information is undoubtedly desirable, the rationale behind the 24 hour government target is unclear, as hospitals will generally supply at least 7 days' worth of medicines at discharge, and it is unlikely that a patient will need to visit their GP within 24 hours of being discharged. Currently, there is no UK evidence which supports the 24 hour target in terms of patient outcomes.

Instead, this target has placed increased pressure on junior doctors to send out discharge information, often for patients with whom they have had no experience treating, and may not allow sufficient time for a second check of the summary to be made. Whilst junior doctors appear happier to do this, perhaps through a lack of foresight, or simply because of it being common practice, most GPs were not comfortable using unchecked discharge information. Junior doctors may be mistaken in thinking that GPs will always recognise whether or not the summary has been accuracy checked, or that they will provide that second check themselves upon receipt, rather than assuming that all the information provided on the summary is correct.

6.5.2 Medicine changes

GPs considered the explicit inclusion of medicine changes to be significantly more important than the junior doctors. Nearly half of GPs considered just details of medicine changes to be preferable to a full list of medicines on discharge summaries, compared to just over a quarter of junior doctors who believed this to be the case.

This could indicate that junior doctors lack awareness of the process of updating the patient's medicine record after discharge, for which information about medicine changes is particularly relied upon by GPs. GPs' prioritisation of medicine changes validates the inclusion of details of medicine changes as an important component of the minimum dataset when care is transferred in the Royal Pharmaceutical Society's recent transfer of

care guidance.(20) In favouring continuation plans over medicine changes, junior doctors did however demonstrate an understanding of the need for care continuity post discharge.

Both GPs and junior doctors perceived details of the rationale for medicine changes as least important. This may be because the rationale for changes made, once known or identified in the discharge summary, can be deduced from other discharge information provided, such as diagnosis. However, recent investigation into the documentation of prescribing decisions in a UK hospital found that hospital doctors are often unable to deduce why changes have occurred from the documentation available to them.(43) Further research to explore how junior doctors gather information about medicine, using the resources available to them, when composing discharge summaries is therefore warranted.

6.5.3 Training and guidance

Reflecting findings from previous literature (48), junior doctors described a lack of guidance for writing discharge summaries and expressed a desire for more training on the ideal content to include in a discharge summary, indicating a lack of confidence in what is required from them. This is consistent with recent findings from a study of postgraduate trainee medics in Canada, which investigated trainees' perceptions of their own and others' roles at discharge, and found a lack of both inter and intra-professional clarity regarding roles and responsibilities. Substantial disagreement between trainees was reported for 38% of the 13 discharge roles described(166).

Inter-professional education has been introduced to UK undergraduate healthcare degree programmes and postgraduate courses, to foster “*an understanding by every student of the roles of members of different professions in the health and social care team, with a view to ensuring that such teams work more effectively*”,(167) and is supported across UK nursing, medicine and pharmacy curricula (167-169).The concept of *intra*-professional education, however, which facilitates understanding of the roles of other workers within your own profession, is presently under-researched.(170) In the present study, the GPs' lack of awareness of the process and frequency by which summaries are checked for accuracy, combined with a lack of junior doctor confidence with respect to desirable summary content, suggests that promotion of intra-professional understanding between primary and secondary care doctors might assist in improving the quality of discharge summaries being produced. Further exploratory research in this area is therefore warranted.

6.5.4 Study limitations

The present study was a small, local service evaluation of a UK general hospital and consequently may not be representative of all hospitals and the GP population they serve within the UK. GPs included were familiar with receiving electronically written and sent discharge summaries and so may have had different views to those using only paper-based summaries.

For the purpose of this study only four different characteristics and content of discharge summaries were selected. These had, however, been identified from local audit work as being of significance and relevance to the future research objectives of the team. Although doctors were asked to list any other components which they considered to be of importance, they were not asked to rank these additions. Some doctors stated that it was impossible to rank the content listed, and these respondents were excluded from final analysis. In instances where ranking is unsuitable, or where more information than simply a list of ranks is required, application of a Discrete Choice Experiment (DCE), a type of stated preference research in which a service is broken down into and described according to its properties, may be suitable. A DCE would, in the case of this study, enable the relative value of discharge summary components to be examined together with the willingness of doctors to trade between them in order to gain an increase or reduction in particular components.

6.5 Conclusion

Although both groups of doctors rank accuracy as being the most important characteristic of discharge summaries, junior doctors frequently send information into primary care that has not been accuracy checked by pharmacy, and many are comfortable with doing so. GPs and junior doctors differed in their perceptions of the importance of medicine changes being provided on summaries, indicating junior doctors lack understanding of the GP's role with respect to updating patients' medicine list post discharge.

When prioritising work and deciding on the most appropriate actions, it is important to understand the perspective of the recipients of your actions. If junior doctors' perceptions of what is important within discharge information differ from those of general

practitioners, then it is likely that problems will still exist. Promotion of inter-professional understanding between the two groups of doctors therefore might assist in improving the quality of information produced at discharge.

The key concepts identified within the survey were used to inform the interview topic guide for the subsequent interviews with GPs to further explore the important aspects of discharge summaries, described in Chapter 7.

Chapter 7: GP interviews and the development of DCE attributes and levels

7.0 Chapter overview

This chapter reports the second qualitative study conducted to design and generate attributes and levels to be used within the DCE: semi-structured interviews with GPs. This represented stage 2 of the DCE design and analysis process. Finally it reports the final chosen attributes and their respective levels.

7.1 Aims and objectives

This qualitative study had four key objectives:-

- To conduct interviews with GPs to focus the characteristics and components of discharge summaries that are significant to them, identified through a previously completed survey, into attributes that can feasibly be used to describe electronic discharge summaries.
- To assign plausible levels (those that GPs can see as realistic and believable) to the attributes identified as most important.
- To refine the language to be used in the description of attributes, so that GPs would find them appropriate to convey the correct meaning, for them, within the DCE.
- To investigate reasons for the most highly ranked components and characteristics of a discharge summary in the survey being considered important to GPs.

7.2 Methods

7.2.1 Ethical approval

Approval for this study (alongside the survey described in Chapter 6) was sought from UEA Faculty of Medicine and Health Sciences Research Ethics Committee, and granted on 21st December 2012 (Appendix 6.1).

7.2.2 Sampling strategy

Given the specificity of our research question and topic area, it was estimated that a sample of five to ten GPs would be likely to achieve a sufficiently detailed but manageable diverse dataset. It was intended that sampling would cease only when data saturation occurred, i.e. the point at which no further emergent themes or important aspects were being identified in interviews (112), and that concurrent analysis would be undertaken to judge at which point this occurred.

As the DCE was to be conducted with GPs working in the region, the attributes obtained needed to be relevant to the wider population of GPs, and therefore a sample which purposively covered the range of features of the general population of GPs was required.

The subject being investigated was GPs' preferences for information provided in a professional context. Therefore a factor which may have altered their views on this was their own professional working environment or practice. GP requirements and priorities at discharge may have been dependent on the in-house procedures used at their own practice to process discharge information. It was therefore important to recruit a sample of GPs working at different types of GP practices.

The representation of diversity is often important in qualitative research (171). Therefore, the sample would ideally have consisted of GPs of differing seniority (based on years of experience), specialties and backgrounds, who expressed a range of views about the system within the survey. However, it was not possible to determine this information about GPs from the participation card by which they were approached, and so a wholly purposive approach to sampling was not possible to underpin this information.

Nevertheless, a sample with maximally diverse characteristics could have been constructed. When tracing contact details it was possible to identify the gender of the GP (because of their name), and the practice where they worked (because of their address), and so a purposively diverse sample of both male and female GPs employed at different practices could have been selected providing there was a sufficient number of GPs indicating interest in participating. The 173 GPs currently practicing within the area were all sent a copy of the survey (Chapter 6). Of these, the 15 GPs who had indicated an interest in involvement in further research during the survey were approached.

7.2.3 Identification

Only GPs who had expressed a willingness to be approached were contacted and invited to participate. The contact details for GPs who had expressed an interest in further research on the survey participation card were traced using their unique study reference number, allocated for the purpose of the survey and which was present on the participation card, but not on the survey itself, in order to maintain anonymity of question responses.

7.2.4 Recruitment

GPs were sent an invitation by post (Appendix 7.1), which included a participant information sheet (Appendix 7.2) and study consent form (Appendix 7.3). These provided the GP with information about the interview, including what taking part would entail and

what they would have to do; that they did not have to take part and could withdraw their consent to take part at any time; what topics would be covered; how confidentiality would be maintained and where further information could be sought. This was then followed-up with a telephone call four days after posting to allow sufficient time for the GP to read and process the information, and if GPs expressed a willingness to take part, an interview was arranged.

7.2.5 Ethical considerations

7.2.5.1 Avoiding coercion

Coercion is defined as “*the persuasion of an unwilling person to do something using force or threats*” (172). Historically in research, the autonomy of human participants to participate in research has often been compromised (173) leading to disastrous consequences. As a result, it is imperative to uphold an individuals’ autonomy when entering into research. Because this study was affiliated both with CHUFT and a local University, the GP may have felt pressured to participate in the study, because of a sense of duty to the hospital or their profession. GPs may have feared that there might have been consequences of not participating, for example, to their working relationships with the hospital, or a negative impact on their working environment.

To avoid any implied coercion to participate, the GP was provided with a detailed participant information sheet, which explicitly stated that they were under no obligation to take part, and that their decision would not affect their relationship(s) with staff at CHUFT, the University or any other body. If they proved willing to participate after having read the information about the study, GPs were asked to provide their written consent to take part.

7.2.5.2 Informed consent

Informed consent, where participants freely volunteer their consent to take part in the research having been provided with full and meaningful information about the study, is necessary to respect the rights of the GP participants and to protect their well-being. A consent form (Appendix 7.3) agreeing the terms for me to interview the GP (at their practice) was sent to doctors alongside the participation information sheet, which they were asked to read in their own time and, if happy to provide consent to participate, sign before the interview took place. Signing the consent form was seen as the participant's authorisation for me to interview them, and as agreeing to the terms of the interview.

Consent could be withdrawn at any time during the study, and this was stated explicitly on the consent form and participant information sheet. One copy of the signed consent form was given to the participating GP for their records, and the original retained at the University.

7.2.5.3 Confidentiality

It was a necessary ethical principle that participating GPs were not harmed as a result of their participation in this study. It was therefore important to uphold confidentiality within this study in order to permit GPs to speak freely and unreservedly about their opinions of, and experiences with, the electronic discharge system provided by CHUFT, without risk of repercussion from colleagues, patients or hospital staff. Consequently, all data collected were processed and stored anonymously, in accordance with Cauldicott guidelines, with all identifying information relating to GPs and their practices removed. For the purpose of the study, GPs were allocated a unique study reference number, which was used when processing and analysing their interview data. Transcripts of interviews were made available to the participating GP on request.

GPs may have been identifiable (to readers who are familiar with the practices, e.g. local primary care workers and hospital staff) if they provided details about their own GP practice-specific processes or procedures, such as the processes used to reconcile information received from the hospital into patient notes, during their interviews. However, practice-specific information was unlikely to be pertinent to generating attributes for the DCE, as it was important to construct attributes that would be applicable and relevant to all GPs practicing within the local area.

7.2.6 Trustworthiness

Measures were taken to ensure the four criteria of Lincoln and Guba [122] for establishing trustworthiness, credibility, transferability, dependability and confirmability, were upheld during the study.

To ensure credibility, I triangulated the priorities and preferences of GPs obtained from interviews with the results of the GP survey (Chapter 6) in order confirm that the most important attributes have been identified. This study adopted an interpretive approach to analysis, which, together with my pre-existing views, will have inevitably influenced the data interpretation and conclusions that were drawn. In order to avoid misrepresentation,

clarification or explanation was sought during the interviews where anything the GP participants had said was unclear, in order to ensure I had fully understood what was said. 'Thick description' of the GP participants and their environment provided through the detailed field notes I made helped to achieve external validity (122), and enabled the conclusions drawn to be transferable to other settings, situations, and healthcare professionals. To address confirmability, I kept a reflexive account of the research progress, which described my thoughts and feelings, professional judgments, values and research decisions made as the study progressed.

7.2.6.1 Researcher preparation and supervision

As described in section 4.4.9, prior to undertaking qualitative research, I completed two qualitative skills training courses provided by the University of East Anglia and Oxford University Health Economics Research Centre to prepare me for data collection, processing and analysis.

The reflexive account of research progress (or 'research diary') described in 7.2.6 was used as a basis for discussion in regular meetings with PhD supervisors, in which any issues or points for clarification were identified and discussed, or any interesting discussion points identified during my research experiences were relayed and reflected on.

7.2.7 Sensitivity of data

The interviews covered the views and opinions of GPs towards the hospital's discharge service. No personal or sensitive issues were covered during the course of the interviews that could have caused any significant distress to participants. The transfer of patient care between care settings is a topical issue, especially with the dawn of GP-led commissioning in primary care in the UK in 2013, which may have financial implications for primary care workers in the future. The interviews were therefore more of professional interest to participants, rather than causes of distress or upset.

7.2.8 Reflexivity

In preparing for, and during, the interviews I was conscious of a power imbalance between myself as a younger PhD researcher, and the GP interview participants - older, more senior healthcare professionals, who were more experienced working in healthcare than me. Although in theory interview participants should know more about the subject in question

that the interviewer, hence the reason for interviewing them, I was still anxious that I would show my inexperience in the questions I asked and possibly appear ignorant, which may have affected the GPs' willingness to be open during interviews and to provide credible data. I therefore ensured that before the interviews I tried to build my awareness of recent developments in primary care so that I was better able to understand the context in which the GPs' comments were made. I hoped that this allowed a redress of the balance of power and increased my confidence to seek to address my research questions.

7.2.9 Interview setting and format

Interviews were carried out in the GP surgery, lasting a maximum of 45 minutes. Interviews were recorded using an electronic audio recording device (Olympus® WS-100 Digital Voice Recorder),, and then transcribed verbatim. Prior to recording of the interview, I requested explicit verbal consent from the GP to record the interview. The interviews were semi-structured in format, allowing me to set an agenda of key interview topics and themes to discuss, but with the interviewee's responses to determine the relative importance of each of them (112).

In order to generate rich and relevant data from the interview, it was necessary for me to *"simultaneously orchestrate the intellectual and social dynamics of the situation"* (174), or, in other words, to obtain useful content whilst enabling a positive interview environment and agreeable relationship with the interviewee. Even though I needed to make on-the-spot decisions about which questions to ask, and in what order, in response to the answers received, these were strategic and based on an interview topic guide.

7.2.10 A priori concepts

The key concepts identified from the survey reported in Chapter 6 formed the basis of a topic guide to structure and steer the interviews with GPs in order to generate meaningful and relevant data for the research questions. Accuracy was ranked most important by GPs and so deemed a significant indicator of the perceived quality of the discharge summary. Whilst timeliness with which the summary was received was also considered desirable, the increasing pressure placed on hospitals to send timely discharge information is likely to affect the quality of the summary. The relationship between accuracy and timeliness as experienced by GPs in practice therefore needed to be further explored within these interviews. Justification of the reduction to a 24 hour target in which to send discharge

information had not previously been investigated with GPs, in terms of their needs in relation to timeliness in order to provide post-discharge care. The provision of details of medicine changes, previously explored in Chapter 3, was also identified as an indicator of quality of the discharge summary with respect to recommended guidance for discharge summary content (20).

7.2.11 Interview content and topic guide

Table 7.1 below displays a topic guide for the interviews: the planned structure and sequence of the interviews, key interview subject areas and main research question topics, and the subsequent likely sub-questions that were asked. Sub-question topics were developed through sub-division of the main research questions into their counterparts.

The interview topic guide provided me with a simple reference guide to ensure that relevant data was uncovered and all the significant research questions were addressed. Where more unstructured conversation took place within the semi-structured interview, the interview guide was used to ensure similar ground is covered. Open questions were used to encourage GPs to discuss topics in their own words, to encourage more detail and expansion of a topic, and probes were used for clarification or focusing where necessary. Situational questions, rather than abstract questions, were used in order to generate responses which were contextual and ascertained the reasons behind views and preferences.

The interviews consisted of five sections, which are described in further detail in the interview topic guide shown in Table 7.1. Section 1 of the interview served as an introduction, where an example DCE on a subject unrelated to discharge summaries (so as to not bias or influence results) was shown to the GP participants in order to explain the purpose of the research and to define the concept of attributes and levels. Section 2 consisted of questions relating to the service as a whole, the satisfaction of GPs with the quality of information provided by the hospital at discharge and their expectations for discharge information they receive. Section 3 explored results from the survey in terms of the most important characteristics and components of discharge summaries identified. Section 4 explored attributes, levels and language to be used within the DCE, and section 5 consisted of closing questions and discussion of any other issues that GPs felt were relevant.

Sequence	Key subject area	Research question	Sub-questions
Section 1	Context: DCE	Introduce GP to an example DCE, explaining its purpose for this study and the use of attributes and levels	
Section 2	Views on current discharge service	How do you see the quality of the discharge information you receive from CHUFT?	Probe: any areas particularly good (if so, why?)? Any which need improvement? (If so, why?)
	Expectations at discharge	What are the needs and expectations that GPs have for discharge summaries?	What are your expectations for information provided by hospital when a patient is discharged? Why is this?
Section 3	Characteristics (Properties)	What characteristics/ properties of the discharge service are important to you?	Probe: -TIMELINESS -ACCURACY -COMPLETENESS -PHARMACY CHECKING Why is this? Probe: relevance to your role: Probe: relevance to your ability to provide satisfactory patient care
	Components (content)	What components of the discharge summaries are important to you?	Probe: -LIST OF MEDICINES -MEDICINE CHANGES -RATIONALE FOR CHANGES -ACTION FOR GP, FOLLOW-UP PLANS Why is this? Probe: relevance to your role: Probe: relevance to your ability to provide satisfactory patient care
Section 4	Attributes	What attributes do you see as most meaningful for describing discharge summaries?	Probe: (for each) why is this?
	Language	[For each attribute they have identified] How would you describe this so you recognise it?	Probe: (for each) How would you express this?
	Levels	[For each attribute they have identified] What words would you use to describe having more or less of this?	Probe: (for each) why is this? Probe: (for each) what would be an acceptable or unacceptable amount of this? How would an improvement/deterioration in any of these characteristics affect a) your role and/or b) your satisfaction with the summary?
Section 5	Close	Is there anything else relating to the discharge summaries that you would like to discuss or share?	Probe: is there anything you feel I haven't covered? Probe: Anything else you'd like to add?

Table 7.1: GP interview question topic guide

Following the interviews, I used interview findings to construct a mock DCE tool. At the end of the interviews, GPs were asked if they would be willing to be approached in the future to review the mock DCE and to provide feedback.

7.2.12 Data analysis

In order to use the interview data to build on survey findings and the research needs of CHUFT, data analysis needed to generate meaningful concepts, or themes, relating to discharge to carry forward into the DCE as potential attributes. It was important that the attributes generated were based on solid qualitative foundations, generated through considerate and rigorous analysis.

Thematic analysis (103) was used to group the data into categories of similar meaning related to the characteristics and content of discharge communications that GPs consider to be important. Framework analysis was used as an approach to display *a priori* concepts against emergent themes by charting the data into a thematic framework. Framework analysis is particularly useful where interviews are more structured in terms of the questions asked, which enables the framework to be populated from the interview topic guide. They are also able to provide a useful visual tool by displaying the distribution of themes across participants and to confirm consistency among the data.

The transcripts from each interview were therefore thoroughly read, and initial impressions and messages identified and coded by subject. Data was read both literally, in order to establish the correct terms and way of expressing concepts forming attributes, and interpretively, in order to make sense of the GPs' preferences and their corresponding meanings. However, even though the language GPs used was of interest in this study, discourse analysis, in which the way dialogue is constructed is carefully scrutinised, was not appropriate for this data. This is because the conversation generated through interviews did not occur naturally, as it would in ethnography, and the meanings of GPs could be sufficiently established from the terms they routinely used, rather than the way in which they constructed their conversation.

Codes were inserted into the framework based on their relation to *a priori* concepts, or if concerning an unrelated topic, similar codes were grouped together into emergent themes. The resultant themes were discussed with an experienced qualitative researcher at the UEA

for appropriateness and accurate representation of the data, in order to ensure dependability (the consistency of the findings and capability for the study to be repeated).

7.2.13 Formation of attributes

The themes identified were refined into attributes, using appropriate language and terms generated from the interviews, which could then be used within the DCE to convey their intended meaning to GPs. It has been recommended that the smallest number of attributes possible should be used within a DCE (143), and so the final attributes were triangulated with the results of the survey to GPs in order to confirm their credibility. Figure 7.1 summarises how data was combined to form attributes from emergent themes and *a priori* concepts.

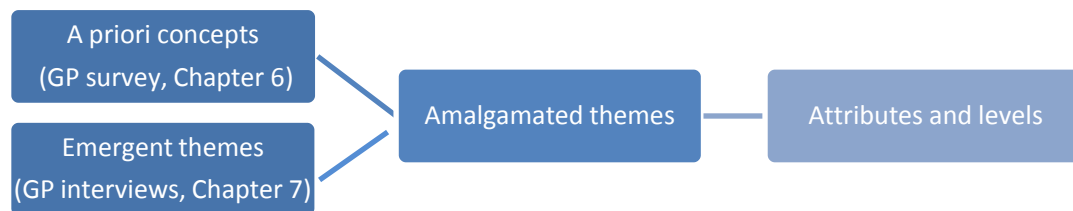


Figure 7.1: summary of attribute formation from emergent and *a priori* concepts

7.3 Results

7.3.1 Demographics

The 15 GPs who indicated willingness to take part in interviews were contacted by telephone and invited to take part, of which 3 agreed to an interview. The demographics of the three GPs and their interviews are displayed in Table 7.2. Interview transcripts are included in Appendix 7.4.

Reference	Gender	Years practicing	Type of practice	Special interests
GP1	M	20	Suburban, small	Orthopaedics, Urology, Minor Surgery
GP2	F	25	Rural, large	Family medicine, Diabetes
GP3	M	12	University, large	Family medicine

Table 7.2: GP and interview demographics

7.3.2 Emergent themes

In addition to the *a priori* concepts identified, which were able to directly inform the DCE in terms of their relation to characteristics and content of discharge summaries, a number of emergent themes relating to the experiences and perceptions of GPs were identified, which are explored further in the subheadings below.

7.3.2.1 Emergent theme 1: Expectations

The theme “expectations” includes the expectations of GPs for the content and characteristics of discharge summaries in order to provide adequate post-discharge patient care. The following sub-themes are included within this theme:-

- Expectations for content
- Expectations for characteristics
- Expectations for timeliness
- Compromising

7.3.2.1.1 Expectations for content

When asked about their expectations for the content of a discharge summary, one GP described the ideal discharge summary as a journey as follows:-

“To be an accurate reflection of the patient’s journey from point of specialty admission through their journey in hospital including investigations and test results to their point of discharge with an up to date list of medicines” [GP1]

This account of the journey through the patient’s admission implies that GPs may be interested to know the whole story of the admission, and an overview of the key findings of investigations made during the admission. This is perhaps to provide context and background for the changes or recommendations to treatment which are made as a result of the admission.

The requirement of this GP for an up to date list of medicine implies that GPs are aware of changes that might be made to medicines during an admission, which may supersede the care plan they have in place for that patient, and so require information about those changes to enable them to provide subsequent care, reflected by GP3:-

“I would like to know what’s changed, so what’s changed from when they were admitted to when they were discharged... Any changes to any medicines, what’s been started and what’s been stopped, and for that to be really, really clear on the discharge letter ‘cause I’d say predominantly when we’re checking these letters when they come in, it really is to look at medicines, you know, to see whether or not the patient has had something changed, whether we in fact need to be issuing them, checking that they’re getting any particular issues with it, that sort of thing, and blood monitoring, that sort of thing” [GP3]

This comment seems to imply that the rationale for GPs requiring information about medicine changes is especially related to the ongoing management and monitoring of the patient whilst back under the care of the GP. GPs were particularly interested in the provision of plans for follow-up or continued care on the discharge summary, which include whose responsibility it should be to arrange plans and how quickly action needed to be taken for that patient.

“I think it’s very important the main message to the GP has to be in that statement to say, you know, this is what needs to happen for this patient. If it’s a plan, if something needs to happen that the GP needs to action” [GP3]

7.3.2.1.2 Expectations for characteristics

Mirroring results of the survey, all three GPs emphasised the importance of the information contained in a discharge summary to be accurate:-

“I mean ideally you don’t have any [errors], spelling mistakes and grammar I can live with... but I think they should be accurate - that’s the point” [GP1]

GP1 here highlights accuracy as being a key purpose of discharge summaries – to transfer accurate information from secondary care - not just a characteristic of the summary. However, this GP describes accuracy as being ideal, as if to acknowledge that it is not always achievable, whereas GP3 (below) felt that there was no compromise in this respect:-

“I don’t think there is any scope for error where medicines or reference to the patient’s safety is concerned... Anything related to patient safety, no, there’s no negotiation there, that has to be completely accurate” [GP3]

7.3.2.1.3 Expectations for timeliness

However whilst accuracy was consistently deemed important, GP requirements for timeliness of summaries seemed to be dependent on the clinical nature of the patient's admission: whether follow-up action was required within the week, and the likelihood of the patient visiting the GP shortly after their discharge, as with:-

"It depends again on the nature of the admission, so I would say an elective hernia repair a few days, but if someone's been admitted with a myocardial infarction and will need follow up such as blood tests within a week at the surgery, we would like to have it within 24, 36 hours... for elective admissions like hip replacements again, or often surgical procedures, I think we could wait longer" [GP1]

GPs were willing to wait up to a week for discharge information which was not immediately required for patient action: or where no changes to the patient's treatment had been made-

"If there's no immediate changes to patient's treatment that we have to action right away I would say probably two or three days is reasonable but certainly within a week... I wouldn't accept beyond a week as being acceptable" [GP2]

One GP felt that receiving the summary within 3 days of discharge was sufficient in order to allow any potential issues or problems that might occur post discharge to have manifested themselves, as with:-

"I would say an ideal for me would be 72 hours, I think within 3 days, so that actually that gives the patient some time to get into the community, it gives time for anything that's going to happen to happen" [GP3]

This seems to imply that the GP's rationale for wanting summaries quickly after discharge is so to meet the clinical needs of the patient. For patients who are likely to require immediate care from the GP after discharge, there is a greater need for summaries to reach the GP quickly in order that they have the information they need to provide care. Where the patient is unlikely to need follow up care from the GP, the summaries are not needed as quickly in primary care.

GPs demonstrated awareness of the targets for sending discharge summaries within a certain timeframe, and the rationale for introducing these timeframes resulting in response to issues being raised by GPs, as with:-

“This has happened because commissioners are trying to address GPs’ concerns about things like discharge summaries, and one of the problems previously has been that they take too long to arrive. You might have had a patient admitted to hospital with something wrong with them and it’s maybe a month before you get a discharge summary. That’s a bit of an exaggeration or an exception but it does happen” [GP2]

7.3.2.1.4 Compromising

GPs explained the need for introducing timeframes and gave examples of problems that were experienced before their introduction. However, they questioned the necessity for a 24 hour target in which hospitals are required to send discharge information, acknowledging the difficulties hospitals face when trying to achieve this, and the ensuing effect on discharge summary quality:-

“It’s gone to the opposite extreme where they are now actually expected in hospitals to send us a discharge summary its either 24 or 48 hours after discharge, and whilst that’s helpful and does inform you, it doesn’t inform you of everything, and quite often you’ll get a very short discharge summary that doesn’t have... it may not be inaccurate, but doesn’t have adequate information for ongoing care” [GP2]

With this, GPs report experiencing knock-on effects associated with the hospitals having to produce discharge information within a shorter timeframe, which include the production of shorter, incomplete and inaccurate discharge summaries:-

“I have experienced a lot of inaccuracies in discharge summaries over the last year or two when there’s been this emphasis on speed rather than accuracy” [GP2]

This implies that whilst speed is important to GPs, favouring it in preference of accuracy, is not what they would ideally prefer. Despite arguing that 24 hours would be an ideal timeframe in which to receive summaries, GPs were cautious about how adhering to this target may affect the quality of the resulting summaries:-

“Obviously the hospital has a target, it is a very narrow target in terms of, I think it’s about within 24 hours if they can get it out... I would say that that’s not necessarily a target that I would want to push” [GP3]

It appears that GPs have conflicting priorities when it comes to the characteristics of summaries: whilst they report wanting to receive information quickly in order to continue care, this has been at the detriment of quality and accuracy, and, as GPs argue, is actually one of the key purposes of a discharge summary.

7.3.2.2 Emergent theme 2: GP as a detective

The theme “GP as a detective” encompasses the experiences of GPs and the action reportedly taken by them when inadequate information is provided on discharge summaries. Through the provision of short, incomplete and inaccurate discharge summaries by hospitals, GPs described often being left without key information following a patient discharge, causing them to feel uncertain of how to proceed with care provision, and being placed in an awkward position when seeing the patients involved in the discharge, who expect them to have access to the most up to date information.

GPs reported often having to ‘play detective’ by having to deduce certain discharge instructions or treatment changes themselves, rather than these being clearly conveyed in the discharge summary text, as with:-

“There are often glaring holes in the information that comes through, with a distinct lack of what led from A to B” [GP3],

This comment seems to underline that when GPs are left without the background or context which led to a clinical decision being made, it would be difficult for them to understand why action was taken and therefore which action to decide to continue with. Retrieval of such missing information was a task which GPs described as difficult and time-consuming:-

“We have to end up phoning secretaries to get missing scans or tests and then put the picture together which takes time for us” [GP1]

Again, GPs refer to the need to understand the context in which decisions were made, rather than simply be presented with the results of those decisions, in order for them to understand how to proceed with care. GPs acknowledged that ambiguity or incomplete discharge information could easily lead to misinterpretations and problems further along in the patient's care, such as:-

“The dosage a patient was on of a medicine when they went into hospital is listed as different when they come out and you're not sure whether that's been changed deliberately for clinical reasons, because it's not mentioned, or whether it is just an inaccuracy on the discharge summary” [GP2],

Where changes aren't explicitly stated as being intentional, GPs are sometimes led to believe that dissimilarities in medicine from admission to discharge are simply inaccuracies. Similarly, if not explicitly stated, problems can occur when a particular piece of information is overlooked:-

“If they make a reference to what the GP needs to do in the sort of cloak and dagger way and it's not specific then it can get missed” [GP3]

7.3.2.3 Emergent theme 3: Perceptions of secondary care

The theme “perceptions of secondary care” encompasses the perceptions that GPs have of the discharge processes undertaken and responsibilities of hospital staff. It also includes the following three sub-themes:-

- Providing feedback
- Working relationships with secondary care
- Intra-professional empathy

7.3.2.3.1 Providing feedback

Although junior doctors write the majority of summaries, GPs consider consultants as having overall responsibility for the discharge summary and, if faced with an issue on a summary, would address matters directly to them:-

“I don't usually address it with the junior doctor who sent the report because quite often they're actually not that involved with the care of the patient, but the consultant has overall responsibility whether or not they had contact with the patient and they are often in

a good position to deal with it. Sometimes, just occasionally, I have actually telephoned the junior doctor who has completed the summary if there's been something that I think the junior doctor can address, like an inaccuracy in prescribing" [GP2]

This GP reported feeding back to the hospital in order to provide advice to junior doctors about poor prescribing practice where inaccuracies are present on discharge summaries, something which is not generally commonplace for GPs to do, but which may have been of use to the junior doctor to help improve their practice. The lack of feedback provided by primary care to junior doctors in hospitals is something which was explored further in chapter 4. In this example, the GP chooses to go above the junior doctor in order to address an issue, recognising that junior doctors often write summaries for patients they do not know clinically and so are not necessarily equipped to respond appropriately to a GP query.

7.3.2.3.2 Working relationships between GPs and secondary care

The need of the GP to be able to communicate with and refer back to the doctor responsible for the patient's care whilst in hospital highlights the importance of maintaining good working relationships and collaboration between primary and secondary care.

However, working relationships were sometimes tested with respect to transfer of care, where GPs felt they were unfairly burdened with tasks set by the hospital for them within the discharge summary. GPs deemed many of the tasks set for them on summaries as inappropriate for them to have to carry out, and which should instead have been the responsibility of the hospital to arrange, as with:-

"The thing that really annoys me is when 'GP to arrange this appointment, GP to arrange that appointment, GP to arrange this follow up', I mean, that's inappropriate, you know, we haven't been involved in that admission and actually if there's a decision that another specialty needs to see that patient then really there has to be some discussion with that specialty as to how that's going to be facilitated for that patient" [GP3]

This GP implies that increased workload is placed on them by the hospital through inappropriate follow-up instructions, and identifies the importance of liaising with other care providers to decide the logistics of how care can be facilitated for a patient, rather

than assuming the GP will be able to do it. The idea of a patient's care being passed from doctor to doctor was highlighted as a concern of the same GP as in the above quote, who also raised the subject of responsibility for seeing the patient's care through to the next stage, and not simply passing the buck onto the primary care providers:-

“So the patient's not dumped back into the community, then has to speak to another doctor who hasn't been involved in the decision making process, and then gets referred on from there. Because that's just time wasting, and I think a little bit of shirking responsibility in terms of, actually, if you need to make a referral then it needs to be done in secondary care” [GP3]

This GP identifies the potential impact of poor liaison with other care providers when a patient makes a transfer between settings on both the quality of the patient's experience and time. By instructing the GP to make referrals, the hospital increases the workload on the GP and increases the time to achieve a referral for the patient, and also increases the possibility of error through an additional pathway of communication.

7.3.2.3.3 Intra-professional empathy

The GPs demonstrated having insight into the processes involved in compiling a discharge summary and the problems faced in secondary care, acknowledging the time pressures, commitments to other tasks, and trainee status of the majority of doctors who write discharge summaries. One GP was particularly empathetic to junior doctors:-

“I'm trying to be realistic in the fact that actually the junior staff who haven't seen the patient and then doing lots of other unfamiliar activities in the hospital and learning... That is a very busy time for a junior doctor” [GP3]

GPs commented on the difference in quality between discharge summaries which have been written by a doctor who has treated the patient during their admission, and those written by doctors who have not.

“A discharge summary I would often say is more accurate when it has been done by a person who has had some form of clinical exposure to the patient. I would say invariably there are a lot of discharges that come out with the first statement saying ‘I have not seen this patient’ and that is not their fault and I feel almost a bit sorry for the doctor who’s been lumbered doing it, because they’re trying to scrabble together some information probably in a really hurried fashion. And that leads to inaccuracy” [GP3]

GP3 implies that summaries written by doctors who have not treated the patient are less accurate, and recognises possible reasons for this, combining time pressures with the need for the junior doctor to gather information to form the discharge summary, rather than knowing the information directly themselves. The GP is sympathetic towards junior doctors who find themselves in the situation of writing a summary for an unknown patient, and demonstrates insight into the workings of secondary care, knowing that junior doctors are often ‘lumbered with’ discharge summaries. He also implies that it is an habitual occurrence for summaries to be written by junior doctors who have not treated the patient, one with which GPs are accustomed, though not necessarily content.

7.3.3 Linking to *a priori* concepts

Four *a priori* concepts were identified in the survey of GPs as being relevant to the preferences and priorities of GPs for discharge summaries: accuracy, timeliness, the provision of follow-up plans and medicine changes. These are charted alongside relevant data excerpts in the thematic framework diagrams below, divided by GP participant in order to visualise the extent of spread of data among the participants.

Table 7.3: A priori concept 1 -Accuracy

GP reference	1.2. Expectations for accuracy	1.3. Experience of inaccuracy
GP1	<p><i>I think they should be accurate, that's the point</i></p> <p><i>Drug errors you can often see micrograms for milligrams but it's not ideal. Investigation reports which are wrong, that's unacceptable</i></p>	<p><i>Sometimes you don't have all the information and if it's not accurate</i></p> <p><i>If it's not on the discharge summary then we don't know what is the correct information so we then have to liaise with the specialist. So it just has a knock on effect, mainly in terms of time.</i></p> <p><i>It takes time for us to double check every medicine</i></p>
GP2	<p><i>Accuracy is a key indicator [of quality]</i></p> <p><i>I have telephoned the junior doctors who has completed the summary if there's been something I think the junior doctor can address like an inaccuracy in prescribing</i></p>	<p><i>I have experienced a lot of inaccuracies in summaries when there's been this emphasis on speed rather than accuracy</i></p>
GP3	<p><i>When we're checking these letters when they come in it really is to look at the medicines</i></p> <p><i>Anything related to patient safety, no, there's no negotiation there, that has to be completely accurate</i></p>	

Table 7.4: A priori concept 2 - Timeliness

GP reference	2.1. Expectations for timeliness	2.2. Importance of time	2.3. Time versus quality
GP1	<p><i>Obviously the hospital has a target, it's a very narrow target</i></p> <p><i>For acute admissions, elective admissions like hip replacements again or often surgical procedures I think we could wait longer</i></p>	<p><i>So it depends again on the nature of the admission</i></p>	
GP2	<p><i>If there's no immediate changes to patient's treatment that we have to action right away I would say probably two or three days is reasonable but certainly within a week.</i></p>	<p><i>Whilst speed is helpful it doesn't inform you of everything</i></p> <p><i>If there has been any change whatsoever to patients' treatment or there are outstanding investigations or else, patients will very frequently turn up at my surgery within a week asking for information that I don't always have</i></p>	<p><i>Expecting [summaries] to arrive within 24 hours of discharge but this is actually usually at the expense of useful information</i></p> <p><i>I have experienced a lot of inaccuracies in summaries when there's been this emphasis on speed rather than accuracy</i></p>

GP3	<p><i>It's a very narrow target in terms of 24 hours, that's not necessarily a target that I would want to push</i></p> <p><i>Sometimes be able to provide the discharge summaries in a timely fashion</i></p> <p><i>I would say... I think a week is too long, I would say an ideal for me would be 72 hours, I think within 3 days</i></p>	<p><i>How quickly we are going to need to act on that information</i></p> <p><i>So that actually... gives the patient some time to get into the community, it gives time for anything that's going to happen to happen</i></p>	<p><i>They might not be able to get on with those things churned out in time</i></p> <p><i>They're trying to scabble together some information probably in a really hurried fashion and it leads to inaccuracy</i></p>
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Table 7.5: A priori concept 3 - GP action

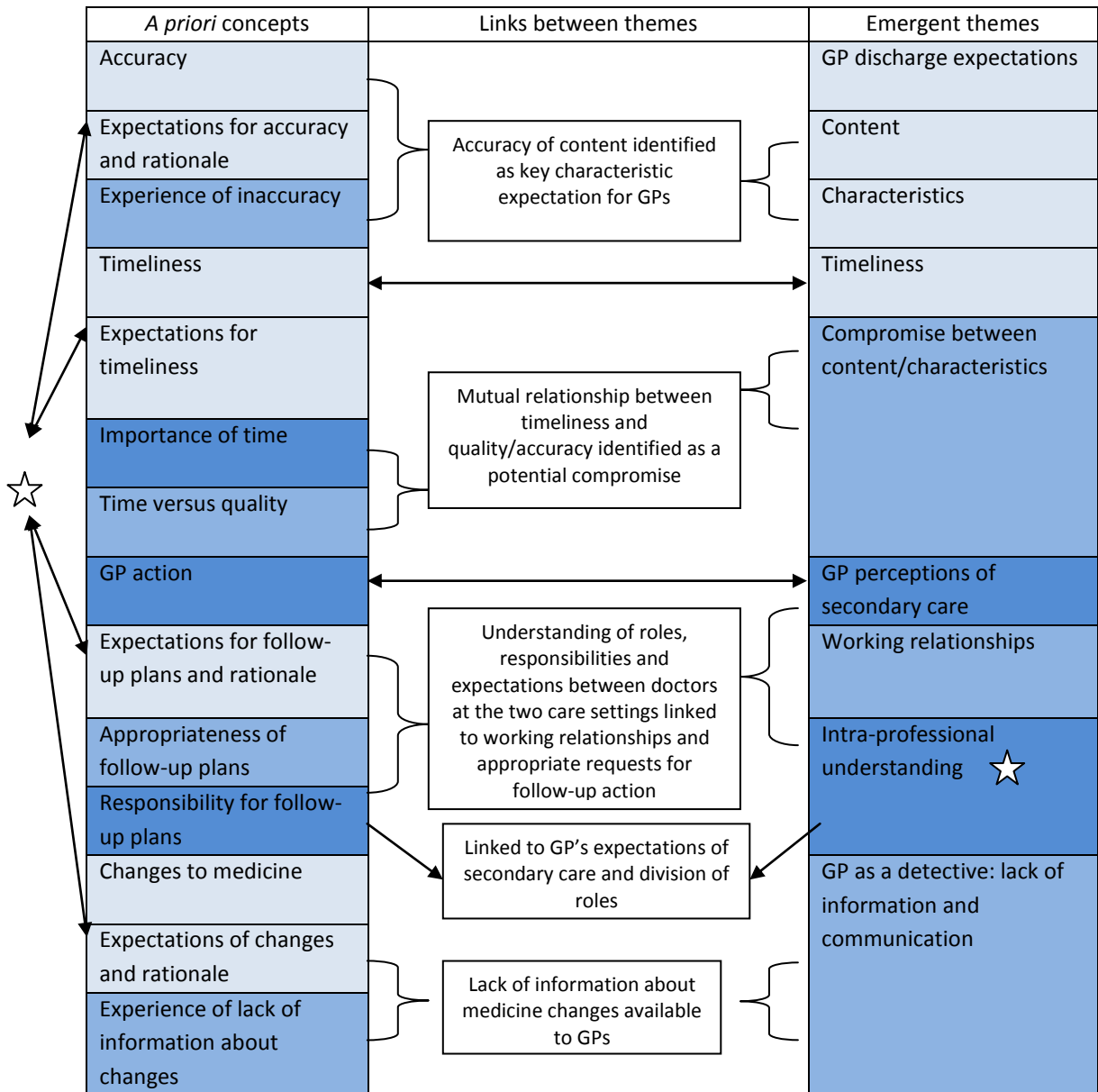
GP reference	3.1. Expectations for follow-up plans	3.2. Appropriateness of follow-up plans	3.3. Responsibility for follow-up plans
GP1	<p><i>Clarification of the management plan if there is insufficient advice</i></p> <p><i>A management plan given to the GP with a timescale</i></p>	<p><i>I guess that there is some inappropriate use of that column as to what the GP is expected to do</i></p>	<p><i>It's kind of assumed the GP will pick it up</i></p>
GP2	<p><i>Doesn't have adequate information for ongoing care</i></p>		<p><i>I'd like to know... what plans for future treatment are, whether they are the responsibility of the GP or the consultant looking after them</i></p>
GP3	<p><i>It's very important that the main message to the GP has to be this is what needs to happen for this patient</i></p> <p><i>now if they make a reference to what the GP needs to do in the sort of cloak and dagger way and it's not specific then it can get missed</i></p>	<p><i>It says GP to do this that and the other and this is obviously something that is going to be needing to be checked in secondary care</i></p> <p><i>You get some inappropriate requests as to what the GP is expected to do</i></p> <p><i>the thing that really annoys me if when 'GP to arrange this appointment, GP to arrange that appointment, GP to arrange this follow up', I mean, that's inappropriate</i></p>	<p><i>If they want GP to do something then that is the slot to say 'look GP please can you make sure this gets done'</i></p> <p><i>It always gets done if, you know, it's put in [the summary]</i></p> <p><i>you know, we haven't been involved in that admission and actually if there's a decision that another speciality that needs to see that patient then really there has to be some discussion with that speciality as to how that's going to be facilitated for that patient</i></p>

Table 7.6: A priori concept 4 - Changes to medicine

	4.1. Expectations for provision of changes	4.2. Lack of information about changes
GP1	<i>We usually write on the clinic letter that the meds have been updated</i> <i>GP should be the centre of care and kept informed of changes</i>	<i>You'll have no idea what other medicines there are</i>
GP2	<i>I'd like to know whether there has been changes to medication</i>	<i>It's very difficult to work out whether there have been complete changes or whether it's just a few things</i> <i>It can be difficult to work out whether the hospital has stopped a whole lot of medicine</i> <i>The patient's original medication is not actually mentioned</i> <i>You're not sure whether [the medicines] are still continued or not</i>
GP3	<i>What we are actually looking at is what's changed</i> <i>any changes to any medications what's been started and what's been stopped and for that to be really, really clear on the discharge letter</i>	<i>You're not sure whether that's been changed deliberately for clinical reasons because it's not mentioned</i>

7.3.4 Summary of themes

Figure 7.2 displays links and relationships between the *a priori* concepts and emergent themes identified through interviews with GPs, which led to the resulting amalgamated themes. These consisted of three broad themes and seven sub-themes depicted in Figure 7.3.



Key to Figures 7.2 and 7.3	
	Broad theme: Experiences
	Broad theme: Expectations
	Broad theme: Perceptions

Figure 7.2: Map of themes and links identified between themes

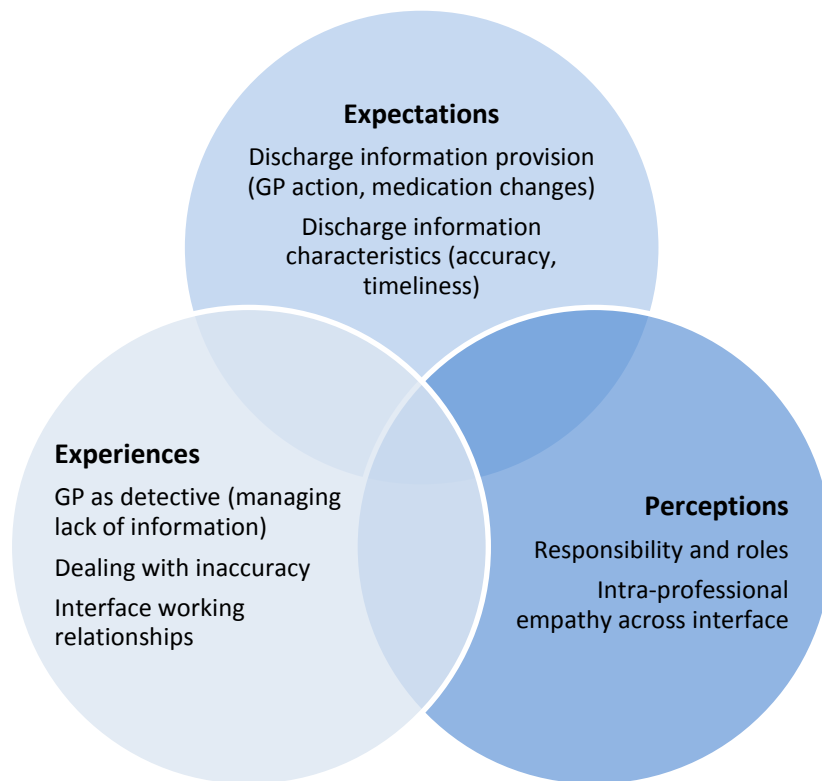


Figure 7.3: Summary of amalgamated themes consisting of three broad themes and seven sub-themes.

7.4 Attribute and level selection

In order to generate attributes, the resulting themes were discussed in detail both within the research team and with an experienced health economist researcher (MT) with extensive experience in DCE design. The stages by which the emergent themes were refined into attributes are depicted in Figure 7.4. Interview findings and themes resulted in the generation of five attributes for use within the DCE, which are described individually in the paragraphs below.

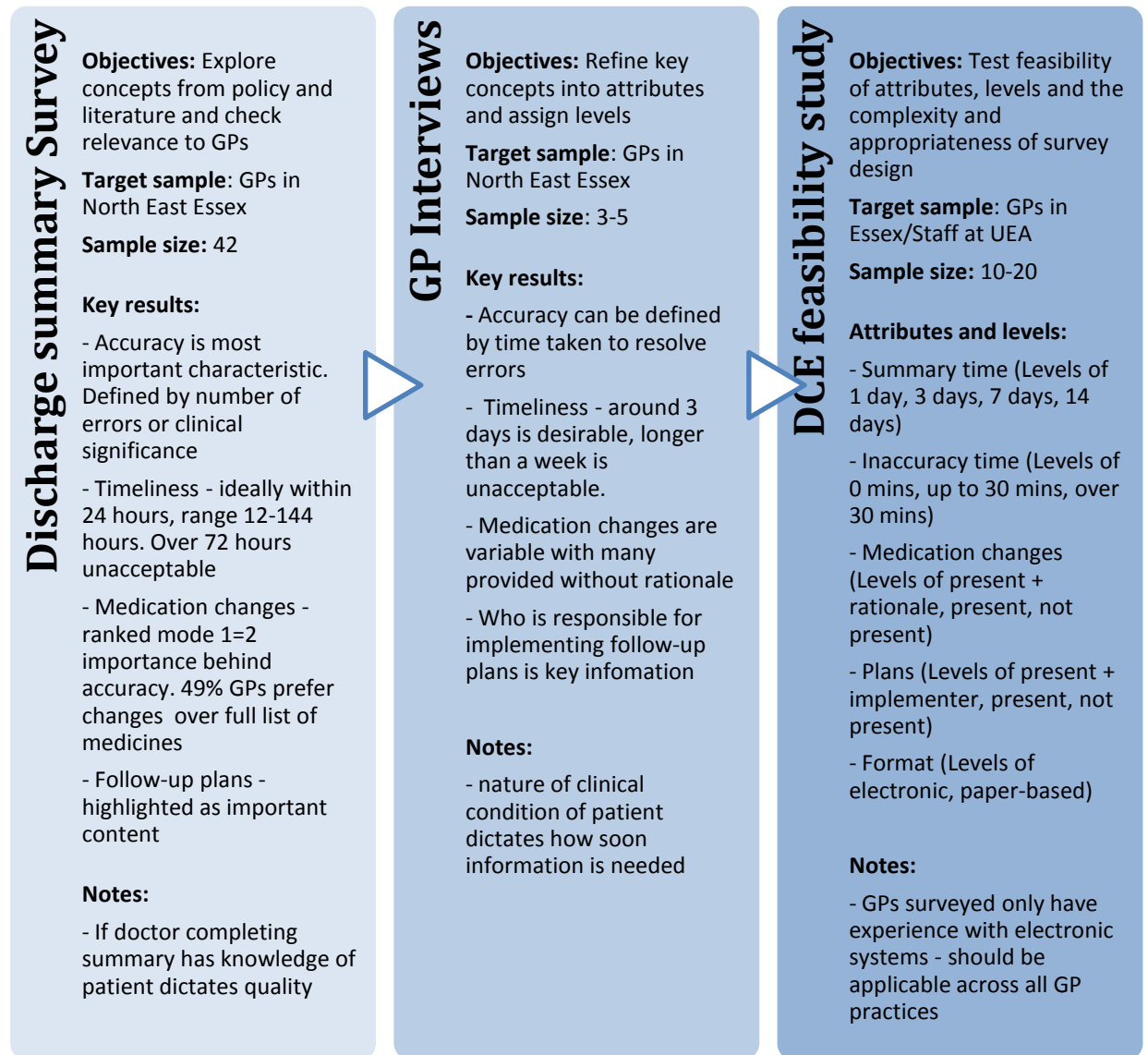


Figure 7.4: Summary of process of attribute and level development

7.4.1 Attribute 1: Time taken to receive summary

The timeliness with which summaries are received post discharge has featured as a prominent issue in existing research with GPs (19) and subsequent NHS contracts (30); and with financial penalties now facing hospitals who are not meeting targets for timely discharge information, these hospital policies too. Within the GP survey, all GPs stated 24 hours or less as the ideal time in which to receive discharge summaries, but reported receiving on average only 60% of summaries within this time. Within the GP survey, the mode time post-discharge that GPs deemed unacceptable to receive summaries was 72 hours (range = 144 hours). However, in interviews GPs said in certain circumstances they were willing to wait up to a week for electronic discharge summaries. Consequently, levels ranging from 24 hours (1 day) to 1 week (7 days) were included for electronic summaries,

with a mid-point of 72 hours (3 days) chosen due to its prominence within the survey results. However, the time taken to receive summaries is inherently linked to the format and method by which summaries are generated and sent. It is impracticable for summaries which are handwritten and sent by post to be received by GPs within 24 hours of discharge. It was therefore necessary to remove the 1 day level, and to include an additional and more plausible level, for summaries which are paper-based. As a result, 14 days was selected.

7.4.2 Attribute 2: Time taken to resolve inaccuracies

Accuracy of discharge information sent on summaries is an issue which has been well researched in transfer of care, and is a known criticism made by GPs (19). Within the survey, GPs most frequently ranked 'accuracy' as the most important characteristic of discharge summaries. However, defining accuracy for the purpose of a DCE is complex. In order to quantify accuracy in terms of attributes and levels, the number of errors present on discharge summaries was considered, but this did not provide GPs with enough information about the significance of errors present, in terms of potential clinical or administrative impact. Within interviews, GPs consistently expressed inaccuracies and inadequacies in terms of the implications they had on their time, which encompasses both clinical and administrative impact of errors. Levels were established by asking GPs to state the proportion (%) of summaries which contained errors that required practice time to address (median 15, IQR 10, 30) and the average time (hours) spent addressing these inaccuracies (median 0.5, IQR 0.5, 1.0).

7.4.3 Attribute 3: Medicine changes

Guidance published by the Royal Pharmaceutical Society in 2011 (20) has highlighted the importance of communicating changes in medicines to the next care provider when a patient transfers between care settings. However, existing literature has found that information about changes to medicines is often not available to junior doctors completing summaries, and they are sometimes forced to make inferences as to why changes have been made (43). Survey results indicate that GPs too consider this information important, with the details of medicine changes most often being assigned the highest two ranks. However 60% GPs reported details of changes being of poor quality, and considered the rationale for changes as being of lesser importance. It is supposed that the rationale was considered less important because reasons for changes can often be deduced from other

discharge information provided, such as the diagnosis. In interviews, GPs described the information about medicine changes provided by hospitals as variable, dependent on the nature of the patient's admission and the knowledge the doctor completing the summary had of the patient. In order to explore this concept further, the details of changes was included as an attribute, with levels which describe the presence of both changes and their rationale.

7.4.4 Attribute 4: Follow-up plans

The provision of follow-up plans on discharge summaries to GPs was not initially considered by the research team as being a significant aspect of discharge based on existing literature and practice experience. However, within the survey, GP respondents used comments boxes and free text opportunities to highlight follow-up plans as additionally important content. This was reiterated in interviews, in which GPs emphasised the importance of details of follow-up plans being included on discharge summaries to ensure continuity of care, and in particular, whose responsibility it should be to facilitate these plans. According to GPs, provision of this information is necessary to ensure that intended plans are executed, and done so in a prompt manner. Consequently, it was decided to include details of follow-up plans as an attribute in the DCE, with levels which describe the presence of plans and the person responsible for facilitating those plans.

7.4.5 Attribute 5: Format and method of receipt of summaries

Although an electronic discharge system is operated at CHUFT, this DCE needs to be applicable across different practice areas over a wide geographical area. This will include GP practices that are not currently able to receive electronic summaries, and who instead rely upon paper-based transmissions. The format of the summary involved was therefore included as an attribute. Its inclusion allowed exploration of GP preferences for electronic discharge summaries, which may be useful to inform local secondary care organisations if they are planning to develop or invest in technology for discharge systems.

7.4.6 Summary of attributes and levels

Table 7.7 lists the five chosen attributes, their corresponding levels and design coding structure to be used in the main DCE.

Attribute definition	Attribute description	Levels	Coding	Design coding	Analysis
Time to receive summary	Timeliness with which summary is received	1 day 3 days 7 days 14 days	Continuous	0 1 2 3	1 3 7 14
Time to resolve inaccuracies	Presence of inaccuracies and the practice time required to resolve them	No inaccuracies present (baseline level) Inaccuracies taking up to 20mins to resolve Inaccuracies taking more than 20 mins to resolve	Dummy	0 1 2	0 10 20
Medicine changes	Provision of details of medicine changes	No changes provided (baseline level) Changes only; no rationale provided Changes and rationale provided	Dummy	0 1 2	- 0/1 0/1
Plans	Provision of details of follow-up plans	No plan provided (baseline level) Plans only; no indication of who is responsible to implement them Plans and who is responsible for implementing them	Dummy	0 1 2	- 0/1 0/1
Format	Format and method by which summary is created and sent	Handwritten and sent by post (baseline level) Electronically written and emailed	Dummy	0 1	0 1

Table 7.7: Summary of chosen attributes and levels

7.5 Discussion

7.5.1 Main findings

The key findings of this informative qualitative study were that the GPs interviewed are often dissatisfied with information sent to them by secondary care at discharge, however they acknowledged, through their own experiences in secondary care, an understanding of some of the reasons behind this. Consequently, GPs demonstrated flexibility and

willingness to compromise in some of the properties of discharge summaries, including timeliness, in order to enable more accurate and high quality summaries to be produced.

Interview findings have informed the development of five attributes describing a discharge summary, and their corresponding levels, to be taken forward for use in the DCE.

7.5.2 Strengths and limitations

This novel study of GPs has been successful in allowing identification of GP views of the important aspects of discharge, and as such has provided some significant new knowledge about their experiences, perceptions and expectations of secondary care at discharge, enabling the construction of key concepts to form a topic guide for subsequent interviews with GPs.

Only three GPs were willing to take part in interviews which meant that the purposive approach to representing maximally diverse characteristics in the sample could not be achieved. The study size was therefore small, and was conducted over a local GP population within one county, and consequently may not be representative of all GP populations served by hospitals within the UK. GPs included in our study were familiar with receiving electronically written and sent discharge summaries, and so may have had different views to those using only paper-based summaries. However, because of the likelihood of small sample sizes associated with qualitative research, representation is best achieved through proliferation of such research, not simply by stipulation of such representation in samples (171).

Initial contact was made with the GPs in writing, followed up with a telephone call to facilitate recruitment; a method successfully adopted by existing qualitative studies of GPs for that purpose (175-177). However, the general reluctance of GPs to participate in interviews was disappointing, and the successful recruitment of our modest sample of GPs was largely due to willing and co-operative practice receptionists or managers, who enabled consultations with GPs by telephone. On numerous occasions messages were left for GPs with practice staff, but they may not have been communicated to the GP. Taking time out of the GP's working day to speak to a researcher by telephone and then to arrange an interview during working hours was also problematic.

For the purpose of this study we selected only four different characteristics and content of discharge summaries that had been identified from local audit work as being of significance and relevance to the future research objectives of the team. Although doctors were asked to list any other components which they considered to be of importance, they were not asked to rank these additions. Some doctors argued that the content listed was impossible to rank, and these respondents were excluded from final analysis. In instances where ranking is unsuitable, or where more information than simply a list of ranks is required, application of a Discrete Choice Experiment (DCE) may be particularly suitable.

7.5.3 Main discussion

The GPs interviewed demonstrated a high level of insight into the pressures of working in secondary care, having experienced working in the same system themselves earlier in their career. There was also a sense of empathy and understanding by GPs towards junior doctors, and the difficulties they face within their role as discharge summary authors. However, rather than mirroring all GPs having begun their career in secondary care, doctors working in secondary care have not necessarily had experience of working in primary care.

As a result, GPs appeared to be torn between feeling sympathetic towards secondary care doctors, and understanding why problems with the quality of discharge summaries exist, whilst suffering themselves with the frustrating consequences of receiving poor quality summaries in primary care.

One of the most frequently identified frustration of GPs was the provision of incomplete information on discharge summaries, with particular reference to incomplete details of medicine changes made during the admission. GPs reported having to take steps to retrieve this omitted information, deduce it from what other information was available, or make an educated judgment based on what other information was available; all of which are time consuming. However, misinterpretation here could lead to significant financial (if the summary involves a non-formulary or unnecessarily prescribed item) or patient safety consequences. Forgotten or unintentional therapy may lead to inaccurate prophylaxis or treatment of diseases, or provoke preventable adverse drug events (62). Intentional omissions (i.e. medicine stopped by the hospital) may be mistaken for unintentional errors, resulting in the intentionally stopped medicine being re-started in the community. One of

the principal risks of discharge summaries is that the accuracy of the data contained in the summary is taken for granted (62).

7.5.3.1 GP requirements and expectations

Whilst the three GPs interviewed shared the same views as to the main requirements of summaries to provide ongoing care in the community, they had mixed views about which information is necessary and what constitutes acceptable or unacceptable quality, largely dependent on the needs to the patient. This is indicative of the need for discharging doctors to tailor discharge summaries in accordance with individual patient factors. For example, some patients may require immediate follow-up care, regular monitoring or access to repeat medicine, and these patients' summaries need to be received promptly by GPs. For some patients it may be necessary to explain the case history in great detail, or simply to highlight any changes which have been implemented. Tailoring summaries in this manner based on patient factors would require discharging doctors to be intuitive to the needs of GPs. This is something which would require deeper understanding of the patient's presenting complaint, the patient's history and the working requirements of GPs in practice, which can only be achieved through guidance and practical experience.

Alternatively, the differing requirements identified from GPs may constitute 'wishful thinking' rather than pragmatic research. Existing research into the requirements of GPs at discharge has been idealistic (21, 22), without consideration of financial or organisational restraints. If service users are asked what they would like to be provided with without acknowledging such restraints, the resulting list of desirable attributes is likely to be lengthy and not necessarily achievable. With this in mind, pragmatic research into the requirements of GPs for discharge summary information is therefore warranted.

Nevertheless, despite their high expectations about what should ideally be provided at discharge, GPs also demonstrated a realistic outlook on what is able to be provided under the current process model and with current staff resources. There appeared to be an acceptance among the GPs that some discharge summaries will not meet their requirements for content or characteristics, and that this was almost a customary part of working in primary care. This is consistent with findings by Stainkey *et al.* in 2010 who reported that GPs have a "historically low expectation of discharge summary quality and cross-boundary communication" (178). The limited resources involved in discharge: time to produce summary, pharmacy accuracy checking, staff knowledge of the patient, make it

even more important to know what is of greatest significance to GPs so that resources can be allocated to these areas.

7.5.3.2 Intra-professional relationships

GPs appeared to have a firm understanding of the roles and perceptions of junior doctors, whereas, as reported in Chapter 4, this is not mirrored by junior doctors. This imbalance may be a result of the junior status of junior doctors, and their lack of experience in the working world, and the fact that GPs were themselves once junior doctors, and so have first-hand experience of the issues faced by current junior doctors. In a survey of 686 UK General Practitioners in 2011 (179), 89% of GPs believed that relationships between secondary and primary care needed to be improved and 53% GPs blamed a growing lack of understanding of the primary and secondary care environments as a reason for communication between secondary and primary worsening. One GP suggested a compulsory shadowing day in General Practice for all junior doctors as part of their professional development *“so they can see for themselves the challenges faced in primary care”*.

Intra-professional training and development might assist with promoting an increased appreciation of the needs of others within the medical profession. This would also help to distinguish and clarify roles and responsibilities for the different doctors working at either side of the interface. Further work to investigate strategies to improve the collaboration and understanding between these two groups of doctors is warranted.

7.6 Conclusion

Participant GPs expressed expectations for the content and characteristics of discharge summaries could be seen to relate directly to their role in continuing care provision post discharge. GPs reported being less fixated on timeliness of receipt of summaries than guidance or hospital targets would suggest, and are instead primarily concerned with the accuracy and richness of the content of summaries, which enables them to understand both the essence of the patient's admission, and intended plans for future care.

Attributes arising from the interviews were largely those that had been expected from *a priori* concepts and research objectives, but adjusted in response to the emergent themes

identified. The attributes and levels identified in this study were taken forward to be used in the design of a DCE questionnaire, which is described in Chapter 8.

Chapter 8: Application of the DCE questionnaire

8.0 Chapter overview

This chapter describes the design and application of the DCE questionnaire, using attributes and levels identified in Chapter 7. This questionnaire was sent to GPs in areas in the East of England to elicit their preferences for discharge summary characteristics and components.

8.1 Aims and objectives

The objectives for this project are divided into primary and secondary objectives.

Primary aims were to:-

- Utilise attributes and levels identified in Chapter 7 to design and develop a DCE questionnaire
- Apply the DCE questionnaire to investigate preferences of GPs in the East of England for discharge summary content and characteristics.

Secondary aims were to:-

- Determine the extent to which GPs are willing to accept a decrease in timeliness in order to achieve improved accuracy of discharge summaries.
- Investigate the scope for carrying out the DCE on a larger scale

8.2 Method design

8.2.1 Design objectives

In their 2008 good practice guidance for ensuring quality in constructing and applying DCEs in healthcare, Louviere *et al.* (142) list four key objectives for the design of DCE studies:-

1. Identification – ensuring the desired forms of utility function can be estimated from the experiment
2. Precision – ensuring that the statistical efficiency of the experiment allows the parameters to be estimated precisely
3. Cognitive complexity – ensuring the experiment does not impose excessive cognitive burden on respondents
4. Market realism – addressing whether the way in which the experiments represent choice processes are realistic.

In order to achieve quality in the design of this DCE, these four principles were adhered to so as to ensure that the design maintains its appropriateness, relevance and precision.

8.2.2 Attribute and level selection

The design of attributes and corresponding levels used within this DCE questionnaire are reported in Chapter 7.

8.2.3 DCE questionnaire design

With five attributes, four at three levels and one at two levels ($3^4 2^1$), the total possible combinations of attributes and levels generated a full factorial design of 162 possible profiles ($=3*3*3*3*2$) which could be used within the DCE design. However, this number of possible profiles was clearly not practical to use within a single questionnaire. It was therefore necessary to create an orthogonal design using choice modelling software. This presented a smaller number of profiles, whilst minimising correlation between levels of the attributes, and retaining its statistical properties such that preferences between attributes could still be elicited.

In light of Coast *et al.*'s finding of there being no difference in response rate between a DCE with 16 or 8 choices (144), it was decided to try 12 choice sets within the design, so presenting 12 DCE questions to participants. Using NGene software, a model was generated combining 24 alternative profiles into a choice set of 12 questions. The input formula for this is displayed in Appendix 8.1

This number of questions enabled a high statistical efficiency of the design to be achieved, whilst remaining a manageable and cognitively feasible questionnaire for participants to complete. The statistical efficiency of the design was quantified by measuring the D-error value, which minimises the variance and standard error of the parameter estimates. The lower the D-error value, the higher the efficiency. The D-error for our design was 0.2275.

8.2.3.1 Labelling alternatives

In this study it was not possible to provide labelled alternatives, as the two discharge services that were presented to the respondents were hypothetical, and therefore could only be known as discharge summary A or B. In practice, GPs are not able to make a choice between the discharge summaries they receive: instead, this experiment allowed the significant attributes of the discharge service to be identified via a hypothetical statement of preference between the alternative discharge summaries presented.

8.2.3.2 Opting out

In practice, GPs are not able to opt-out of receipt of discharge summaries, and they are not able to decline service uptake. However, an opt-out option was able to be incorporated by offering respondents to choose their current service, i.e. the discharge communications they usually received as an alternative choice. For this, GPs were asked to define the usual summaries they received at the start of the experiment, and then given the option to choose between the two discharge summaries offered or their usual summaries.

To use the 'current service' received by GPs as an opt-out option required the average or usual discharge summary received by GPs to be defined. However, because we were investigating a wide geographical area in which different discharge systems are operated by the secondary care organisations within those areas, and because there is wide variation in the content and nature of the EDS depending on the hospital from which it came, the ward type, and the nature of the patient's admission, it is likely that it would have been difficult for GPs to state the properties of the 'average' or 'usual' discharge summary they receive. In order to avoid this, the GP was instead asked to define at the start of the questionnaire the 'last discharge summary' that they received. This would be fresh in the GP's mind, able to be accessed easily for reference if necessary, and provided researchers with an example of the sorts of variation in summaries that are seen across the study area.

8.2.3.3 Implausible profiles

Because it is impracticable for a summary which is sent by post to be received by the GP within 1 day of discharge, the attribute 'format' was inter-related to the attribute 'time to receive summary'. Paper-based summaries therefore could only take levels of 3, 7 and 14 days, whereas electronic summaries could take values of 1, 3, or 7 days for receipt. Whilst, however, it is feasible for electronically sent summaries to take 14 days to arrive, it is unrealistic for this combination of attributes and levels to occur. The design therefore included the following constraints attached to it: when attribute 5 (format) is paper (=0), only levels 3, 7 and 14 for attribute 1 (time to receive summary) should occur, and when attribute 5 (format) is electronic (=1), only levels 1, 3 and 7 for attribute 1 (time to receive summary) should occur.

8.2.3.4 Consistency and dominance testing

Consistency tests were included within the questionnaire choice set used in the questionnaire for peer review and the main study in order to gauge how well respondents

understood the questions and to evaluate any shortcomings in the design. Inconsistent responses may indicate that respondents do not understand or have not properly read the question, or that they do not hold strong preferences for a particular attribute or level and so answer differently when posed with the same choice question. One question also contained a dominance test in which one of the alternatives was clearly superior to the other. Respondents who do not choose the dominant alternative may, as above, not have understood or read the question properly, or, conversely to inconsistent respondents, may hold strong preferences, such that they always choose an attribute at a particular level when making a choice, even when the combination of attributes and levels of the alternative scenario(s) presented is superior. Whilst inconsistent and dominant respondents will still be included in the main regression analysis, their characteristics will be compared to consistent respondents. With the inclusion of these two test questions, the final DCE choice set consisted of 14 questions.

8.2.4 Peer review testing

GPs who were interviewed in phase 2, and to a selection of pharmacists and non-academic staff in the research department at the University were asked to peer review the first paper version and first online version of the DCE, and complete a separate evaluation form asking critical questions to provide feedback on the nature, structure, content and overall impression of the DCE questionnaire. Participants in the peer review were asked to complete the DCE questionnaire and an evaluation form, the content of which is described in Figure 8.1.

1. *Time taken to complete this questionnaire*
2. *Ease of completion on a 1-5 Likert scale*
3. *Is the number of questions manageable?*
4. *Are the attributes and levels appropriate?*
5. *Are there any attributes or levels missing?*
6. *Would you be willing to complete this questionnaire as an online/paper version?*

Figure 8.1: Questions included in the peer review evaluation form

Thirteen respondents reviewed an online version DCE questionnaire, of which three were GPs in North East Essex and the remainder were pharmacists, academics and lay persons who were consulted for their opinion on the presentation and content of the

questionnaire. Additionally, two pharmacists also completed a paper version of the DCE. 11 respondents completed the questionnaire.

8.2.4.1 Time and ease of completion

- The time respondents spent completing questionnaire ranged from 5 to 20 minutes (mean 11.8 minutes).
- Of the 11 that answered, 5 (45%) described it as being 'OK' to complete, and 6 (54%) as 'easy' or 'very easy'.

These results provided a good indication of the length and complexity of the questionnaire being manageable for GP respondents, although it is likely that peer reviewers may have answered the questions faster and with less consideration over individual questions than when completing it for real.

8.2.4.2 Questionnaire length and format

- The format was described as "*clear*" (respondent 1) and "*easy to follow and well explained throughout*" (respondent 4).
- 5 (45%) respondents would have been willing to complete a paper version of the questionnaire, but 8 (72%) were unsure if their colleagues would have also.
- 7 (64%) respondents described the number of questions included as the 'right amount', but 4 (36%) felt 'too many' were included.

These results confirmed that the format and layout of the questionnaire was presentable and acceptable for use. The high willingness of respondents to complete a paper questionnaire was surprising in the age of modern technology, but is consistent with the literature which indicates that postal respondents to DCEs answer questions more consistently than the online respondents (180).

In spite of this, due to the size of the sample of GPs who were hoped to be included in the main study, it was decided to use an online version of the questionnaire in order to permit quick and widespread distribution. With the majority of respondents indicating the number of questions was appropriate, the choice set was kept at 12 questions plus the inclusion of two consistency tests (n=14).

8.2.4.3 Last discharge summary received

As the group who reviewed the DCE questionnaire was not solely comprised of GPs, the results for the questions asking for a description of the last discharge summary received would not be an accurate reflection of the summaries that are currently received by GPs working in the area. However, previous audit work investigating timeliness, accuracy, and content of discharge summaries sent from CHUFT described in Chapter 2 provided researchers with an indication of current discharge summary quality.

8.2.4.4 Appropriateness of attributes and levels

Regarding the attribute 'time spent resolving inaccuracies', one GP commented: "*rarely would an inaccuracy take over 30 minutes to resolve*" [respondent 4]. This is contrary to the findings of the survey to GPs (described in chapter 4 of this thesis) where GPs reported a median (IQ) proportion of 15 (10, 30) percent of summaries containing inaccuracies, with each inaccuracy taking a median (IQ) of 0.5 (0.5, 1.0) hours to resolve.

Another respondent argued that the range from 0 to 30 minutes was wide, and that whilst 5 minutes would be an acceptable time to be spent on inaccuracies, 25 minutes would not. As a result, it was decided to reduce the timeframe from 30 minutes to 20 minutes in order to allow more sensitivity to detect the smaller values within the range.

Provision of a range of values for 'timeliness' was suggested (e.g. 0-3 days, 4-7 days etc) in order to be inclusive of all possible values. This was especially relevant for respondents when defining the last discharge summary they received. As a result, the values for time in which to receive a summary were changed from the exact number of days after discharge to 'within' a certain number of days of discharge in order to provide a range of values for instances where the last summary received by GPs did not fall exactly to one of the levels listed.

8.2.4.5 Summary of peer review

Table 8.1 summarises the amendments to the DCE questionnaire that were made as a result of the peer review.

Attribute	Previous levels	Amendment to levels made following peer review
Time to receive summary	1 day 3 days 7 days 14 days	Within 1 days Within 3 days Within 7 days Within 14 days
Time to resolve inaccuracies	0 mins Up to 30 mins 30 mins or longer	0 mins Up to 20 mins 20 mins or longer

Table 8.1: Summary of changes made following peer review

8.3 Method

8.3.1 Ethical approval

Ethical approval was granted from the UEA's Faculty of Medicine and Health's Research Ethics Committee on 27th September 2013 (Appendix 8.2).

8.3.2 Study population

The study population for this DCE study were the 500 NHS-registered GPs serving at practices within Norfolk, 173 GPs in North East Essex, and GPs based at the 41 GP practices in Ipswich and East Suffolk. These areas were served by three Clinical Commissioning Groups (CCGs), formerly Primary Care Trusts (PCTs), formed in 2013.

8.3.3 Sample size estimation

A secondary aim of this study was to estimate the number of responses likely to be received for a larger scale DCE questionnaire. Existing DCEs sent by post have reported a response rate of 39-71% (146, 151, 152, 160, 181). Whilst no difference in response rate has been reported for online and postal DCEs, increased fatigue has been observed with online questionnaires (180).

Assuming a response rate of 40% across a population of 500 GPs practising in selected areas of East Anglia, a sample size of about 200 GPs was expected in this study. A sample size of at least 50 respondents is recommended for Discrete Choice experiments (152).

In order to maximise the likely response to this questionnaire, it was short in length, addressed to the recipient, in colour, and originating from the University. Furthermore, contact was made with the GPs before sending the questionnaire (182). However, a second follow-up copy was not sent to non-respondents due to the workload restrictions of gatekeepers used at the CCG.

8.3.4 Inclusion and exclusion criteria

All NHS-registered GPs practising in the included areas of East Anglia were included and sent an online questionnaire. GPs whose contact details are not held by their relevant CCG were excluded. GPs who work part-time or who are dually based at a practice outside of the study areas were included.

8.3.5 Recruitment

The online link to the questionnaire was emailed to all GPs meeting the inclusion criteria, alongside a covering letter (Appendix 8.3) providing information about the study with details of how the questionnaire could be accessed online. The email was sent to GPs via gatekeepers at Norwich, North East Essex, and Ipswich and East Suffolk CCGs. Failure to respond after six weeks was considered as non-participation in the study.

8.3.6 Confidentiality

Completion of the questionnaire was anonymous: GPs were able to freely access the questionnaire and complete responses without revealing their identity. Each GP was allocated a unique reference code for the purpose of data processing.

8.3.7 Questionnaire format

Design of the DCE questionnaire and its adaptations following peer review is described in section 8.2. The questionnaire was initially constructed in Microsoft Word, and then inserted into an online questionnaire template on SurveyMonkey® (Appendix 8.4). The questionnaire consisted of four sections; the first of which gathered information about the characteristics of the last discharge summary received by the GP; the second explained the discrete choice questions, provided task instructions and a worked example; the third consisted of the choice questions; and the fourth asked basic demographic data on the respondents recruited (including their years of experience, gender). Background and

contextual information on the study was provided in an information sheet which preceded the questions.

The discrete choice questions consisted of a series of choice sets, which each included two alternative profiles and the option of the GP's current service, in the form of the last discharge summary they received. The question invited the GP respondent to make a choice between the options for discharge summaries presented as to which one they would prefer. They were then asked to indicate their choice using a simple tick box. An example of a DCE question is shown in Figure 8.2.

	Discharge summary A	Discharge summary B	Last summary you received
Time taken to receive it	Within 1 day	Within 14 days	
Medicine changes	No changes provided	Changes and rationale provided	
Follow-up plans	Plans and responsible implementer provided	No plans provided	
Time taken to resolve inaccuracies	0 mins (no inaccuracies present)	Up to 20 mins	
Summary format	Electronic	Paper-based	
Your choice (please tick ONE only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 8.2: Example DCE question

8.3.8 Data analysis

Online questionnaire responses were collated and imported directly into an SPSS (version 18) spreadsheet. Basic demographics of the GPs were analysed using frequencies and chi-squared. Comments made by GPs in free text questions were grouped using basic thematic analysis (103). Raw responses to the DCE were analysed to investigate the characteristics of respondents with constant preferences (who always chose the last summary they received).

Responses to the DCE choice questions specifically were entered into a further spreadsheet on Microsoft Excel, in which they were cleaned such that they could be analysed with a Multinomial Logit model (MNL) using LIMDEP software (see Chapter 5).

Using the MNL, regression analysis was conducted for all GP respondents completing the DCE. The dependent variable was whether A or B was chosen, and the independent variables was the difference in the levels of the attributes.

The equation for this MNL model is displayed below. This is constructed from two components: an explainable (systematic) component and an unexplainable (random) component. The systematic component represents a function of the attributes of the alternatives. The random component represents the unobserved variations in preferences between individuals.

The magnitude of the regression coefficients (β) represents the impact of a unit change in an attribute on the utility of switching between choices (A, B or 'last summary received'). The greater the magnitude of the coefficient the greater the impact of a unit change on the utility, and therefore the greater the preference for that attribute. The statistical significance of the β value for an attribute indicates its importance. Ratios between coefficients describe the willingness of GPs to trade between attributes (the marginal rate of substitution). Marginal rate of substitution was calculated for all statistically significant attributes.

In a DCE question, respondents choose the option (A, B or 'last summary received') which provides the higher level of utility. Utility scores (measure of benefit) were calculated for three scenarios (alt_k): the average last summary received (current practice); the summary provided within 1 day of discharge (NHS target); and the summary which provides the highest utility value to doctors (ideal practice). The equations used to estimate utility are displayed below in Figure 8.3.

$$\begin{aligned}
 U_{alt_n} &= V(Att_{alt_n}, \beta) + \varepsilon_{alt_n} \\
 V(Att_{alt_n}, \beta) &= ASC_{alt} + \beta_1 att_{alt1} + \dots + \beta_k att_{altk} \\
 V(Att_{altk}, \beta) &= ASC_k + \beta TIME_k * TIME_k + \beta TIME_IN_k * TIME_IN_k + \\
 &\quad \beta CHANGE_k * CHANGE_k + \beta PLAN_k * PLAN_k + \beta FORMAT_k * FORMAT_k
 \end{aligned}$$

alt_k	Chosen alternative to investigate. I.e. NHS target, current practice, ideal practice
U	Utility
Alt	an alternative
Att	an attribute
N	the individual respondent
U_{altn}	the utility of respondent n choosing alternative alt
B	regression coefficient
$V(Att_{altn}, \beta)$	explainable component (function of the attributes and alternatives of individual n for alternative alt)
ϵ_{altn}	unexplainable component (unobserved variations in preferences of individual n for alternative alt)
ASC	attribute specific constant for alternative alt

Figure 8.3: Estimation of utility for different profiles

8.3.9 *A priori* expectations

In order to investigate theoretical validity of DCE responses, their consistency with *a priori* expectations was explored. *A priori*, it was expected that respondents would prefer a reduction in ‘time to receive summary’ and ‘time to resolve inaccuracies’, i.e. for summaries to be received in less time with less inaccuracies present, therefore their coefficients in the above equation to hold a negative sign. It was also expected that respondents would prefer an improvement in the provision of ‘changes’, ‘follow-up plans’ and ‘format’, i.e. for summaries to contain more details of changes and follow-up plans, and to be electronic, therefore their coefficients in the equations to hold a positive sign.

8.4 Results

8.4.1 Response rate

Of the 700 GPs who were sent a link to the online questionnaire, 81 accessed the questionnaire. Of these, 57 attempted and 40 completed the DCE questions.

8.4.2 Respondent demographics and questionnaire feedback

Respondent demographics were available for the 40 respondents who completed the DCE questionnaire. Respondents had been practising for a mean (SD) of 16.1 (8.0) years and 56.4% of respondents were female.

Eighteen (45.0%) respondents described the difficulty of the DCE questionnaire as being 'OK' to complete (displayed in Figure 8.2). Twenty-three (57.5%) respondents felt that there were too many questions. None of the respondents felt there were too few questions.

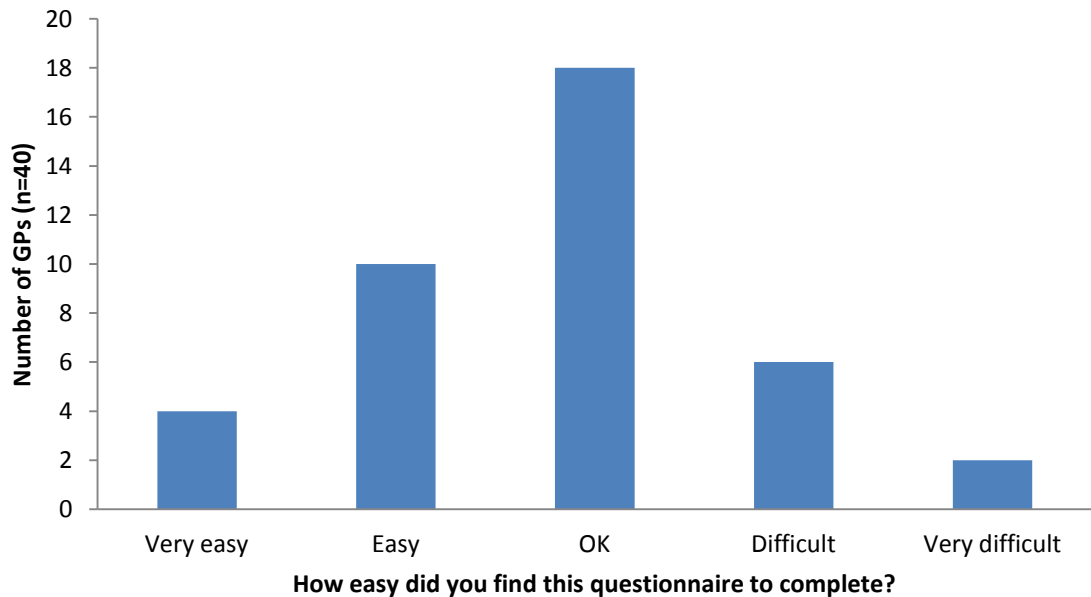


Figure 8.4: GP perceptions of the level of difficulty of DCE questionnaire

When providing feedback on the attributes and levels used within the questionnaire, 32 (80%) respondents considered that the attributes, and 29 (72.5%) considered that the levels, were appropriate for describing a discharge summary. Of those who did not consider them appropriate, other suggestions included the investigations carried out in secondary care, primary and secondary diagnoses, layout of summary, and the name of the responsible clinician.

95% of respondents passed the dominance test (where one option presented was clearly superior to the other) and 80% passed the consistency test (where questions 4 and 14 were repeated). Of the two respondents who failed the dominance test, both chose the last summary they received rather than the dominant option. Of the respondents who attempted the consistency test questions (n=38), six respondents failed i.e. answered inconsistently. Table 8.2 below also shows the characteristics of these two groups.

	Gender (% female)	Mean years practising	Ease of completion (range)
Overall sample	56.4	16.1	0 to 4
Consistency fail	50.0	19.0	1 to 4
Dominance fail	50.0	12.0	1 to 2

Table 8.2: characteristics of GPs who failed consistency and dominance tests

It was not possible to describe the differences between GPs who completed the questionnaire and who did not, as non-finishers did not complete demographic questions.

8.4.3 Last discharge summary received

Of the respondents who completed the DCE questions (n=40), the characteristics of the last summary they received were as follows:-

- 40% of the last summaries received arrived within three days of the patient's discharge, 30% within seven days and 5% within seven days. 25% of summaries were received within 1 day of discharge.
- 57.5% of the last summaries received contained inaccuracies which required up to 20 minutes to resolve, and 10% contained inaccuracies requiring over 20 minutes to resolve. 32.5% of summaries did not contain any inaccuracies.
- 72.5% of the last summaries received contained details of medicine changes only, with 15% containing details of changes and their rationale. 12.5% of summaries contained no details of medicine changes.
- 52.5% of the last summaries received provided plans for follow-up care, with 25% providing plans for follow-up and a named responsible implementer. However 22.5% of summaries did not provide any plans for follow-up.
- 52.5% of the last summaries received were written and sent electronically to the GP.

An additional 40 respondents provided information on the last discharge summary they had received, but did not attempt or complete the DCE questions. Information provided on the last discharge summaries received by complete and incomplete respondents was largely comparable (see Table 8.3). However, incomplete respondents received summaries that were significantly more accurate than those who completed the questionnaire (see Table 8.3). Additionally for incomplete respondents, the most frequently observed

timeframe in which they received their last discharge summary was within 7 days, compared to within 3 days for respondents who completed the questionnaire.

Attribute	Level	Questionnaire completers	Questionnaire non-completers	Fisher's exact test
		Number of GPs (%)	Number of GPs (%)	P value
Time to receive summary	Within 1 day	10 (25.0%)	4 (10.0%)	0.070
	Within 3 days	16 (40.0%)	10 (25.0%)	0.116
	Within 7 days	12 (30.0%)	19 (47.5%)	0.084
	Within 14 days	2 (5.0%)	7 (17.5%)	0.077
Medicine changes	No changes	5 (12.5%)	11 (27.5%)	0.081
	Changes only	29 (72.5%)	24 (60.0%)	0.172
	Changes and rationale	6 (15.0%)	5 (12.5%)	0.500
Follow-up plans	No plans	9 (22.5%)	11 (27.5%)	0.398
	Plans only	21 (52.5%)	22 (55.0%)	0.500
	Plans and implementer	10 (25.0%)	7 (17.5%)	0.293
Time to resolve inaccuracies	0 mins	4 (10.0%)	15 (37.5%)	0.040*
	Up to 20 mins	23 (57.5%)	17 (42.5%)	0.132
	Over 20 mins	13 (32.5%)	8 (20.0%)	0.155
Summary format	Paper	19 (47.5%)	17 (42.5%)	0.411
	Electronic	21 (52.5%)	23 (57.5%)	0.411

*denotes significance at the 0.05 level

Table 8.3: Most common characteristics of the last discharge summary received by DCE questionnaire completers and non-completers

8.4.4 DCE question results

Thirty (75.0%) GPs chose the last summary they had received on at least one question within the questionnaire. Two (5.0%) GPs solely chose their last summary throughout the questionnaire, demonstrating constant preferences.

Seven (17.5%) GP respondents chose an alternative in which the time to receive a summary was within 14 days on at least one occasion (number of scenarios for which TIME = 14 days chosen = 12). 2 GPs chose the last summary they received, where the time taken to receive their last summary was within 14 days.

Table 8.4 displays the regression coefficients calculated from the MNL model for all respondents who completed the DCE questionnaire. The attributes 'time to receive

summary', 'time to resolve inaccuracies', details of 'changes' and details of 'follow-up plans' were all found to be significant at the 0.05 level. Format of the summary was not found to be significant.

A unit increase in the 'time to resolve inaccuracies' was the most important marginal change in an attribute as indicated by the largest β value, followed by details of changes and follow-up plans respectively. 'Time to receive summary' was considered the least important attribute of summaries by GPs, indicated by the smallest β value.

Attribute	β coefficient	Standard error	Significance (p)
Constant	-0.3576	0.1214	0.0032
TIME	-0.1777	0.0254	<0.001
TIME_IN	-0.8760	0.1061	<0.001
CHANGE	0.8609	0.1139	<0.001
PLAN	0.7961	0.1055	<0.001
FORMAT	0.2233	0.1688	0.1859
No. of observations		486	
Log likelihood		-295.027	

Table 8.4: Regression coefficients for DCE attributes

The negative sign of the ASC value indicates that, all else being equal, respondents preferred the last discharge summary they received to either of the alternatives presented. The negative signs of the β coefficients for attributes 'time to receive summary' and 'time to resolve inaccuracies', indicate that GPs would prefer summaries to have less of these attributes, i.e. less or a shorter time to receive summaries and less or a shorter time to resolve inaccuracies present on summaries. The positive signs of the β values for the attributes 'changes', 'follow-up plans' and 'format', indicate that GPs would prefer to have more of these attributes i.e. more details of changes, more details of follow up plans. These results are consistent with *a priori* expectations for the model.

8.4.5 Marginal rate of substitution

GP respondents would be willing to wait an extra five days to receive a discharge summary in order to gain one unit improvement in the provision of details of medicine changes on a discharge summary $[-(0.866/-0.177) = 4.86]$ i.e. moving from a discharge summary containing no details of changes to one which contains details of changes only, or from a

discharge summary containing details of changes only to one which contains details of changes and rationale.

GPs would be willing to wait an extra five days to receive a discharge summary in order to lose (because the coefficient for 'time on inaccuracies' is negative as GPs would like less of it) one unit in the time spent resolving inaccuracies on discharge summaries [$-(-0.876/-0.177) = 4.95$], i.e. moving from a discharge summary with inaccuracies taking over 20 minutes to resolve to one which contains inaccuracies taking up to 20 minutes to resolve, or from a discharge summary containing inaccuracies taking up to 20 minutes to resolve to one which contains no inaccuracies.

GPs would be willing to wait an extra four days to receive a discharge summary in order to gain one unit improvement in the provision of details of follow-up plans on a discharge summary [$-(0.7961/-0.177) = 4.23$], i.e. moving from a discharge summary providing no details of follow-up plans to one which provides details of plans only, or from a discharge summary providing details of plans only to one which provides details of plans and the responsible implementer for them.

8.4.6 Utility models

Utility of three scenarios: the average last summary received (current practice), the summary provided within 1 day of discharge (NHS target), and the summary which provides the highest utility value to doctors (ideal practice) were calculated and are displayed in the equations below (Figure 8.5).

Coefficient values and design levels for each of the scenarios for the purpose of analysis are displayed in Table 8.5. The highest utility was for the 'ideal' scenario presented, in which all levels presented are at their optimum. Moving from the current practice to the 'ideal' practice predicted a gain in utility of 10.68, i.e. moving from the current service to the 'ideal' provides a higher utility to GPs. However, moving from the current practice to the national target, in which the 24 hour target in which to receive summaries is met but the level of inaccuracy is higher, predicted a loss of utility of 7.68.

$V(\text{Att}_{\text{alt}_k}, \beta) = \text{ASC}_k + \beta \text{TIME}_k * \text{TIME}_k + \beta \text{TIME_IN}_k * \text{TIME_IN}_k + \beta \text{CHANGE}_k * \text{CHANGE}_k + \beta \text{PLAN}_k * \text{PLAN}_k + \beta \text{FORMAT}_k * \text{FORMAT}_k$
Utility of the most commonly seen (average) 'last discharge summary received' was calculated as follows:-
$\begin{aligned} U(\text{last}) &= \text{ASC} + (-0.1777*3) + (-0.8760*10) + (0.8609*1) + (0.7961*1) + (0.2233*1) \\ &= -0.3576 - 0.5331 - 8.76 + 0.8609 + 0.7961 + 0.2233 \\ &= -7.7704 = -7.78 \end{aligned}$
Utility of (electronic) summary provided within 1 day of discharge (as with government NHS target) with highest inaccuracy and average content (plans provided and medicine changes) was calculated as follows:-
$\begin{aligned} U(\text{gov}) &= \text{ASC} + (-0.1777*1) + (-0.8760*20) + (0.8609*1) + (0.7961*1) + (0.2233*1) \\ &= -0.3576 - 0.1777 - 17.52 + 0.8609 + 0.7961 + 0.2233 \\ &= -15.4598 = -15.46 \end{aligned}$
Utility of (electronic) summary which gives the highest utility to doctors (ideal practice) was calculated as follows:-
$\begin{aligned} U(\text{ideal}) &= \text{ASC} + (-0.1777*1) + (-0.8760*0) + (0.8609*2) + (0.7961*2) + (0.2233*1) \\ &= -0.3576 - 0.1777 + 1.7218 + 1.5922 + 0.2233 \\ &= 3.002 = 3.00 \end{aligned}$

Figure 8.5: DCE utility equations

Attribute	β coefficient	Level value for analysis		
		Scenario 1: current practice (average last summary rec'd)	Scenario 2: government NHS target for practice	Scenario 3: ideal practice
Constant	-0.3576			
TIME	-0.1777	3	1	1
TIME_IN	-0.8760	10	20	0
CHANGE	0.8609	1	1	2
PLAN	0.7961	1	1	2
FORMAT	0.2233	1	1	1
Utility score		-7.78	-15.46	3.00
Gain in utility moving from current service			-7.68	10.68

Table 8.5: Levels assigned to attribute in each of the three suggested scenarios for calculating utility

8.4.7 GP comments

The comments written by GPs in the free text sections of the DCE questionnaire are described below, divided into the themes identified in Chapter 7. These comments provide verification of both questionnaire and interview findings.

8.4.7.1 Accuracy

Accuracy of discharge information was resoundingly considered the most important property of discharge summaries. However this was not only an issue for patient safety but also for working logistics, because GPs often don't have sufficient time available to them to rectify mistakes made on discharge summaries:

"GPs do not have 20 minutes to spend per patient sorting out inaccuracies in summaries" [GP73]

8.4.7.2 Format

Most GPs were indifferent to whether summaries were produced electronically or paper-based, instead prioritising the content and accuracy of discharge information rather than the mode of receipt:

"Electronic vs paper [is the] least important factor. Much more important is content, logic and accuracy" [GP57], and:-

"Paper or electronic doesn't matter to me as long as the info gets through" [GP36].

8.4.7.3 Timeliness

Despite being considered overall less favourable than accuracy, timeliness was still emphasised by many as an important property of discharge summaries:

"It is essential that discharge summaries are received in a timely fashion and are accurate" [GP20]

Reasons for timeliness being considered important by GPs often related to the speed by which patients contact the GP surgery post-discharge for information or follow-up care, which is difficult for GPs to provide without having first received a discharge summary:

"It is really important to have the report within 2 days as many patients ring within that time" [GP60], and:-

"There are numerous patient contacts within the immediate post discharge period and having a summary to hand is essential" [GP73]

However, GPs acknowledge the differences that exist between discharges, and that for some patients discharge information is required more rapidly than for another:

“Speed of communication depends on the case - often 3 days will be acceptable (2 weeks is much too long) but some discharges need a 'same day' letter” [GP57]

8.4.7.4 Medicine changes

GPs commented on the need for hospitals to provide a rationale for medicine changes in order to ensure intentional changes are not mistaken for unintentional errors by the GP, which could lead to patient safety being compromised:

“Rationale for changing meds would be good too, as would show that dose changes etc. were deliberate, not typos” [GP70], and:-

“It is important to have a rationale for the changes of meds- not always clear and we have to make "assumptions" [GP40]

8.4.7.5 Follow-up plans

GPs reported frustration with following-up incomplete information provided by the hospital, more so when the hospital has delegated responsibility for the provision of follow-up care or action, sometimes inappropriately:

“It is frustrating when we are then left responsible for following up investigations which have been completed and results not yet received or investigations not yet completed” [GP40]

Timeliness of receipt of the summary was also linked to the expected action for the GP to take, again highlighting the difference between summaries which contain information that needs to be processed by the GP quickly after discharge and those that can wait longer:

“It is not helpful to tell the GP to do something in a week if the report takes 7 days to come to the surgery” [GP60]

8.4.7.6 Professionalism

In the interviews reported in Chapter 7, GPs identified the handover of care and the content of discharge summaries as being the responsibility of the hospital. GPs in the DCE questionnaire, however, went further to identify the concept of professionalism of discharging doctors in discharge summary composition. One GP saw inaccurate discharge information as a breach of professionalism:

“It is inexcusable and unprofessional to have serious clinical mistakes or omissions” [GP57]

Similarly, another GP considered the provision of high quality discharge summary and the accountability for its content to be part of the role of a professional:

“On time, accurate, fully loaded with information and accountability, for God's sake we are a profession or has that been lost?” [GP66]

8.4.7.7 Accountability

GPs requested a named contact at the hospital, to whom issues with discharge summaries could be directed, and who was directly involved with the patient's care so able to address any issues accordingly:-

“Useful to have a named contact who completed the summary who knew the patient on the ward in case there are queries. This is meant to happen but is not necessarily accurate... and also for consultant's names - need their actual name please” [GP4]

One GP suggested a more senior hospital doctor would be better equipped to do this:-

“A discharge summary should be written by a mid grade doctor or above - discharge summaries written by juniors who cannot discuss the patient when you phone is not very satisfactory” [GP20]

As with follow-up care, GPs also expressed dissatisfaction at having to contact the hospital at all for further discharge information or clarification:-

“There is nothing more annoying than having to chase up basic information” [GP57]

8.5 Discussion

8.5.1 Main findings

The results of this DCE study are plausible and theoretically valid in terms of *a priori* expectations for the chosen attributes. All of the attributes, except for format of delivery were considered significant by the GP respondents. Approximately half of the last discharge summaries received by GP respondents were electronic. This is surprising, as in recent years, the more legible electronic summaries have been increasingly used in place of handwritten summaries. The insignificance of format indicates that the other attributes, describing the content and timeliness of summaries, must be considerably more important

to GPs in order to lead them to discount the format when making their choice between summaries. Unsurprising however, based on previous findings from GPs in Chapters 6 and 7, was that discharge summary accuracy (specifically, GP time taken to resolve inaccuracies) was considered the most significant attribute by GPs.

8.5.2 Strengths and limitations

To our knowledge, this is the first study that has used a DCE to investigate preferences of discharge summary content from general practitioners. In terms of strengths, this study has applied a DCE to a novel and unique setting. Despite being conducted on only a small scale, some significant and interesting results have been generated which indicate the potential for meaningful findings on a larger scale. These results could potentially challenge policy in the field of discharge summary standards and national targets set for timeliness.

In terms of limitations, firstly, the study sample size was smaller than intended. Despite sending to high numbers of GPs, few engaged with the questionnaire. GPs who participated reported higher levels of inaccuracy in the last discharge summary they received, compared to those who did not participate, which quite possibly could mean they were subsequently more motivated to contribute to research on the quality and content of summaries.

The research team was unable to make contact with GPs directly by email which led to reliance on gatekeepers at CCGs. However, recent structural changes in the managerial set up and running of local CCGs in 2013 meant that the CCGs we approached were less willing to engage with research due to being busy with more pressing practical tasks. There was also uncertainty within the CCG set ups whether there were any employees who were able to access a large database of GP contact details, and whose responsibility within the CCG it was to facilitate this task. The method by which the DCE questionnaire was sent may also have been a factor in the poor sample size we generated. Most of the DCEs in the literature have been predominantly sent by post. Within the DCE, GPs did not demonstrate significant preferences for the format of the discharge summary, which indicates they may be more amenable to complete a paper questionnaire than an online version. The study should therefore be repeated using a paper version of the questionnaire, which may provide a better response rate and so more robust data from which to draw conclusions.

Failure to achieve the recommended 50 respondents for a DCE renders it not appropriate to explore the gap between levels, in order to investigate if the movement between two

particular levels is more important than a movement between two others (i.e. is the movement between 0→1 more significant than 1→2). Because of the small sample size it was not possible to run a model to explore these values, and instead it was assumed for the purpose of this study that there is an equal value for the movement between each level. This may have biased our results with respect to movement between level of inaccuracy, where the difference between having no inaccuracies and only minor inaccuracies may have been more or less significant than moving from some inaccuracies to major inaccuracies present.

Secondly, a possible limitation of this study is the existence of other, unidentified DCE attributes, which may have affected the GP respondents' decision-making behaviour. These attributes could have been completely missed during surveys or interviews with GPs, or have been wrongly discounted later on during the process of attribute development, which would render the DCE biased and of limited use for any subsequent policy formation (141). However, the use of qualitative methods and the combination of methods adopted in this study to develop attributes is recognised in the literature as a robust technique to avoid de-selection of relevant attributes and ensure those selected are inclusive (163).

Lastly, as with all stated preference research methods, choices made by GPs during this study were hypothetical, and may not necessarily match the decision-making behaviour they would adopt in real-life if faced with the same decision. However, the use of hypothetical scenarios are often advantageous over revealed preference data because they allow control of the attributes and levels which enable a choice to be made (151), and so can focus on a particular research aim. In the case of this study, stated preference data allowed focus on the elements of a discharge summary which were not only of relevance to GPs but to our research objectives regarding the importance of accuracy in comparison to timeliness.

8.5.3 Main discussion

8.5.3.1 DCE findings

In terms of characteristics, the last discharge summaries received by GPs were largely comparable, with the attributes describing the average last discharge summary received falling in the middle of the possible levels presented. This confirms that an appropriate and realistic range of levels were presented. The last received summaries by respondents who

did not attempt or complete the questionnaire were significantly more accurate than those who completed the questionnaire. If these GPs regularly receive summaries with a high level of accuracy, they are likely to be more satisfied with the discharge summaries, which might explain their decision to not complete the questionnaire. However, three-quarters of GPs chose the last summary they have received over the alternatives presented on at least one occasion, and the negative value for the ASC indicates that, all being equal, GPs prefer the last summary they received. This implies that GPs are not as dissatisfied with the current service as expected, based on existing literature (19) and our previous findings. However, the DCE questionnaire was sent to GPs practising in 3 CCGs across East Anglia, whereas previous research conducted in this thesis was in the region of North East Essex only. GPs from other regions in East Anglia are served by different secondary care organisations, which may produce better quality summaries than others. Similarly, summaries received in North East Essex are mostly electronic. Regrettably, in this study it was not possible to identify from which CCG the respondent GP originated.

Remarkably, in spite of the national target to provide discharge information within 24 hours, GPs were willing to wait between four to five days after discharge in order to gain a one unit improvement in the provision of medicine changes, follow-up plans and accuracy. This clearly highlights an inconsistency between national policy; and what GPs actually want when a patient is discharged. The preference of GPs for accuracy and quality content over timeliness challenges the current national target for discharge summaries to be sent within 24 hours. This study has allowed a numerical value to be placed on the preferences of GPs for accuracy over and above all other relevant aspects of a discharge summary. It now remains to be ascertained whether the 24 hour target should be relaxed in order to allow junior doctors more time in which to produce summaries, or whether the target itself is valid, but it is the resources and processes in secondary care which need to be altered in order to allow doctors to not only meet the 24 hour target but also to furnish high quality information during this time. Put differently, the 24 hour target itself surely is something for secondary care sites to aspire to; and is it in fact the resources in place to enable that target to be met which need to be evaluated. Nonetheless, with current resources available to secondary care, it is clear that GPs' priorities are for the information to be correct and of high quality, not just received quickly.

In their 2011 investigation of GP views on the content of psychiatric discharge summaries, Serfontain *et al.* describe GPs as being faced with "*the tensions between wishing to be well-*

informed and awareness of time pressures" (183), indicating that whilst GPs often need information quickly, they acknowledge that high quality information takes time to produce in secondary care. One solution to this existing 'tension' could be to allow GPs access to shared care records, which (as discussed in Chapter 1) could enable GPs to quickly be able to access relevant clinical information post discharge to facilitate care continuity in the community (88).

Another solution was suggested by Kripalani *et al.* (24) in their systematic review of discharge literature, whereby an interim discharge document should be provided in instances where it is not practicable to produce good quality discharge information within a certain timeframe:-

"If a complete discharge summary cannot be sent on the day of discharge, then an interim discharge note should be sent. At minimum, it should include the diagnoses, discharge medicines, results of procedures, follow-up needs, and pending test results" (24)

This key information could enable the GP to address the immediate post-discharge practical needs of the patient, such as implementing any changes to medicine and making arrangements for follow-up. More detailed information and explanation could then follow in a secondary summary shortly afterwards to provide the GP with context for the action taken during the patient's admission. Further research into the practicality and ethical implications of such a system is warranted.

In this study, the ability of summaries to meet the practical needs of the patient, through the provision of medicine changes and follow-up plans, was found to closely follow accuracy in the priorities of GPs. This is consistent with findings by Serfontein *et al.*, who reported that GPs consider practical information (such as follow-up plans, arrangements for patient support, and a point of contact) of utmost importance (183).

Serfontein *et al.*'s findings also suggested that different discharge information was required by GPs depending on patient circumstances, such as the number of patient admissions and familiarity of the GP with their medical history. For example, for a patient who had multiple admissions to the specialist hospital, provision of detailed background information in the clinical text was unnecessary, compared to when that patient was admitted on the first

occasion. However, this study focused on specialist psychiatric discharge summaries, which may be different in nature to summaries produced by general hospitals.

In Turner's 2007 DCE paper investigating the preferences of patients for GP consultations (152), patients were reported to prefer seeing a GP who had information about their medical history before the consultation. Similarly, our findings have shown that GPs too prefer to have up to date and accurate patient information received post-discharge, indicating that patients and GPs share the view that care continuity is a priority. However, Turner's findings imply that patients have an expectation for their medical information to be transferred quickly to the GP, or at least be in their possession in advance of them meeting for a consultation. This might indicate that patients are not familiar with the increased risk of inaccuracy associated with summaries which are sent quickly rather than first being carefully checked.

By describing a summary's accuracy in terms of GP time, the implications of inaccuracy on GP working life would have inevitably been considered by GPs when completing the questionnaire. It is therefore reasonable to assume that availability of time during the working day is highly valued by GPs, as they consider having to spend resolving inaccuracies undesirable. Discharge systems in the future which help to facilitate reconciliation in primary care to reduce the burden associated with the process of reconciling a summary from secondary care and transcribing any relevant information or changes into the care record may therefore be of use to GPs.

8.5.3.2 GP views and comments

Almost 60% of respondents indicated that they found the questionnaire difficult to complete, which perhaps might explain the high number of GPs who began, but did not finish the questionnaire. A higher response rate may have been achieved with fewer questions but this would have affected the efficiency of the design.

The free text boxes included within the DCE questionnaire were unexpectedly well-completed by GPs, which provided triangulation and further confirmability with previous survey and interview findings from GPs. However, the GPs who chose to complete the questionnaire may have held more extreme views about discharge summaries than those who did not participate, and so may have been more eager to express them where the opportunity presented. The comments provided were largely consistent with themes

previously identified during GP interviews, which implies that these findings are a good representation of the general population of GPs. However, in addition to previous findings, the DCE questionnaire identified professionalism as a concept relating to information provision at discharge, with a few GPs believing that the provision of accurate information at discharge is a professional responsibility. One GP in particular referred to the profession as losing sight of its responsibilities associated with transfer of care, implying frustration with how the system operates presently.

Despite GPs showing tolerance about any lack of clarity in their last received summaries, this general sense of frustration has been echoed in the literature. As far back as the 1980s, there was debate about GP preferences for discharge summaries (22, 184), and still, in the 2009 national CQC survey (19) GPs continue to report dissatisfaction with the information provided to them at discharge. Significant changes to the system's operation are therefore necessary if significant improvements are to be achieved.

8.6 Conclusion

This novel DCE has identified a key dissimilarity between the preferences and priorities of GPs and, ironically, the national targets implemented to support them with care continuity in practice. Further research to investigate methods to realign these two parameters so that the expectations and requirements of hospitals, GPs and patients for care continuity are met is therefore necessary.

This study concludes the practical work conducted as part of this PhD thesis. Final discussions, conclusions and suggestions for future research endeavours in this field are presented in Chapter 9.

Chapter 9: Final discussion and conclusions

9.0 Chapter overview

This chapter brings together the findings from all thesis chapters to discuss the key messages, implications to practice, and future research opportunities identified.

9.1 Thesis objectives

Four key objectives were identified from a review of the literature at the beginning of this thesis. These were to:-

1. Assess the effectiveness of the electronic discharge system operated at CHUFT in terms of the timeliness, accuracy and quality of electronic discharge summaries produced.
2. Understand junior doctor experiences of summary preparation; to explore where information for discharge summaries is sourced, how it is interpreted, and the training and experience which facilitates this process.
3. Attempt to improve information available to junior doctors for the purpose of preparing an electronic discharge summary.
4. Explore and understand the needs of GPs with respect to the content and properties of discharge summaries.

These are now revisited in the light of the study findings.

9.2 Key findings

9.2.1 Objective 1: To assess the effectiveness of the electronic discharge system

Findings from the first study yielded key issues involved in the discharge process, and potential areas to explore within this PhD thesis. In terms of the role of the pharmacist at discharge, whilst the majority of discharge summaries were sent to primary care on the same or following day of discharge, less than half were checked by a pharmacist before they were sent. This indicated that the target in which to send out discharge information quickly had resulted in 'corner cutting', through bypassing the final pharmacy accuracy check. With respect to quality and content of the summaries, only 22% of discharge summaries reported details of medicine changes which had occurred during the patient's admission, and 12.2% of discharge summaries wrongly stated 'no changes' where changes to medicines had in fact occurred. This sub-optimal documentation of medicine changes led to the further investigation of their communication in Chapter 3.

In terms of accuracy, 59% of the summaries reviewed contained at least one discrepancy. Over a quarter of the discrepancies were on summaries which had not been checked by pharmacy, and were therefore released into primary care. The number of medicines that a patient is prescribed, and their length of stay in hospital, were significant predictors for the presence of discrepancies on discharge summaries.

9.2.1.1 Further discussion and practice implications

The existence of so many inaccuracies on discharge summaries demonstrates the need for a pharmacy check at discharge to prevent them from being transferred to the GP, and thus perpetuated in primary care. Pharmacists have been found to help improve the accuracy of discharge summaries (50). However, some issues still remain: pharmacists are only human, and are just as easily at risk of making an active failure, such as not spotting an inaccuracy during the checking process, as doctors can be when completing a summary. Equally, whilst pharmacists can ensure the accuracy of medicines transcribed, they are often unable to improve the quality of the summary, in terms of the clinical information written and details of the rationale for prescribing decisions made, because of their limited clinical involvement with the patient. A 2011 prospective non-randomised trial in a UK hospital found that ward pharmacists who attended consultant-led ward rounds made significantly more interventions (correcting prescribing errors and optimising treatment) per patient than ward pharmacists who did not (185). Increased involvement in clinical care, including attendance on ward rounds, could therefore make pharmacists a more robust defensive layer in the reduction of errors at discharge.

Electronic discharge summaries, as reviewed in this thesis, have been increasingly adopted by hospitals worldwide to increase legibility and speed of transfer from the hospital. However, certain issues regarding the manual operation of the electronic system still remain. Electronic summaries can be associated with active failures of the doctor operating them, when selecting items from a drop-down list or checking incorrect tick boxes, as well as latent conditions in the system itself; where the system does not permit prescribing of certain non-formulary or unlicensed medicines. Like structured handwritten summaries, electronic discharge systems provide a template for the summary structure in order to ensure certain information is included, and they also have the potential to render some fields mandatory to encourage summary authors to complete them. However, the system is unable to ensure the quality or content of the summary, which is still reliant on the competency and human performance level of the summary author. Therefore, the

possibility of active failures (slips, lapses or mistakes) being made by the junior doctor completing the summary still apply. Electronic summaries also involve a transcribing element, whereby the medicines listed on the chart are typed into the electronic discharge summary, again, increasing the occurrence of human-based active failures. Similarly, when received in primary care, electronic discharge summaries do not eliminate the problem of GP reconciliation of discharge information, as transcribing is again necessary when the GP practice staff manually update the patient's record with any medicine changes made.

The Department of Health has changed its original intention to replace electronic healthcare systems, with the aim to now build onto existing systems operated in secondary care. The Department estimates it will cost at least £220 million to get systems in NHS organisations to work together (88). With an increasing number of hospitals and care organisations using electronic discharge, and eventually electronic care records, a rise in concomitant Electronic Prescribing (EP) systems are expected. However in 2007, it was reported that only three hospitals in the UK were operating EP systems across the whole hospital site (92).

Beyond the UK, EP in hospitals is not widespread, with Denmark and Sweden the only countries in which EP is routinely used; but pilot investigations in recent years have taken place in Germany and Spain (92). EP systems allow a patient's clinical, laboratorial and medicines information to be uploaded, accessed and stored directly into their central care record, and discharge summary template, allowing for a more accurate transfer of information through elimination of the transcription (and so human) element of composing a discharge summary.

However, whilst EP could revolutionise the accuracy of discharge summaries, they are still reliant on the responsible doctor in secondary care to populate the central care record with accurate and up-to-date information about medicines prescribed. As reported in this thesis, doctors are often unsure of the relevant clinical information, or the rationale for prescribing decisions made, and as a result may be reluctant to write this information in the medical record or notes, irrespective of whether these are handwritten or electronic.

The ideal solution to this would be for hospitals and GP practices to employ the same electronic system, or at least, two compatible systems to prevent the need for copying and transferring information between them. This would enable the GP to have the most up-to-

date and accurate clinical information about a patient, which could be accessed quickly and at any time of day. The introduction of a shared care record would also place more responsibility or onus on hospital doctors, and in particular the responsible consultant, to ensure that medical notes are maintained accurately and completely – such that a GP would be able to understand decisions documented in the patient notes.

Such a system may in fact remove the need for a discharge summary document to be produced altogether – as GPs themselves would be able to access all the relevant patient information needed to continue care. Instead, only a handover component within the system would be needed to indicate where responsibility for care provision shifted between secondary and primary care teams. Such an integrated approach would also be of considerable benefit where a patient was admitted to hospital, as it would enable GP records to be accessed quickly by admitting doctors in order to make their assessments, diagnoses, and ensure the patient's regular medicine can be commenced promptly as an inpatient.

9.2.2 Objective 2: To understand junior doctor experiences of summary preparation

Combined fieldwork episodes consisting of ethnographic interviews, think-aloud techniques and observations were conducted with junior doctors working at one UK secondary care site. The resulting data showed that junior doctors often worked in challenging and distracting environments, under sub-optimal circumstances, when preparing discharge summaries. These circumstances included being under pressure to meet national and hospital targets for timeliness, or where a patient was required to leave quickly, having inadequate written clinical information available to populate the summary, and themselves having a lack of personal knowledge of the patient.

Junior doctors also reported receiving inadequate guidance and support from the hospital, and other healthcare professionals, on the ideal summary content and what constituted a high quality discharge summary. Subsequently, they demonstrated a lack of understanding of GPs' requirements from a discharge summary (Chapter 6). In surveys sent to junior doctors and to GPs, both groups perceived accuracy as being the most important characteristic of discharge summaries. However, junior doctors frequently reported sending summaries which had not been accuracy checked by pharmacy, and many did not

feel especially uncomfortable with doing so. This may imply a lack of insight into primary care, or simply may be due to a lack of feedback provided to them, such that if any inadequacy or inaccuracy were to be identified by a GP, the junior doctor would be unlikely ever to find out about it.

Junior doctors also struggled with the concept of responsibility at discharge, understanding that by signing the summary they were taking responsibility for the information included therein, but often with the knowledge that this information was in fact inadequate. Junior doctors also reporting feeling it was unfair for them to have to take responsibility if they had not been involved in the patient's care, and where instead of personal knowledge, assumptions or guesswork had to be employed when preparing the summary.

9.2.2.1 Further discussion and practice implications

The danger of the combination of a lack of guidance and lack of feedback is a perpetuation of skills- and knowledge-based errors made by junior doctors in practice. If inadequacies or mistakes are not highlighted – either by senior hospital doctors, pharmacists or GPs - poor practice is likely to continue throughout the doctor's career, with them unaware of any weaknesses. Only if and when an event in which patient safety is compromised occurs might the doctor become aware of such issues with their performance.

Potential consequences associated with transferred errors in primary care might include cost implications, medicines wastage, and inappropriate prescribing, which could be unnecessary, sub-therapeutic or clinically unsafe. With so much at stake, if junior doctors are not involved in a patient's care, and do not have the same level of clinical experience as their seniors, one might argue whether summary completion should be the junior doctor's responsibility at all. Of benefit might be a system in which a junior doctor writes the summary, but has a subsequent five-minute discussion with a consultant or senior doctor, who takes overall responsibility for the patient's care. By doing this, the consultant can ensure completeness or accuracy of the summary, and the junior is able to clarify any areas of uncertainty.

However, senior hospital doctors may not actually know any better than the juniors about what constitutes high quality in a discharge summary, or what the GP actually wants at discharge. GPs have been hospital doctors themselves before undertaking training in general practice, whereas senior secondary care doctors, depending on their rotations and

specialty, may not have ever worked in primary care. It would be reasonable to suggest then, that GPs would instead be the best professionals to be advising junior doctors as to the required content of discharge summaries; as was actually suggested by junior doctors interviewed in Chapter 4. In order to promote understanding and ensure standardisation of this process across the junior doctors, the introduction of a Standard Operating Procedure (SOP) at CHUFT for the purpose of summary completion would be advisable.

Existing research has indicated that some secondary care doctors perceive working in primary care as being somehow inferior, and that remaining in secondary care after completion of Foundation Level training means that one has 'made it' as a doctor, rather than having 'fallen back' on general practice (130). This attitude, if established within the higher ranks of hospital doctors, is likely to percolate down to junior doctors, who subsequently may not view integration or communication with GPs as being important. This also might provide an explanation for why, historically, discharge summary writing has been allocated to junior doctors, because it is perceived as being a task of low significance.

If hospital politics and hierarchy of roles mean junior doctors do not want to 'bother' their superiors with discharge summaries, should the ward pharmacist have a more contributory role? The circumstances in which discharge summaries are generated, as reported by junior doctors in Chapter 4, reaffirms the necessity for pharmacy contribution to the discharge summary. This could either be as a final accuracy check or alternatively in the actual composition of material in the summary. Pharmacy involvement can confirm that information about medicines sent to primary care is an accurate account of the treatment during admission and reflection of the future prescribing intentions of the care team.

Additionally, if ward pharmacists insist that clearer detail is provided by the consultant throughout a patient's admission, or that the pharmacist is included within ward rounds, the pharmacist is then in a strong position to assist the junior doctor at patient discharge with completing the summary. One doctor stated that they would not think of questioning a consultant's decision on a ward round: perhaps a ward pharmacist instead might feel more confident, or be better qualified to do this. However, in order to enable a pharmacist to make this valuable contribution and make an informed and confident assessment of the discharge summary, pharmacists need to have a more inclusive role embedded within the ward's multi-disciplinary team. This would ensure they are privy to decisions involving

medication made on the ward and so can better facilitate the communication of such decisions discharge summaries.

9.2.3 Objective 3: To improve information available to junior doctors

In response to the poor documentation of medicine changes observed in Chapter 2, inpatient medicine charts were amended at CHUFT to allow for better annotation of medicine changes. It was hoped that by improving the written communication available to doctors preparing discharge summaries, medicine changes would be more likely to be documented on discharge summaries. A significant improvement was observed in the documentation of new medicines and previously taken medicines. However, medicine which was stopped or changed was not well documented on charts or discharge summaries. Doctors were required to document a reason on the chart for stopped or changed medicines, which proved challenging for them to fulfill. This was possibly a result of factors such as poor knowledge of the rationale for changes due to inadequate communication (both verbal and in patient notes), time pressure, and perceived low importance of the need to communicate this information.

Consequently, the provision of information about medicine changes on discharge summaries did not significantly improve with the new charts. When changes were followed up in primary care four weeks post-discharge, disparity existed between what was prescribed at discharge and what the GP held on their most recent medicine list.

9.2.3.1 Further discussion and practice implications

Interviews with junior doctors identified that rather than not having a suitable medium through which to communicate changes (i.e. the new charts); instead, doctors often did not actually know the rationale for changes, which prevented them from being documented appropriately both on charts and in notes. A culture seemed to exist in which doctors were pressed for time, were not always sure of the information being documented themselves, and did not appear to feel comfortable checking with more senior doctors, leading to inadequate documentation. Existing evidence has reported a common assumption among hospital doctors that the rationale for prescribing decisions will be obvious to others accessing the notes (43). Our findings indicate that this assumption is inaccurate. Junior doctors are therefore restricted by a combination of a lack of knowledge through training, and lack of appropriate attitude to discharge, and a lack of resources or system-based facilitators for their role in discharge, all of which may contribute to poor quality and

inaccurate discharge summaries. It may be advisable to make pharmacists, and other healthcare professionals on the ward, aware of some of the issues faced by junior doctors when composing summaries in order that they might better assist them and facilitate this process where possible.

In future practice it is therefore necessary to strive to encourage hospital doctors, at all levels, to document any medicine changes made and their rationale clearly, whether it be in the patient notes, or on drug charts, so that these may be made available to other healthcare professionals wishing to access that information. If this information is unknown to the doctor writing in the notes or chart, it should be considered as their responsibility to source and/or clarify it, in order to ensure accurate information is documented. Hospital pharmacists are ideally placed to champion and encourage this practice, as well as being able to identify patients for whom decisions have not been well communicated in writing and 'whistle blow' as necessary. The need for clear written communication should be encouraged at all stages of the patient's admission. This should be strongly embedded within hospital culture, and for all healthcare professionals who contribute to written communication to be vigilant to, in the interests of patient safety.

Ward pharmacists conduct the majority of Medicines Reconciliation when a patient is admitted, recording their subsequent findings on drug charts. However, they contribute much less frequently to the patient medical notes. Pharmacists will sometimes consult the medical notes in circumstances where clarification is required, but do not routinely check the medical notes for accuracy or quality of prescribing, as they do on the drug chart. Increased pharmacy input to the medical notes might assist with improving the quality of documentation, especially with regard to rationale for medicine changes and prescribing decisions made. However, in order to do this, pharmacists would need to have a working knowledge of the patient, achieved by heavier involvement and integration within the clinical team.

Doctors indicated their reliance on ward pharmacists when prescribing on drug charts, referring to the distinctive 'green pen' used to correct errors and optimise prescribing. However, they were often unfamiliar with the pharmacy checking procedures adopted at discharge, for example, which summaries are checked, and when in the process this would occur. This indicates that doctors do not necessarily expect their discharge summaries will be checked, which may contribute to the indifference of junior doctors to sending

unchecked summaries, identified in Chapter 6. Pharmacists at CHUFT do not routinely or formally feed back to junior doctors about errors made on discharge summaries, or any other prescribing errors identified. Instead, these are simply corrected, without documentation of the intervention having occurred, unless an error is serious enough to warrant further action. This is also the case at other UK hospitals: A pilot study of prescribing errors identified by hospital pharmacists at a London hospital in 2007 (49) found there were 474 errors across 4995 medicine orders prescribed, of which pharmacists indicated they would have formally reported only 19 (4%) as medicine safety incidents. This under-reporting of incidents may contribute to an under-appreciation by other healthcare professionals of the work carried out by pharmacists to improve accuracy in prescribing across UK hospitals. It also may lead to a masking of the problem such that the true extent of erroneous prescribing is not appreciated. In this study, pharmacists additionally provided a feedback report to consultants by clinical speciality, which included a list of errors identified, a graphical summary, plus a commentary, which was found to be well-received and welcomed by consultants. Authors had intended to provide feedback to individual consultant teams within specialities, but it was not always possible to identify the responsible consultants from drug charts, again, indicative of poor record-keeping.

A formal route, such as a report form or brief intervention sheet, by which pharmacists could feedback individually to prescribers at discharge, might assist with improving the EDS produced. The provision of feedback by pharmacists may also improve working relationships between ward pharmacists and junior doctors, enabling inter-professional learning about different healthcare roles and responsibilities within the hospital.

9.2.4 Objective 4: To explore and understand the needs of GPs at discharge

A novel approach to explore the preferences of GPs for discharge summary content was the application of a DCE questionnaire, which enabled a quantitative value to be assigned to GP preferences. The DCE questionnaire identified accuracy as being the attribute of discharge summaries most significant to GPs, over and above all other relevant properties. The preference of GPs for accuracy and high quality content over the timeliness of receipt, challenges the current national target for discharge summaries to be sent within 24 hours.

9.2.4.1 Further discussion and practice implications

GPs and hospital doctors alike recognise that with increased speed of information transmission post-discharge, often without a final pharmacy check, quality and accuracy

are likely to be compromised. GPs expressed frustration with this reality, with one GP in particular referring to the profession as losing sight of its responsibilities associated with the transfer of care, in having moved towards a targets-based healthcare system.

In 2013, the Francis Inquiry report (186) was published as an independent report in response to serious misconduct at the Mid Staffordshire NHS Trusts. One of the key findings of this report was that financial targets had created a culture in which patient care was coming second, reporting that *“The Trust prioritised its finances and its Foundation Trust application over its quality of care, and failed to put patients at the centre of its work”*. At CHUFT, an increase in target-driven practice for timeliness to avoid financial penalties has resulted in the removal of the barriers in place to prevent errors, namely the final accuracy check by a pharmacist.

That is not to say that targets overall are inappropriate in healthcare; there is certainly a need for guidelines and limitations to be enforced, in order to ensure that care continuity is prioritised by hospital doctors. As with readmissions, offering of financial incentives or imposing penalties have been the methods of choice of governing bodies to achieve this. However, as one GP identified in Chapter 7, the drive towards timeliness seems to have gone from one extreme to the other, where discharge summaries were historically renowned for being late, they are now mostly timely but notoriously inaccurate. Both of these scenarios are sub-optimal for GPs to continue with post-discharge care in the community. In the DCE questionnaire reported in Chapter 8, timeliness of summary receipt was considered the least important attribute of a discharge summary. This indicates that GPs would, contrary to what imposed targets might suggest, actually prefer the former of these two extreme scenarios, in which the content provided was at least accurate. Awareness of the preferences of GPs may now assist pharmacists to focus on these areas when conducting a final accuracy check of a discharge summary, in order to better meet their information needs when a patient is discharged.

One solution for the present tension between the need to send summaries promptly, and risking inaccuracy in doing so, is to relax the target back to within 48 hours. This was found to be the modal acceptable timeframe in which to receive summaries by GPs surveyed in Chapter 6. Questionnaires (Chapters 6 and 8) and interviews (Chapter 7) with GPs have indicated that acceptable levels for the receipt of summaries could be as much as six days following discharge. In the DCE questionnaire, GPs were found willing to wait between four

to five days after discharge in order to gain a one-unit improvement in the provision of key discharge summary content. This identifies an inconsistency between the 24 hour national policy; and what GPs actually want.

GPs consulted in this research have also indicated that some summaries need to be received in primary care quicker than others, depending on individual patient factors such as the need for patient monitoring, follow-up assessment or supply of medicine. Flexibility surrounding the imposed targets for timeliness, based on certain patient factors, could allow secondary care more time in which to complete summaries, and in doing so ensure that they receive a final accuracy check by a pharmacist. However, the likely irony is that complex summaries, which require more time in secondary care to prepare, are those which are needed more urgently by the GP following discharge.

In the most recent UK White Paper '*Liberating the NHS*' (187) the planned abolishment of Primary Care Trusts in 2013, and their replacement with GP commissioning via CCGs, was proposed. This replacement has involved increased responsibility and influence being handed to GPs, who are now largely in control of local spending and service commissioning. It is therefore important for GPs to be able to interact with other healthcare stakeholders as well as the members of their profession working in different branches and care settings.

Sentiments and perceptions reported by doctors of those working in different care settings indicate that more should be done to increase the integration between healthcare professionals involved in secondary and primary care, with a view to reducing preconceptions and increasing understanding so professionals within medicine (and other disciplines, including pharmacy) see each other as equals. Co-operation between care settings is essential for fluent care and optimum patient experience.

9.3 Discharge model

Figure 9.1 is a model to show the processes involved in the transfer of information, the barriers which exist, and the ideal human- and system-based defences which could be employed to prevent errors at each stage.

This model represents three main transitions in the process of communicating a medicine change between secondary and primary care. The attending doctor makes a prescribing decision in secondary care and may, or may not, record this and the rationale in the patient notes or on the inpatient chart. Alternatively, the attending doctor may be a senior doctor on a ward round who makes a prescribing decision but does not explain the rationale to the junior doctor who is acting as scribe, thus the rationale does not get recorded. The discharge summary is prepared by a discharging doctor who may, or may not, have been involved in the patient's care. Rationale for prescribing decisions is sought from the patient notes, drug charts, other healthcare professionals and personal experience and knowledge. Where this information is unavailable, decisions and their rationale may be excluded from the discharge summary. The discharge summary then reaches primary care and is reconciled in comparison with the patient's GP-held notes. Prescribing decisions may, or may not, have been made apparent to the GP on the discharge summary, who will then choose whether to implement these decisions in practice. Ultimately, the action of the doctor at each stage is determined by the communicated action from the doctor involved in the previous stage.

Barriers and opportunities for the introduction of error can be observed at all stages in the discharge process. Possible human- and system-based defences against these opportunities for error, as laid out in this chapter, could include:-

- Allocation of discharge completion to more senior doctors or those who have had direct contact with the patient
- Electronic prescribing
- Shared care records
- GP-led junior doctor training on discharge summary completion
- SOPs for discharge summary completion
- Increased time in which to complete the discharge summary
- Pharmacist contribution to the discharge summary

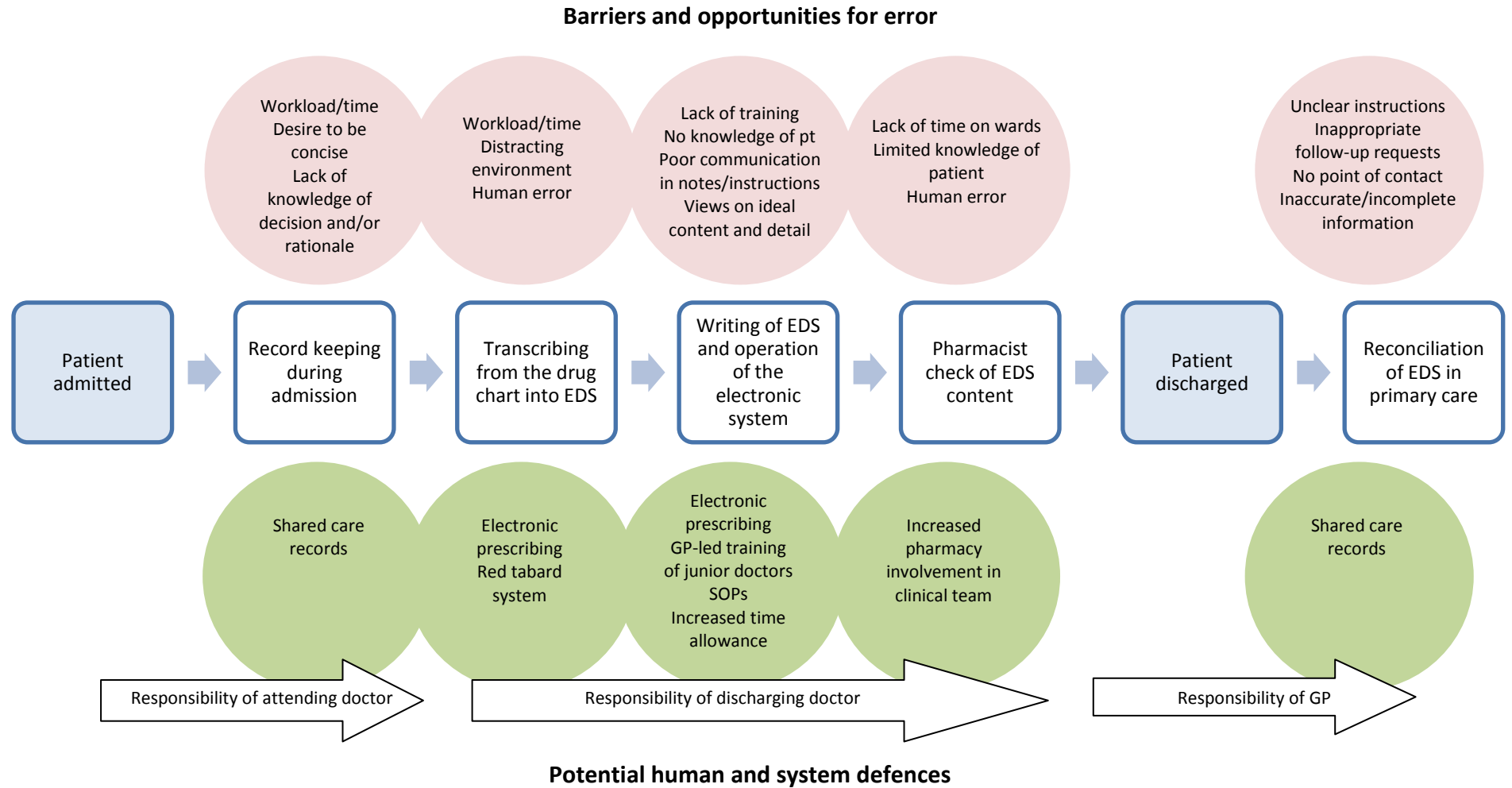


Figure 9.1: Barriers and opportunities for error, and the potential human and system defences within the discharge process.

9.4 Contribution to knowledge

This thesis has contributed to existing knowledge in the field of care transfer across four key areas (188):-

9.4.1 Empirically-based characterisation of a phenomenon of interest

The analysis in this thesis of the quality, accuracy and timeliness of electronic discharge summaries, and the severity level of inaccuracies found in summaries, has helped specify the current situation of discharge and provided a baseline view of the system as it operates. Analysis of the accuracy of EDS has also identified the importance of a pharmacy final accuracy check to prevent error on discharge summaries being perpetuated within primary care. This has also identified individual patient risk factors which may increase the likelihood of an error occurring on their discharge summary.

9.4.2 Implementation of theoretical principle

The implementation and testing of an element of the RPS guidance in practice, via the Early Adopter programme, demonstrated how practice guidance can be applied in a healthcare setting and what the potential limitations are. The importance of testing guidance in practice was highlighted through implementing a change to inpatient drug charts, which were not found to significantly affect the quality of information about medicine changes provided on discharge summaries. Applying this principle to the preparation of discharge summary identified a further need to investigate what processes and resources hospital doctors use during the preparation of discharge summaries.

9.4.3 Codification of the 'obvious'

The combined ethnographic approach used to explore the experiences of junior doctors has provided insights into the culture of junior doctors, their views on their role at discharge and experiences in carrying out that role. These have provided evidence for anecdotal beliefs held by GPs of what it must be like for them. This research has also provided some novel findings including junior doctors' lack of appreciation of the requirements of the general practitioners to whom they are meant to be communicating during discharge. This may stem from hospital

doctors' perceived unimportance of communication during care transfer and/or lack of training and support in area.

9.4.4 Application of a technique in a new context

Applying a DCE to GPs to examine their preferences for information during patient discharge from hospital has enabled an existing research technique to be applied in the novel setting of GP requirements. Despite the small scale of the study, the significance of the attributes examined suggests that this technique can be successfully applied within the field of care transfer. Results of the DCE on the preferences of GPs for timeliness have challenged existing national targets for timeliness, given its identification of GP requirements for high quality discharge information, rather than hurriedly-sent but incomplete or inaccurate information to be supplied.

9.5 Thesis limitations

Given the opportunity to repeat this thesis, I would make several methodological changes. In terms of the structure of data collection, I would have instead structured the study so that I interviewed junior doctors before attempting to alter the medicine charts. This would have allowed data collected from the junior doctors to help inform those changes which would be of most benefit to them in practice, rather than directly targeting the system instead of first gaining an understanding the human processes within it.

The recruitment of GPs was an issue throughout the study projects, which led to smaller sample sizes than intended. Engaging with GPs via gatekeepers proved to be complicated and hampered by the change in commissioning bodies in primary care, with PCTs handing over to CCGs in 2013. Such factors may also have affected both the willingness of GPs and time available to them to participate in interviews (Chapter 7) and in questionnaire-based research (Chapters 6 and 8).

Collecting charts and medical notes to accompany discharge summaries (Chapters 2 and 3) was both time-consuming and logistically challenging. Resourcing assistance from ward staff or

employing more researchers may have enabled more eligible charts, patients and summaries to be identified and recruited into these studies.

The latter two limitations underline the need for engagement with colleagues in healthcare to facilitate research and to disseminate findings, in order to have a meaningful impact in practice.

9.6 Further research following on from this study

This study has identified several further research questions for future research on the communication of patient care during hospital discharge.

Regular inadequacies have been identified in the documentation of medicine changes on charts and discharge summaries, and in the medical notes. Although identifying such inadequacies is not in itself a novel concept, the present research suggests specific ways in which piloting resources to attempt to improve communication of medicine changes within secondary care through the introduction of electronic care records or changes in the culture of record-keeping in healthcare, could be worthwhile.

The DCE questionnaire study suggested that GPs prefer discharge information to be accurate and to have high quality content, rather than simply be received quickly. More research is needed to ascertain whether the national 24 hour target should be relaxed in order to allow secondary care doctors more time in which to produce summaries, and enable them to be pharmacy checked, or whether the target itself is valid, but the resources and processes in secondary care which need to be altered in order to allow targets to be met. The success of this study in applying a DCE questionnaire with a small sample size indicates that it would be feasible and worthwhile to conduct this exercise on a larger scale to test the preferences of GPs across a wider sample.

Results of ethnographic work with junior doctors, and of the examination of GPs' perceptions of secondary care, have identified several potential barriers to the discharge summary preparation process, and opportunities for error to be introduced. This indicates that the role of producing

discharge communication should not necessarily be the responsibility of a junior doctor. Further research to investigate the scope for re-allocating roles in this area would be beneficial.

9.7 Final conclusions and thesis recommendations

Final conclusions from the work reported in this thesis are that:-

- Electronic discharge summaries are often prepared inaccurately, with the discharge process largely being human-based and thus containing multiple opportunities for active failures. A pharmacy check at discharge is necessary to prevent such inaccuracies from being transferred to primary care.
- Medicine changes are poorly documented on discharge summaries, which is likely to be a result of limited information about the rationale for changes being documented in patient notes and on inpatient drug charts by secondary care doctors.
- The barriers faced by junior doctors preparing discharge summaries include a busy environment, interruptions, time pressure, lack of guidance, lack of knowledge of the patient and poor written communication of discharge instructions in patient notes. This is also combined with lack of knowledge of what GPs require, and a system in which no feedback is provided.
- Disparity exists between the requirements of GPs, and how junior doctors perceive them. Alignment of these requirements could be achieved with intra-professional education, to promote further understanding of the roles of the two groups within the medical profession.
- GPs give greater value to accuracy and practical recommendations (medicine changes and follow-up plans) in a discharge summary than to the timeliness of receiving them. Relaxing the 24 hour target may be worth considering to allow doctors in secondary care more time to prepare high quality summaries, and enabling them to be checked for accuracy by a pharmacist before being released to the GP.

- Pharmacists are ideally placed in hospitals to champion and promote better written communication of medication changes during a patient's admission. Additional input from pharmacists into prescribing decisions during clinical ward rounds may enable them to be better prepared to assist with discharge summary composition.

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