Shared Electronic Patient Record Access for Community Pharmacists

Is there a need and what are important considerations for the design, use and implementation?

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Author Declaration

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Abstract

Introduction

There is a compelling need to improve the effectiveness and efficiency of healthcare and in particular, the quality and accessibility of information being shared among care providers. Shared electronic patient records (shared EPRs) are perpetually updated online summaries of care which can be used to support timely sharing of accurate patient information across care settings. A shared EPR is one of the proposed core components of the Electronic Health Record for Ireland. In England, a shared EPR called the Summary Care Record is already available, with access now extended to community pharmacists.

As a pivotal member of the primary care team, community pharmacists have previously expressed a desire to have access to more information about patients. Due to their accessibility and expertise there have been calls for greater involvement of community pharmacists in out-of-hours care, transitions of care and medication reconciliation, with clear benefits to care outcomes demonstrated when this happens. The Pharmaceutical Society of Ireland's *Future Pharmacy Practice in Ireland* document recommends that pharmacy should be incorporated in the development of national health IT systems. However, the development and implementation of such systems are complex undertakings that are prone to failure. Therefore, a structured approach should be taken in the development of a shared EPR for Ireland, identifying the need that exists, considering how it should be designed, its potential use and how to successfully implement it in practice.

Aims

This research reviews existing evidence from which a conceptual framework is developed to support the development of shared EPRs. It describes the Summary Care Record in England and current progress on community pharmacist access. It also surveys community pharmacists in England and Ireland about their views on shared EPRs. In doing so, it aims to learn from community pharmacists in England about their experience of Summary Care Record and provide recommendations for the design, use and implementation of a shared EPR for Ireland, particularly as it applies to community pharmacy.

Methods

A literature review was conducted and a conceptual framework was developed. Two online questionnaires were created. One was for community pharmacists in Ireland to assess their readiness and willingness for shared EPR access, the other for community pharmacists in England to learn about their experience of Summary Care Record access and their views on implementation of the system. The questionnaires were completed by 201 community pharmacists in Ireland and 57 community pharmacists in England. Data were analysed using frequencies, mean and standard deviation. Chi-square tests and Mann Whitney U tests were used to test for independence and difference.

Results

The conceptual framework outlines the important considerations to be addressed in shared EPR development under the headings of need, design, use and implementation. Results from the questionnaires showed that community pharmacists in Ireland would like access to more information about patients, particularly in relation to medication history, allergies, diagnoses and rationale for therapy changes. Community pharmacists in England report that access to additional information through Summary Care Records is improving a number of areas of practice, with a greater effect

reported among those using the system frequently. They rate information relating to medication history as most useful. However, Summary Care Record was perceived to be limited in its current form. Community pharmacists in Ireland and England indicate a strong willingness to share information from their systems with other pharmacists and doctors. In general, community pharmacists in England appear to be more conservative about the prospect of sharing such information than their counterparts in Ireland.

Discussion & Conclusion

This research has shown that a clear need exists for shared EPR access for community pharmacists. The design of shared EPRs must consider the user interface and experience, content of the record and access security. There are a variety of ways in which shared EPRs could be used within community pharmacy to benefit patients and practice, with initial improvements likely to be in efficiency of care and access to information out-of-hours. Implementation of shared EPRs is a large-scale project requiring sociotechnical change and should ensure careful planning, with appropriate consideration given to training, evaluation and impact on role.

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List of Abbreviations

ADRs	Adverse Drug Reactions
ANT	Actor Network Theory
CDSS	Clinical Decision Support System
CP	Community Pharmacist
CPOE	Computerise Physician Order Entry
EHR	Electronic Health Record
EPR	Electronic Patient Record
EPS	Electronic Prescription Service
GPhC	General Pharmaceutical Council
GPIT	General Practice Information Technology
HIQA	Health Information and Quality Authority
HIT	Health Information Technology
HSE	Health Services Executive
IHI	Individual Health Identifier
IOM	Institute of Medicine
LR	Legitimate Relationship
MRPs	Medication Related Problems
NHS	National Health Service
OTC	Over the Counter
PICO	Population, Intervention, Comparison, Outcome
POC	Proof of Concept
PSI	Pharmaceutical Society of Ireland
PTV	Permission to View
SCR	Summary Care Record
SCRa	Summary Care Record Application
SCRGP	Summary Care Record Governance Person
TOC	Transition of Care

Chapter 1 - Introduction

1.1 Background and Motivation

1.1.1 Changing healthcare and future role of pharmacy

In most developed counties, the demand for healthcare continues to escalate. People are living longer and their health-needs are becoming more complex. This is no different in Ireland. An ageing population will see the number of people over 65 grow by circa 3% over the next 10-15 years. There will be an associated increase in chronic illness with 40% of the population predicted to have at least one chronic illness by 2020. As a result, national policy is focused on keeping people healthy and where illness occurs, on treating patients as close to home as possible. This needs to involve a multidisciplinary approach that utilises expertise of healthcare providers working collaboratively to deliver optimal care for patients (Dept of Health, 2015, PSI, 2016).

Pharmacists are regarded as one of the most trusted professionals in the world (Veronin, 2015). In 2008, a White Paper published in England identified significant potential for pharmacists to play a greater role in the delivery of care, outside of the traditional role of the safe and effective dispensing of prescriptions. It specifically mentioned areas such as health promotion, chronic disease management, optimisation of medicines usage and involvement in clinical pathways development that support delivery of integrated care (DoH, 2008). Pharmacists have a history of being early adopters of HIT (Nelson et al., 2016), with reports as far back as the 1960's of computers being used in pharmacy (Brooks and Gmyrek, 2011).

In Ireland, with over 2 million people visiting community pharmacy each month across a network of over 1800 pharmacies (PSI, 2016), community pharmacists (CPs) are uniquely positioned in the health system to support enhanced delivery of cost effective improvements to public health and medicines' management. In recognition of this, the Pharmaceutical Society of Ireland's (PSI) *Future Pharmacy Practice in Ireland* document makes a number of recommendations pertaining to the future role of pharmacists in Ireland. These include:

- Pharmacists supporting health system reform
- Pharmacy supporting national health and wellbeing
- Pharmacy supporting patients in chronic disease prevention and management
- Pharmacy supporting medicines management throughout the patient pathway (PSI, 2016).

The same document recommends the use of technology as an enabler for shared patient care, efficiencies in delivery, and safer transitioning of care (PSI, 2016).

A comprehensive literature review in 2006 concluded that Health IT (HIT) has the potential to support a dramatic transformation of healthcare delivery, making it safer, more effective and more efficient (Shekelle et al., 2006). Over the last three decades, the widespread adoption of IT in healthcare was considered inevitable by the diffusion of innovation theory (Beasley et al., 2011) and was seen as a way of addressing the widening supply and demand gap (Ludwick and Doucette, 2009). However, adoption of HIT in practice has been slower than anticipated (Grabenbauer et al., 2011). Failures are common (Cresswell et al., 2013), associated with three out of every four large scale HIT projects (Wears and Berg, 2005).

A shared EPR called the National Shared Record is planned to be one of the four key components of the Electronic Health Record solution for Ireland. This will facilitate the sharing of information about patients between users and organisations (eHealth Ireland, 2016a). Careful consideration is being given how this should work. Pharmacy as a profession is often neglected in the research, design, decision making and leadership of HIT systems (Nelson et al., 2016). However, as a key member of the primary care team, community pharmacy will have an important role in contributing to and using the National Shared Record and pharmacists should be consulted and involved throughout its development.

In England, there has already been progress in the area of shared EPRs, with the Summary Care Record (SCR) now widely distributed and CP access in place. With many similarities between both jurisdictions there are likely to be lessons that can be learned following the implementation of the SCR in England that could be considered in the development of the National Shared Record for Ireland.

1.2 Research Overview

1.2.1 Developing the Research Question

The researcher's primary areas of expertise and interest relate to community pharmacy and the role of technology in future practice. When considering the research topic for this dissertation, an initial area of research (sharing of electronic patient records with pharmacists) was selected. This was based on developments in practice internationally, priorities nationally and personal experience and interest of the researcher. This was further refined through an initial review of the literature, and discussion with dissertation supervisors, course lecturers, colleagues, classmates, and other experts in the field. The research question subsequently refined and presented along with an overview of the proposed research in the form of a Research Proposal. The research question is presented below:

1.2.2 Description and Purpose of the Research

This dissertation contains descriptive, cross sectional research (Bowling, 2009) using both existing evidence and primary research to answer the research question posed. The primary research comprised of questionnaires for CPs in Ireland and England.

The purpose of this research is to:

- Identify whether is a need for access to shared EPRs for CPs.
- Make suggestions for the design, use and implementation of the National Shared Record for Ireland, particularly as it applies to community pharmacy. Findings from the research may be useful in the development of the National Shared Record for Ireland and inform the thinking on how it could be used in the community pharmacy setting.

1.3 Dissertation Overview

The dissertation consists of six chapters. This chapter, **Chapter 1,** introduces the topic and background to the research.

Chapter 2 is a literature review relevant to the research question. It presents a description of shared EPRs and progress in this area internationally. It then addresses aspects of community pharmacy practice that may be supported by access to shared EPRs and provides an overview of HIT implementation. Finally, it presents a conceptual framework that evolved from reviewing the literature which is then applied to the research question.

Chapter 3 provides and overview of healthcare and pharmacy in England. It then describes the SCR and outlines the development and progress in relation to CP access to SCR based on available information and evidence from a proof of concept pilot. It further provides an overview of healthcare, pharmacy and eHealth in Ireland.

Chapter 4 outlines the methodology employed for the primary research. This consisted of two online questionnaires. The first was targeted at CPs working in Ireland. It asked them about areas of their practice that may be supported by shared EPRs, and about their willingness and readiness to receive and share information as part of the National Shared Record for Ireland.

The second questionnaire was designed for CPs in England where pharmacist access to SCRs has already been provided. It sought to understand the reasons why CPs have accessed SCRs, how it has impacted on their practice, future developments they'd like to see in relation to the system and how they found the training and implementation that accompanied the roll-out.

Chapter 5 describes detailed results from the primary research using the structure of the conceptual framework presented in Chapter 2. Analysis, deduction and areas of comparison between both questionnaires are then presented.

Chapter 6 discusses the results of the primary research and their relevance to practice, policy and research in the context of existing evidence and knowledge. It outlines the strengths and limitations of the research. It then uses the conceptual framework developed to present a summary of recommendations that the researcher believes should be referred to in the planning and design of CP access to shared EPRs and finishes with a conclusion to the dissertation.

Chapter 2 - Literature Review

2.1 Introduction

A literature review is defined as "*the comprehensive study and interpretation of literature that relates to a particular topic*" (Aveyard, 2014). Literature reviews are an essential tool in the research process as they provide a framework around which the importance of the research can be established and a benchmark by which new findings can be compared (Creswell, 2014).

The aim of this literature review is to provide an overview of shared EPRs, identify areas of healthcare and community pharmacy practice that could benefit from access to information contained in shared EPRs, and discuss implementation of HIT systems.

2.2 Search Strategy

A systematic approach to the literature review was taken. The method applied to determining the search terms to use and the criteria applied are outlined in the below bullet points. More detailed information about journals and search terms used are included in Appendix A.

Search terms were decided upon using the following steps:

- Listing of search terms relevant to the topic and then listing associated terms and synonyms for these.
- Use of search strategy built around a PICO framework (Population Intervention Comparison and Outcome) which supported the grouping of search terms into thematic groups.
- Use of MeSH (Medical Subject Heading) search terms in PubMed to allow different terms on the same topic to be captured in the search results.

To apply rigour to the resulting publications, critical appraisal was undertaken to assess the quality of the research and where possible, peer-reviewed studies were selected that did not have any conflicts of interest. To aid with this process, the *Six Questions to Trigger Critical Thinking Tool* (as developed by Woolliams et al., (2009) and re-developed by Aveyard (2014)) was referred to when assessing publications (Appendix A).

2.3 Shared Electronic Patient Records

The first section of the literature review addresses shared EPRs. It does this by looking at international progress and examples, and presenting benefits and challenges identified.

2.3.1 Definition and description

There are several different approaches that have been taken when considering how best to share EPRs on a national scale. There are a number of examples already in existence internationally which vary in scope, functionality and ambition (Dobrev et al., 2010). There are also a variety of names and definitions associated with such records even though in practice, many of their features are often comparable. In England, the term Summary Care Record (SCR) is used (NHS, 2017). Other countries use terms such as Shared Summary Care Record (Australia), Shared Care Record (New Zealand), Individual Health Record (Wales), and Emergency Care Summary Record (Northern Ireland and Scotland) (HIQA, 2016). The proposed comparable system for Ireland will be called the National Shared Record (eHealth Ireland, 2015a). For the purpose of this research, the term 'shared electronic patient records' (shared EPRs) is used to describe such systems, except when specifically referring to the SCR system in England or discussing plans for the National Shared Record in Ireland.

Coiera describe such records as "*perpetually updated online summaries of care*" (2011). In its 2016 *International Review of Summary Care Records,* the Health Information and Quality Authority (HIQA) in Ireland chose the following definition from Greenhalgh et al: *"…a secure structured summary of key medical information, held centrally on a national database that is accessible over a secure network from any location where a patient seeks treatment*" (2010b).

The core information that is stored on existing examples of shared EPRs can vary, but at a minimum they generally include demographic details about the patient, medication information (current repeat medication, acute medication and recently discontinued medicines), allergy information and previous adverse reactions (HIQA, 2016). They may also contain a broader view of a patient, containing data such as medical history, progress notes, laboratory data, radiology images, referral letters and discharge summaries (Greenhalgh et al., 2010b, Veronin, 2015). More advanced functionality may also be present, including the ability to provide evidence-based clinical decision support systems (CDSS), quality management and data reporting (Veronin, 2015). They are usually not created by users, but rather are automatically populated through uploading of extracts from local systems and then stored on centralised purpose-built systems (Coiera, 2011).

2.3.2 International Progress

Despite there being examples of shared EPR systems internationally (Dobrev et al., 2010), CP access is not yet the standard approach (HIQA, 2016). While detailed analysis of international progress is outside of the scope of this research, a number of examples of existing systems are briefly described below.

2.3.2.1 United Kingdom

England, Scotland, Wales and Northern Ireland each have a national, centrally stored, shared EPR. However, despite a common vision, each country developed their own bespoke solution, with wide ranging variations in strategy, implementation, stakeholder engagement and evaluation. A common feature is that the information contained on the systems is extracted from GP records and they were originally intended to support unscheduled or emergency care (Greenhalgh et al., 2013). Of the four systems, CP access is currently only provided in England (HIQA, 2016). As CP access to SCRs forms part of the primary research of this dissertation, this system will be described in greater in detail in Chapter 3.

2.3.2.2 New Zealand

The Shared Care Record (ShCR) in New Zealand contains more information than the SCR in England, consisting of demographics, medication, allergies, summary of recent and long-term conditions, discharge summaries, recalls, lab and x-ray results and immunisations. It is populated by information contained on GP practice systems and accessed via a secure system called 'ManageMyHealth' (Compass Health 2017). GPs must inform their patients about the ShCR and patients can choose to opt-out or remove information from their record (HIQA, 2016). Usage has been steadily increasing since the portal was launched in 2014, with approximately 100,000 registered users by the end of 2015 (HIQA, 2016). New Zealand is another international example where CPs have been provided with access to shared EPRs.

2.3.3 Benefits of Shared Electronic Patient Records

At the simplest level, access to shared EPRs can enable a patient's medication history to be ascertained and provides live access to important safety information such as allergies that may otherwise not be available (Moore et al., 2011).

The EHR IMPACT study, published in 2010 by the European Commission, looked at the socio-economic impact of established interoperable electronic systems in healthcare across Europe and beyond (Dobrev et al., 2010). In reviewing what the authors considered to be 11 good practice cases, it found

a range of benefits. These are summarised in the below table and fall under four main headings: healthcare organisations, patients, healthcare professionals and third parties.

Table 2.1: Benefits of shared electronic patient records (Dobrev et al., 2010)

Stakeholder	Benefits shown
Healthcare organisations	• Improved patient safety with reduced errors because of better availability of information • Reduced duplication of tests • Facilitation of integrated care pathways through improved information access • Reduced waiting times • Better compliance with agreed care guidelines • Better quality prescribing • Improved efficiency of care, allowing resource to be deployed elsewhere • Improved management through use of reports and statistics to make evidence-based decisions
Patients	• Improved patient safety with reduced errors because of better availability of information • Better transition of care with improved continuity • Reduced pain and inconvenience from unnecessary repeated tests and procedures • Reduced duplicate and missed appointments • Less cost due to reduction in unnecessary tests, procedures and appointments
Healthcare Professionals	• Efficiency and quality of care improved • More effective multidisciplinary teams • Less time wasted through searching for information or carrying out unnecessary tests • Improved job satisfaction as care can be delivered supported by the right information available when it is needed
Third parties (e.g. payers)	• Better value for money on overall healthcare spend due to reduced waste and administration costs • Improved information about care delivery across entire system through analysis of structured data, allowing better decision making and allocation of resources

However, it was found that although benefits from the systems evaluated fell under similar broad headings, they are often very individual and specific to the environment in which they operate and the functionality that they support. For example, to deliver a reduction in missed appointments, a system may need functionality such as SMS reminders or ability for patients to view/amend appointments online.

A review of SCR adoption in England in 2010 found that SCRs added value to consultations, particularly for patients on multiple medications or where information about patients medication and allergies were not otherwise available (Greenhalgh et al., 2010b).

As well as the benefits listed above, another proposed but still to be realised benefit of interoperable shared EPRs is the potential for secondary use of data. It has been suggested that information collected could be anonymised and used for research, population health studies and development of new medicines. This could only be achieved through appropriate data linkage of data that are recorded using appropriate standards and terminology and in accordance with relevant data protection legislation (RCP, 2013).

The EHR IMPACT study is quick to point out that return on investment (referred to as Socio-Economic Return) for successful systems are not achievable in the short-term. From the examples analysed, it was shown that it takes on average seven years before these benefits are seen (Dobrev et al., 2010). An assessment of benefits and costs of HIT systems in 2006 reviewed 256 studies and predicted substantial savings could be accrued from large-scale HIT systems (such as shared EPRs). The estimated time taken to reach break-even point by this review ranged from three to 13 years (Shekelle et al., 2006). While cost-benefit analyses of HIT projects have reported mixed results (Shekelle et al., 2006), the authors of the EHR IMPACT study believed that the socio-economic gains to be derived from fully interoperable EHR systems will eventually exceed the costs (Dobrev et al., 2010).

2.3.4 Reported Challenges of Shared Electronic Patient Records

The usefulness of a shared EPR is limited if data are inaccurate, incomplete, or out of date data exist (Coiera, 2011). Lack of interoperability and limiting the ability to update the record to only certain users reduces the potential accuracy of the data being accessed and limits their potential use. A UK study in 2011 concluded that for information to be reliable, both primary care and hospital clinicians should have both read-access (i.e. ability to view) and write-access (i.e. ability to input) to shared EPRs (Moore et al., 2011).

Linked to completeness and accuracy of information is the area of liability and implications for choosing or not choosing to view available information. However, it is considered that if a healthcare professional makes a decision in good faith based on information contained within a shared EPR that subsequently causes patient harm, they should not be liable for damages (Goundrey-Smith, 2013). The issue of liability in the context of SCR in England is discussed further in Chapter 3.

Data breaches, either intentional or unintentional, are an inherent risk of any electronically shared data. In the development of the SCR for the National Health Service (NHS) England, *Connecting for Health*, the organisation responsible for informatics within the NHS, required best in class data security standards and extensive penetration testing to be in place before choosing a product. Significant governance procedures, which are presented in Chapter 3, were also put in place. Nevertheless, while it is important that such controls are in place, it was reported by some users that fear of surveillance acted as a barrier to them using SCRs (Greenhalgh et al., 2010b).

Another challenge reported in relation to SCR adoption in England was attributed to the fact that successful implementation required significant cooperation from GPs (as the information is taken from their system) even though the benefits of the system are enjoyed by other stakeholders. This was compounded by concerns from GPs about access to confidential information taken from their systems being provided to users unknown to them (Eason and Waterson, 2013). However, this initial resistance reduced over time as increasing numbers of practices cooperated with the programme (Greenhalgh et al., 2013).

2.3.5 Controls for Shared Electronic Patient Records

Patient confidentiality is a key professional requirement of all healthcare professionals and sharing of patient information must factor all relevant legislative and regulatory requirements (Goundrey-Smith, 2013). As recommended in the *Caldicott Report*, HIT systems intended to support data sharing must allow these obligations to be met and should ensure that best practice principles are incorporated at the design stage (The Caldicott Committee, 1997).

Additional requirements are in place for healthcare providers across the NHS in relation to information governance (IG). IG is defined as "*processes by which personal information is collected, managed, transmitted and used in a secure and confidential way in an organisation*" (Goundrey-Smith, 2013). IG is particularly relevant when considering sharing data between organisations and all providers in the NHS must complete an online assessment tool on an annual basis to provide assurances in relation to IG (PSNC 2017). A supporting guide on IG was published in 2013 in which it is emphasised that the duty to share information can be as important as the duty to protect confidentiality (HSCIC 2013).

Consideration of how to obtain consent for information to be collected, stored and accessed is another essential component in the design of shared EPRs, both from a provider and a patient perspective, and has a direct effect on acceptance and adoption (Greenhalgh, 2008). In community pharmacy, apart

from recording of dispensing information about a prescription (where presentation of the prescription constitutes implied consent), pharmacists are required to obtain consent for any other information stored or processed about patients (Goundrey-Smith, 2013).

A number of different consent models can be employed in relation to the creation of and access to shared EPRs. One approach that has been used is a two-stage model, where implied consent is applied to allow automatic record creation, and explicit consent is required to allow the record to be viewed. This is the model applied in Scotland and Northern Ireland and has proven popular among all stakeholders (Dobrev et al., 2010, Greenhalgh et al., 2013, HIQA, 2016). In New Zealand, an opt-out model is used in relation to record creation, with patients also having the option to exclude specified information. It is the responsibility of the GP to advise patients that a record has been created that has may be viewed by other users (HIQA, 2016). Patient explicit consent is required before records are viewed. Detail of the consent model used for the SCR in England is provided in Chapter 3. Whichever consent model is chosen, potential associated increase in workload for healthcare professionals needs to be considered (Greenhalgh, 2008).

2.4 Identifying the Need for Shared Electronic Patient Records in Community Pharmacy

In making the case for CP access to shared EPRs, it is first important to ascertain if there is a need for such access. In the sections that follow, a number of areas of practice will be outlined where information contained in shared EPRs could support the delivery of care.

2.5 Transitions of Care

2.5.1 Definition

Transitions of Care (TOCs) are described as "*a set of actions to ensure patient coordination and continuity of care as patients transfer between different locations and/or different levels of care within the same settings*" (Coleman and Boult, 2003, Rochester-Eyeguokan et al., 2016). They often involve multiple stakeholders including doctors, nurses, pharmacists, allied health professionals, social workers, as well as the patient themselves, their family members and carers (Burns et al., 2012).

2.5.2 Prevalence & Cost

TOCs have been shown to be high-risk periods for patients, particularly in relation to medication safety (Rochester-Eyeguokan et al., 2016). It is estimated that 60% of all medication errors occur at TOCs (National Transitions of Care Coalition, 2008). Hospital admission and discharge are especially risky relative to others stages of care (Moore et al., 2011, Redmond et al., 2013, National Transitions of Care Coalition, 2008) and medication discrepancies occur in up to 70% of patients at these transitions (Mueller et al., 2012).

In addition to the impact on patient safety, TOCs have been shown to bear a significant financial cost. In the USA, an estimated annual cost of $25-$45 billion has been attributed to inadequate management of TOCs, resulting in avoidable complications and readmissions to hospital (Health Affairs, 2012). In the USA, the government-operated national insurance programme, *Medicare*, spends $15 billion per annum on unintended hospital readmissions, with 76% of these readmissions considered to be avoidable (Gibson, 2015).

2.5.3 Factors that Contribute to Errors at Transitions of Care

Factors that contribute to errors at TOCs that were identified in the literature fit broadly into four categories – medication, patient, communication and care provider. Examples of each of these are presented in Table 2.2.

Table 2.2: Factors that contribute to errors at Transitions of Care

Category	Examples
Medication related	• Medication list discrepancies cause by absence of or inaccurate medication reconciliation • Prescribing errors • High medication use
Patient related	• Poor medication adherence • Lack of understanding regarding treatment • Cognitive function • Inability to recall medication list at admission • Transportation, housing and social factors • Poor access to support services • Lack of involvement/engagement of patients in their treatment plan
Communication related	• Inaccurate or incomplete communication when responsibility shifts between providers or back to patient • Delayed communication • Unsuccessful communication • Lack of interoperability between systems in different care settings
Care provider related	• Ineffective team based care • Absence of evidence based treatment decisions • Lack of provider accountability • Poor accessibility to allow patients to ask questions • Application of non-standardised TOC procedures • Poor provider education/awareness of TOC processes • Lack of timely follow-up • Limited incentive for secondary care providers to communication with primary care • Inter-professional barriers

(Gibson, 2015, Grimes et al., 2012, Karapinar-Çarkıt et al., 2017, Redmond et al., 2016, Rochester-Eyeguokan et al., 2016).

2.5.4 Role of Community Pharmacists in Transitions of Care

The role of CPS in TOC has not been clearly defined, even among pharmacists themselves, with a study showing almost half of pharmacists (47%) did not have a clear idea of their role in TOC services (Melody et al., 2016). However, the majority of pharmacists (80%) recognise the benefits of their involvement in TOC in improving patient outcomes, believing that their involvement would improve patient understanding of their medication, reduce errors, and enhance their relationship with patients (Gibson, 2015). Due to their unique set of skills and accessibility within the community, there is a call for CPs to play an increased role in TOC, particularly in relation to medication management (National Transitions of Care Coalition, 2008) and their involvement has been shown to have a positive impact on quality of care (Melody et al., 2016). CPs support this view, with (82%) believing their role should

be expanded in TOC, particularly in relation to identification and prevention of prescribing errors (Redmond et al., 2016).

The reality is that CPs are already routinely involved in TOCs. As an example, hospital discharge prescriptions are commonly encountered in community pharmacy, with one unpublished study in Ireland identifying an average of 4.1 prescriptions being presented per day in participating pharmacies (Grimes et al., 2016). CPs frequently identify problems with these prescriptions, with studies reporting that drug related problems are identified by CPs in one in four discharge prescriptions (Braund et al., 2014, Paulino et al., 2004). Prescriptions with drug related problems are three times more likely to result in supply to patients being delayed (Grimes et al., 2016) with 79% of CPs in Ireland reporting it is "*difficult or impossible*" to contact hospital prescribers (Redmond et al., 2016). Another survey of CPs in Ireland found that 93% considered communication with hospital prescribers to be poor (Grimes et al., 2012).

The biggest barriers identified by CPs in relation to their involvement in TOC are time, lack of communication with prescribers and lack of information at discharge (Gibson, 2015). However those who view time as the biggest barrier are still willing to participate in TOC if given the opportunity (Gibson, 2015).

More than three quarters of CPs in Ireland wish to receive more information about patients (Grimes et al., 2012). Providing CPs with discharge information about patients has been shown to reduce medication discrepancies (Munday et al., 1997). Although CPs would like to receive this information, they rarely receive it (Grimes et al., 2012). In particular, CPs want information about current medications, medication changes, special requirements, adverse drug reactions and allergies (Redmond et al., 2016, Urban et al., 2013, Munday et al., 1997). A study in Northern Ireland that provided CPs with a faxed discharge summary found that 92% of respondents reported receiving this information to be beneficial in the delivery of care to their patients (Scullin et al., 2007).

2.5.5 Role of Health IT in Transitions of Care

The use of technology is consistently cited in literature as important to improve TOCs through supporting secure, timely communication of accurate, up to date, structured information using defined datasets (Rochester-Eyeguokan et al., 2016, Redmond et al., 2016, Kripalani et al., 2007, Coleman and Boult, 2003, Institute of Medicine, 2003). A publication in the Journal of the American Geriatrics Society recommended the use of technology and a universal care-planning tool to support TOC that facilitates two way communication and includes at a minimum; current problem list, medications, allergies, baseline physical and cognitive function, advance directives and contact information for the primary care team and caregivers (Coleman and Boult, 2003).

2.5.6 Transitions of Care at Hospital Discharge and Discharge Summaries

Summaries of a patient's relevant clinical data, such as might exist in shared EPRs, are central to good communication at TOCs (Coiera, 2011). However, communication of information about patients at the point of discharge is well understood to be an area requiring significant improvement (Kripalani et al., 2007). Information communicated at discharge needs to be accurate, reliable, valid, timely, relevant, legible and complete (HIQA 2013). To achieve this, it is important that a cohesive, nationally agreed approach to discharge information is adopted using agreed standards and datasets. Standards of this nature exist in a number countries including Ireland, Northern Ireland, Scotland, England and Australia (HIQA, 2013, GAIN NI, 2013, SIGN, 2012, RCP, 2013, NETHA, 2012). In addition, the international health standards organisation, *Health Level 7,* have developed their own standards for discharge summaries (HL7, 2005).

Benefits of standards in discharge summaries as described by HIQA are summarised in Table 2.3 (HIQA 2013).

Table 2.3: Benefits of standards in discharge summaries (HIQA 2013)

Benefits to patients	• Improved consistency and quality of information • Increase efficiency in care
Benefits to hospitals	• Standard approach to discharge summaries • Reduction in locally created solutions to discharge summaries • Discharge process is more efficient • Standardisation of terminology facilitates easier secondary use of data
Benefits to primary care	• Information received is standardised across all healthcare organisations • More complete information about patients is available • Information is available in more timely manner if summaries are shared electronically.

The Australian Commission on Safety and Quality in Healthcare have gone a step further in the development of standards. A clinical safety review in 2014 that assessed accuracy and quality of data in electronic discharge summaries found that although the data was being transferred accurately from hospitals, information varied from one organisation to the next and terminology used was inconsistent. This was driven by different formats that existed across the range of systems in use by different organisations. They subsequently published the National Guidelines for On-screen

Presentation of Discharge Summaries in 2016 in an effort to improve standardisation on not just what is captured, but on how it is presented (ACSQH, 2016). This suggests that to achieve standardisation in HIT systems, standards need to be detailed and explicit.

A pilot project carried out in 2016 in two Irish hospitals to improve the accuracy of discharge prescriptions utilised a HIT system called 'eClinical Pharmacy Suite' (eHealth Ireland 2016). This application aimed to support the role of hospital pharmacists by facilitating medication reconciliation at admission and discharge and the production of computer-generated prescriptions. When the application was used, compliance with the HIQA discharge summary standards increased from 50% to 97%, with the biggest improvement relating to CPs and GPs being provided with rationale for medication changes (Jago-Byrne et al., 2017). This demonstrates the role that HIT and standards can play in supporting improved information transfer across care settings.

2.6 Medication Reconciliation

2.6.1 Overview

Medication Reconciliation is cited as a patient safety priority by a number of international agencies. (DoHC, 2008, NPC, 2008, NICE, 2015) and is defined as "*the comprehensive evaluation of a patient's medication regimen any time there is a change in therapy in an effort to avoid medication errors such as omissions, duplications, dosing errors, or drug interactions, as well as to observe compliance and adherence patterns. This process should include a comparison of the existing and previous medication regimens and should occur at every transition of care in which new medications are ordered or existing orders are rewritten or adjusted or if the patient has added non-prescription medications to (his or her) self-care*" (ASHP-APhA, 2007).

An observational cross-sectional study carried out in two acute public hospitals in Ireland reported medication non-reconciliation in 50% of in-patient episodes, relating to 16% of prescribed medications (Grimes et al., 2011). A study in the USA found that of the identified medication errors at admission, 85% were due to inaccurate medication histories, with almost half of these being omissions (Gleason et al., 2010). Errors at discharge have been identified in over half (57%) of patients (O' Riordan et al., 2016).

Medication reconciliation has been shown internationally to decrease the frequency of non-intentional changes and reduce unplanned use of healthcare resources, including the rate of and time to hospital re-admission (Jack et al., 2009, Schnipper et al., 2009). The application of a formal intervention involving medication reconciliation with patients from six hospitals in the US resulted in a reduced hospital admissions rate of 30% (Voss et al., 2011).

2.6.2 Role of Health IT in Medication Reconciliation

The use of HIT is now commonly used in the medication reconciliation process (Bassi et al., 2010). A systematic review found that medication reconciliation supported by HIT can reduce the proportion of medications that have discrepancies by 45%, although the number of patients affected or average number of discrepancies are not significantly reduced (Mekonnen et al., 2016).

Although evidence points to potential for technology to support medication reconciliation, it is not the only answer. A study of an established integrated HIT system linked to pharmacy dispensing identified one or more medication discrepancies in 60% of primary care patients. It concluded that existence of electronic records does not guarantee accurate and complete data, and cannot replace engagement and counselling of patients on their medication (Linsky and Simon, 2013).

Furthermore, there have been a number of potential barriers identified that should be considered when designing a HIT system for medication reconciliation. These include insufficient standardisation in data elements relating to medication, lack of access to up to date to shared records across care settings, lack of standardisation of these records when they are available and concern for patient confidentiality and data protection (Urban et al., 2013, Burns et al., 2012, Moore et al., 2011).

2.6.3 Role of Community Pharmacists in Medication Reconciliation

CPs in Ireland have recently indicated their willingness to participate in medication reconciliation processes, with a 2016 study reporting 74% of CPs believing they were best placed handle reconciliation (Redmond et al., 2016). In England, patients who receive a 'Medicines Use Review' from CPs post-discharge have been shown to have reduced re-admissions within 28 days (RPS 2012). The use of a framework for medication management by CPs in the US has been shown to reduce the number of visits to GP and emergency departments, as well as reducing hospital stay and healthcare costs in general (Burns, 2008). Furthermore, community pharmacy systems are used as a source of information about patient medication histories by other healthcare professionals (Karapinar-Çarkıt et al., 2014). For example, CPs may be contacted by hospital doctors or pharmacists to support medication reconciliation at the point of admission (Quélennec et al., 2013).

Burns et al advocate the role of pharmacists, not just in the delivery of medication reconciliation, but in the design of systems that support medication reconciliation. They further recommend pharmacists working cross-functionally to facilitate communication among healthcare professionals and improve TOCs through the use of HIT (Burns et al., 2012).

2.7 Medication Misuse and Abuse

2.7.1 Definition

Although sometimes used interchangeably, there are important distinctions between the terms misuse and abuse in relation to medication. "*Misuse is defined as using a product for a legitimate medical reason but in higher doses or for a longer period than recommended, e.g. taking more of a painkiller than recommended to treat headache. Abuse is the non-medical use of drugs, e.g. to experience a 'high' or lose weight.*" (Wazaify et al., 2006).

2.7.2 Community Pharmacist Role in Medication Misuse and Abuse

As primary custodians of medications in primary care, CPs have an important role to play in identification and support of patients misusing or abusing medication (Wazaify et al., 2006). Suspected medication misuse and abuse is common in practice, with a study published in 2017 that surveyed a range of healthcare professionals including pharmacists, found that two thirds of respondents encountered patients at least weekly whom they suspected of medication misuse or abuse. One in four reported refusing access to medication on this basis at least once a week (Bates et al., 2017). A survey in Northern Ireland identified that almost two thirds of CPs would like to play a greater role in the management of patients suspected of misusing or abusing OTC medication (Hughes et al., 1999). However, lack of accessible information has been cited by pharmacists as a barrier to effectively engaging with patients they suspect of medication misuse and abuse (Hagemeier et al., 2016).

2.8 Emergency Supply Provision in Community Pharmacy

In Ireland, the Medicinal Product (Prescription and Control of Supply) Regulations 2003 (as amended) permit pharmacists, in certain circumstances, to supply prescription only medicines to patients without a prescription (PSI, 2012). Requests for emergency supply by patients is common in community pharmacy, with an English study reporting that two thirds of CPs surveyed receive emergency supply requests daily (Morecroft et al., 2015). It is a valuable service, supporting better medicines adherence (by preventing missed doses) and reducing pressure on out-of-hours and emergency services (Morecroft et al., 2015).

There are a number of criteria that must be satisfied before the medication can be supplied under these circumstances, such as that the treatment has previously been prescribed for the patient and the correct dose of the medication can be confirmed (PSI, 2012). Confirming this information can be problematic. For example, in a survey of CPs in England, 20% had refused an emergency supply request because the correct dose could not be confirmed (O'Neill et al., 2002). Furthermore, there is no 'feedback loop' from pharmacy systems to GPs following provision of an emergency supply and a study

in England found that GPs were surprised and concerned at the frequency of emergency supply requests through pharmacy (Morecroft et al., 2015).

2.9 Health Information Technology Implementation

The next section will discuss implementation of HIT. It will provide context on why it is important for it to be considered, factors shown to be important to success and barriers that have contributed to implementation failures and delays. Finally, it will briefly describe the impact HIT implementation can have on the role of users.

2.9.1 Why consider Health IT implementation

As outlined in section 1.2, although HIT has significant potential to be an enabler in the delivery of healthcare, adoption in practice has been slower than expected and failures are common. An example of a large scale HIT project failure is the patient portal in England called *'HealthSpace'* that was abandoned in 2012 due to poor uptake (Greenhalgh et al., 2013). Even system implementations deemed to be successful are prone to project creep, technical difficulties, and budget overspends (Greenhalgh et al., 2009). Likewise, there have been unintended negative consequences described following HIT implementations that paradoxically have undermined patient safety and reduced quality (Harrison et al., 2007). Large scale HIT implementations require significant investment and organisational change at the point of implementation, and ongoing financial investment and resource allocation to maintain and update them (Blumenthal 2009). Consequently, policy makers are increasingly looking for evidence and lessons learned about HIT implementation and adoption elsewhere to inform the approach and strategies that are important to success (Shekelle et al., 2006).

With healthcare being one of the most complex aspects of modern society (Wears and Berg, 2005), studying HIT implementation has been described as like trying to hit a moving target (Cresswell et al., 2010). Beasley et al highlight that large scale HIT implementation involves transformative sociotechnical change, and it isn't possible to simply add these types of systems to existing workflows (2011). To try and address this, a number of theories have been proposed in the literature to help analyse and understand IT implementations in healthcare (Beasley et al., 2011). One such theory that is frequently used is the 'Actor-Network Theory' (ANT) (Cresswell et al., 2010).

ANT focuses on inanimate objects (e.g. technology) and their effect on social processes. It provides a sophisticated view of the sociotechnical relationship that exists between humans and objects, considering technology not as an external force but rather an inherent part of the system. The elements of these sociotechnical systems are deeply connected and interrelated. The application of ANT in research suggests that successful HIT implementation requires interoperability across the

combined systems (Cresswell et al., 2010, Beasley et al., 2011, Wears and Berg, 2005). Although criticisms exist relating to ANT and its assumption that humans and objects can be treated as equals, it has proven useful to draw on its core concepts when analysing HIT implementation (Greenhalgh et al., 2009).

2.9.2 Factors important for successful Health IT implementation and adoption

By demonstrating an appreciation for the sociotechnical factors at play in HIT implementation, organisations are more likely to deliver successful outcomes. If there is acknowledgement that not just the technical aspects need to be considered, but that existing workflows and practices will be fundamentally impacted, user acceptance will be significantly increased (Boonstra et al., 2014). A comprehensive understanding of these existing workflows, as well as users themselves, is required to achieve successful adoption (Grabenbauer et al., 2011).

A strong correlation has been found between use and benefits of HIT – the more systems are used, the more benefits will be realised (Dobrev et al., 2010). System scope has also been found to be important to successful adoption, with much of the success of SCR in England attributed to the narrow range of data the system contains (Eason and Waterson, 2013).

Unintended consequences of HIT can have a significant impact on HIT implementation (Grabenbauer et al., 2011). Whether these are positive or negative, they need to be tracked throughout implementation and beyond through formal evaluation processes involving users, leaders and IT vendors. This will allow issues to be identified in the early stages and provide opportunities to learn from problems and improve systems. It will also increase the chances of future deployments being successful (Harrison et al., 2007).

2.9.3 Barriers to successful Health IT implementation and adoption

One of the main and unavoidable challenges associated with HIT implementation is that quality and continuity of care must be maintained throughout the process (Boonstra et al., 2014). A comprehensive review of HIT implementations concluded that whatever implementation strategy is employed, running paper and electronic systems in parallel should be avoided where possible as it increases workload and potential for error (Cresswell et al., 2013). The same review emphasised the importance of training to support implementation that is tailored to individual roles, considers user confidence with IT and happens as close to system launch as possible. It recommends that about 40% of total implementation budget should be assigned to training (Cresswell et al., 2013). However it is reported by Nanji et al that the reality often fall shorts of this expectation (2011).

Key themes from the literature in relation to drivers and barriers to successful HIT implementation and adoption are grouped under the headings of organisational, technological and political and presented in Table 2.4.

Table 2.4: Drivers and Barriers to successful HIT implementation and adoption

Heading	Drivers of success	Barriers identified
Organisational	• More focus on progress than profit • Consensus on the approach being taken • Previous experience of successful HIT implementation • Strong organisational culture of trust and collaboration • Appointment of multidisciplinary team to lead implementation, involving management, clinical and IT • Assurances in relation to confidentiality and privacy • Robust and comprehensive training that is tailored to individual roles and is 'hands-on' with the system • Availability of on-going technical support • Clear strategy for implementation, with ongoing review and contingencies built in • Identification of champions or super-users among clinical staff to encourage adoption and provide reassurance • Having realistic timescales for delivery • Making available sufficient budget and resource	• Fear of increased litigation • Perceived negative impact on workflow • Poor understanding of intended benefits and reasons for implementation among users • Resistance to change • Concerns about data privacy • Absence of dedicated team to lead implementation and inadequate planning • Failure to look for user feedback and evaluate progress • Failure to learn from lessons elsewhere • Wide and varied number of users with high levels of expertise and autonomy • High implementation workload • Poor data quality
Technological	• Careful selection of the right vendor with sufficient experience and ability to implement bespoke requirements • Sufficient hardware available • Speed and reliability of system and network • User friendly, logically structured system with information easily accessible • Mapping of existing process flows prior to implementation to identify potential areas for improvement that can be supported by HIT	• Poor user confidence with IT use • Insufficient hardware/equipment available • Slow network speeds • Lack of available 'off the shelf' products/systems to meet requirements • Underestimating complexity of healthcare systems and medical data • Poor system reliability/frequent off-lines • Lack of system interoperability • Failure to maintain systems
Political	• Climate and incentives in place that make HIT implementation a national priority • Investments in projects with a long-term view on benefits delivery • Understanding that focus must primarily be on improved quality of care and not financial return • Creation of regulatory and legal framework to enable progress • Incorporation of existing eHealth systems and infrastructure into national networks • Realisation that no one strategy is correct and every health system needs bespoke solution • Learning from lessons elsewhere on factors important to success • Focus on interoperability, both of systems and of people	• Securing sufficient investment for both the system and supporting resource • Time taken to demonstrate return on investment in conflict with political priorities

(Boonstra et al., 2014, Castillo et al., 2010, Cresswell et al., 2010, Greenhalgh et al., 2010a, Littlejohns et al., 2003, Shekelle et al., 2006, Wears and Berg, 2005, Ludwick and Doucette, 2009).

2.9.4 Negative Impact of Health IT on Users

HIT systems have been shown to have potentially negative effects on users such as cognitive overload and new cognitive demands due to multiple clicks and screen navigations (Beasley et al., 2011, Garrido et al., 2005). This has been shown to be compounded when the information is poorly organised and difficult to interpret (Koopman et al., 2011). It is therefore important to consider cognitive impact when developing systems and to apply usability engineering principles when designing the user interface of HIT systems (Beasley et al., 2011).

Likewise, HIT may result in workflow and role changes as responsibilities for tasks shift to different users, causing changes to traditional means of interpersonal communication (Beasley et al., 2011). For example, although it has been shown to reduce error-rate and duplication (Fortescue et al., 2003), 'Computerised Physician Order Entry' (CPOE) replaces face-to-face communication and as a result, there is no guarantee that the message will be picked up, potentially causing delays in treatment (Beasley et al., 2011). As a result, the role of education and training for users is important to be addressed, not just on the technical aspects of new systems, but on the communication and teamwork skills required (National Transitions of Care Coalition, 2008).

2.9.5 Positive Impact of Health IT on Users

It has been shown that shared EPRs improve accuracy and speed of access to information (Dobrev et al., 2010). A review in 2006 found that the transition to digital patient charts has an impact on productivity of users. Although initially the time taken to complete tasks increases, as users become familiar with systems, the time taken to complete tasks reduces. There is a correlation between the initial increase and users' baseline computer skills (Shekelle et al., 2006). A systematic literature review of HIT systems concluded that evidence in relation to efficiencies of work practices was ambivalent, with research demonstrating both increases and decreases in inefficiencies, depending on the situation (Boonstra et al., 2014).

The use of Clinical Decision Support (CDS) embedded within HIT systems, when supported with appropriate training and communication, have been shown to improve compliance and reduce costs. However such benefits are dependent on the quality of the implementation and the design and sophistication of the technology (Wears and Berg, 2005, Shekelle et al., 2006).

2.10 Conclusion and Development of a Conceptual Framework

In reviewing the literature on HIT systems, it became apparent that there are common themes that should be considered in their development. These were distilled into a conceptual framework that will

be used to structure the findings and help answer the research question (Fig 2.1). It is proposed that this framework may be helpful if applied to HIT system development in general.

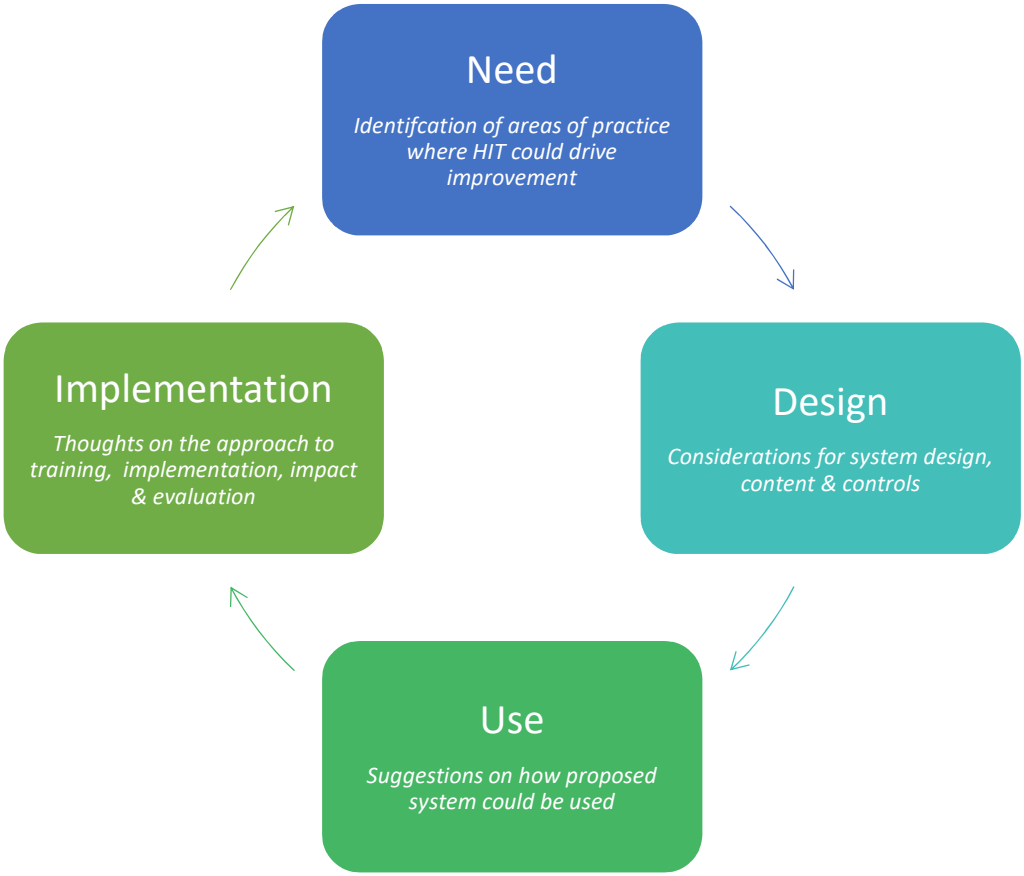


Figure 2.1: Conceptual framework for considering health IT system development

It is also proposed that this framework may be viewed as an iterative model, and used post-implementation to evaluate success. In this context, the questions could be amended to:

- **Need:** Are the identified need(s) being met?
- **Design:** Are users satisfied with the system design and content, and are controls appropriate?
- **Use:** How is it being used? Is this as expected, or are unexpected uses for the system being found?
- **Implementation:** Was the implementation successful and what has the impact been on users and patients?

The research question expanded under this framework is presented in Figure 2.2. The framework will be used to structure presentation of the findings from the primary research (Chapter 5) and then both these findings and the findings from the literature will be discussed under the framework to answer the research question (Chapter 6).

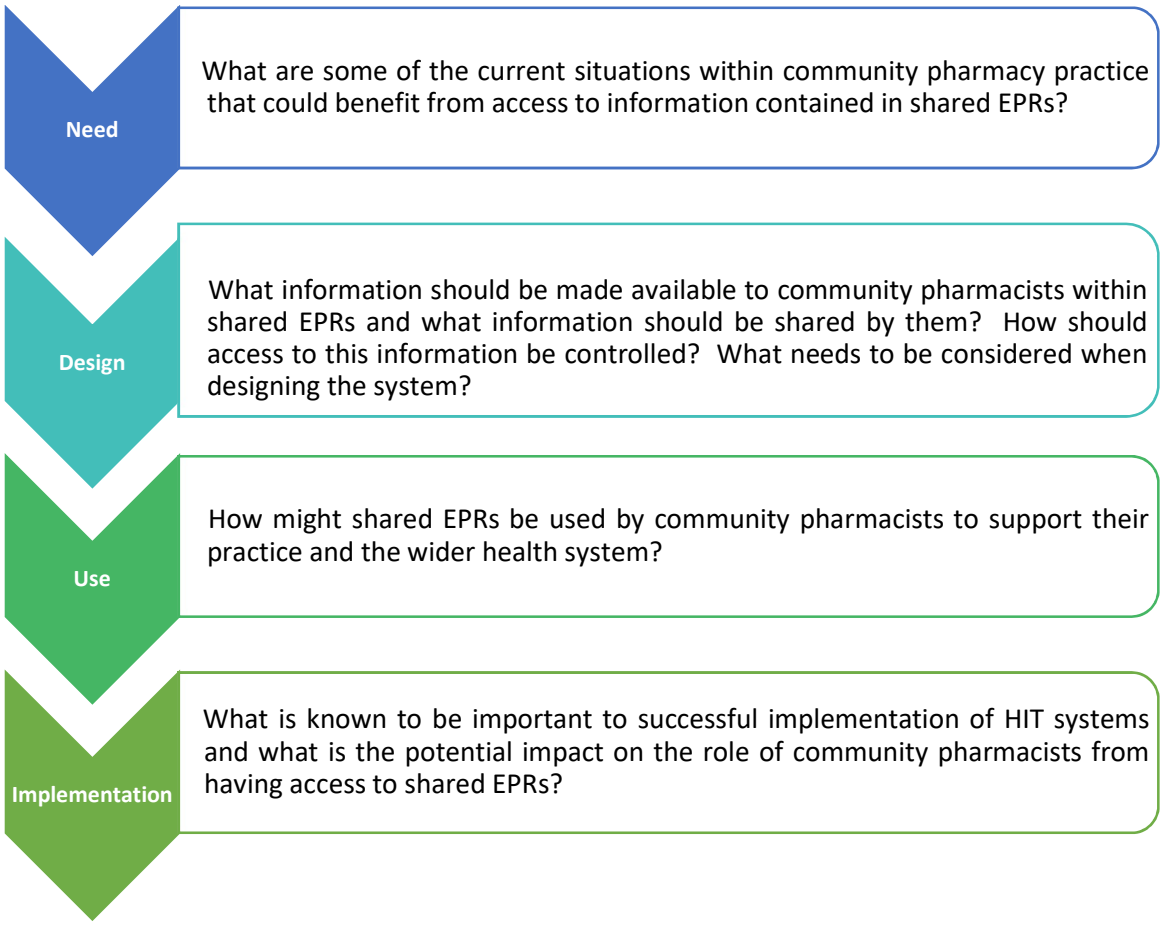


Figure 2.2: Application of the conceptual framework to the research question

Chapter 3 – Description of Summary Care Record in England and eHealth in Ireland

3.1 Introduction

As highlighted in Chapter 2, England is one of the countries where CPs have been provided with access to shared EPRs in the form of SCR and it is a setting for one of the questionnaires. Therefore, in this chapter, an introduction to pharmacy and healthcare in England is presented, followed by an overview of the SCR system. Then a description and findings of the proof of concept pilot carried out in preparation for CP access to SCRs will be presented and SCR access for community pharmacy in England will be described. Finally, an overview of healthcare and community pharmacy in Ireland is provided (the setting for the second questionnaire), along with an overview of eHealth in this country.

3.2 Healthcare and Community Pharmacy in England

Through the National Health Service (NHS), healthcare in England is free at the point of care for all residents (with the exception of some charges such as prescriptions and dental services) (NHS 2016). There over 38,000 pharmacists and 11,688 community pharmacies in England (2.24 per 10,000 population) (Martini, 2014, NHS, 2015). Pharmacists, pharmacy technicians and pharmacies are regulated by the General Pharmaceutical Council (GPhC). All pharmacies offer core, traditional services such as dispensing and counselling, with many also offering enhanced, nationally funded services such as 'Medicines Use Reviews' and 'New Medicines Service'. There are also a range of other enhanced services available through community pharmacies that may be locally commissioned depending on location (such as 'Minor Ailment Service' and stop-smoking services) (NHS, 2015).

NHS England has a national Electronic Prescription Service (EPS). As of May 2017, 90% of GPs and 99% of pharmacies were participating in the service and approximately half of all prescriptions issued are now electronic (NHS Digital, 2017b). As mentioned in Chapter 3, community pharmacy has also been provided with access to SCR.

3.3 Summary Care Record – an Overview

Following the establishment of the National Programme for Information Technology in England in 2005, a plan for a nationally shared EPR, subsequently called Summary Care Record (SCR), was developed. It was assigned a set-up budget of £200m (Greenhalgh et al., 2013) and was aligned to the NHS target for paperless communication between primary and secondary care by 2015 and a paperless NHS by 2018 (RCP, 2013). SCR is an electronic record of pertinent information about patients

(Greenhalgh et al., 2010b). Introduction of SCR began in 2007 in two early-adopter sites, with national roll-out commencing in 2008. This was locally led with extensive input from *Connecting for Health*, the constituent of the Department of Health responsible for informatics (Greenhalgh et al., 2010b, Greenhalgh et al., 2013). National implementation managers and clinical leads were tasked with leading the implementation and to encourage use.

Information in SCRs is populated from the electronic record held by patients' GPs and uploaded to the national repository for health information called the 'Spine'. At a minimum, SCRs consist of the following (Goundrey-Smith, 2013, NHS, 2017):

- Patient demographics (including name, address, date of birth and NHS number)
- Current repeat prescriptions
- Acute prescriptions from last 6 months
- Discontinued repeat prescriptions in last 6 months
- Allergies
- Previous adverse drug reactions

Additional information can also be added if considered appropriate and in agreement with the patient. This may include details of long-term conditions, relevant medical history, end-of-life care preferences and specific communication requirements (Greenhalgh et al., 2010b, NHS, 2017). Information is updated in real-time (CQC, 2016). However, this is dependent on the GP being logged onto the system with a working smart card at the point-in-time that the patient's record is updated (Greenhalgh et al., 2013).

SCRs are automatically created for all patients unless they choose to opt out. Children under the age of 16 require a parent or guardian to opt out on their behalf. Initially all patients were sent a letter which informed them that an SCR had been created for them and advised on how they could opt out. This was supported by a media awareness campaign and talks to various third-party stakeholder groups (Greenhalgh et al., 2013). Despite these actions, subsequent qualitative research found that public awareness of SCR was low (Greenhalgh et al., 2008).

In 2008, the model in relation to SCR creation changed to require any new patients to agree to an SCR being created for them within the GP surgery at the point-of-care. This change resulted in support for SCRs increasing from a number of professional bodies (Greenhalgh et al., 2010b). Over 55 million citizens now have an accessible SCR, equivalent to 96% of the population (Andalo and Sukkar, 2015). Adoption across GPs has been positive, with 98% of GP practices now using the system (NHS, 2017).

Viewing of SCRs is possible either directly through clinical systems or through a dedicated Summary Care Record application (SCRa) web portal on a computer logged in to the secure NHS network. Users accessing the SCRa portal must have a smart card unique to them that has the appropriate Role Based Access Control codes applied. Each access is recorded and auditable. Every organisation must have at least one assigned SCR Governance Person (SCRGP) (previously called a privacy offer) who are required to monitor access to SCR within their organisation. This user can generate audits and reports. In addition, patients may ask to see who has accessed their SCR through a Subject Access Request (NHS, 2017). Frequency of SCR access as of 2016 was approximately 80,000 per week, equivalent to over 4.3 million SCRs accessed per year (CQC, 2016).

3.3.1 Identifying the Need for Community Pharmacist Access to Summary Care Record

In April 2014, the Health and Social Care Information Centre (HSCIC) were commissioned by NHS England to carry out a Proof of Concept (POC) project that enabled CPs to access the SCR. One hundred and forty pharmacies from five geographical areas were included in the project. A total of 1900 SCRs were accessed over the six-month duration of the pilot, an average of 13 per pharmacy. However, there was a wide variance within the POC sites with regards to frequency of access. The most common reason for access (29%) was to support a request for an emergency supply of medication. There were no governance incidents reported.

An audit and a pharmacist questionnaire were both completed to assess the benefit of SCR access in community pharmacy following the POC project. The audit analysed 23.5% of all instances where SCR was accessed. The key findings from these are outlined in Table 3.1 (HSCIC, 2015).

Table 3.1: Audit results from community pharmacist access to SCR proof of concept pilot

Area being measured	Findings from audit and questionnaire
Effectiveness	**Audit** • 92% of SCR accesses prevented a patient needing to be sign-posted to another NHS care setting. 56% of these referrals would have been to the patient's GP **Questionnaire** • 90% of pharmacists agreed that using SCR had allowed them to resolve a patient issue without signposting them to other services
Efficiency	**Questionnaire** • 85% of pharmacists believed that SCR access reduces the need to contact GPs to gather clinical information about patients • 92% believe that SCR allows patients to be treated more effectively when GP practices are closed
Safety	**Audit** • 18% of SCR accesses resulted in a prescribing error being identified. • In 87% of cases, accessing SCR provided information that would otherwise have been unknown to the user **Questionnaire** • 85% of pharmacists believed SCR access had improved patient safety and 73% believed it helped them avoid medication related errors.
Patient experience	**Audit** • Patient waiting time was reduced by being able to access information on their SCR in 82% of cases • Having SCR access enabled pharmacists to meet patient needs in 96% of reported encounters **Questionnaire** • 92% of pharmacists believed SCR access improved the service they provide to patients

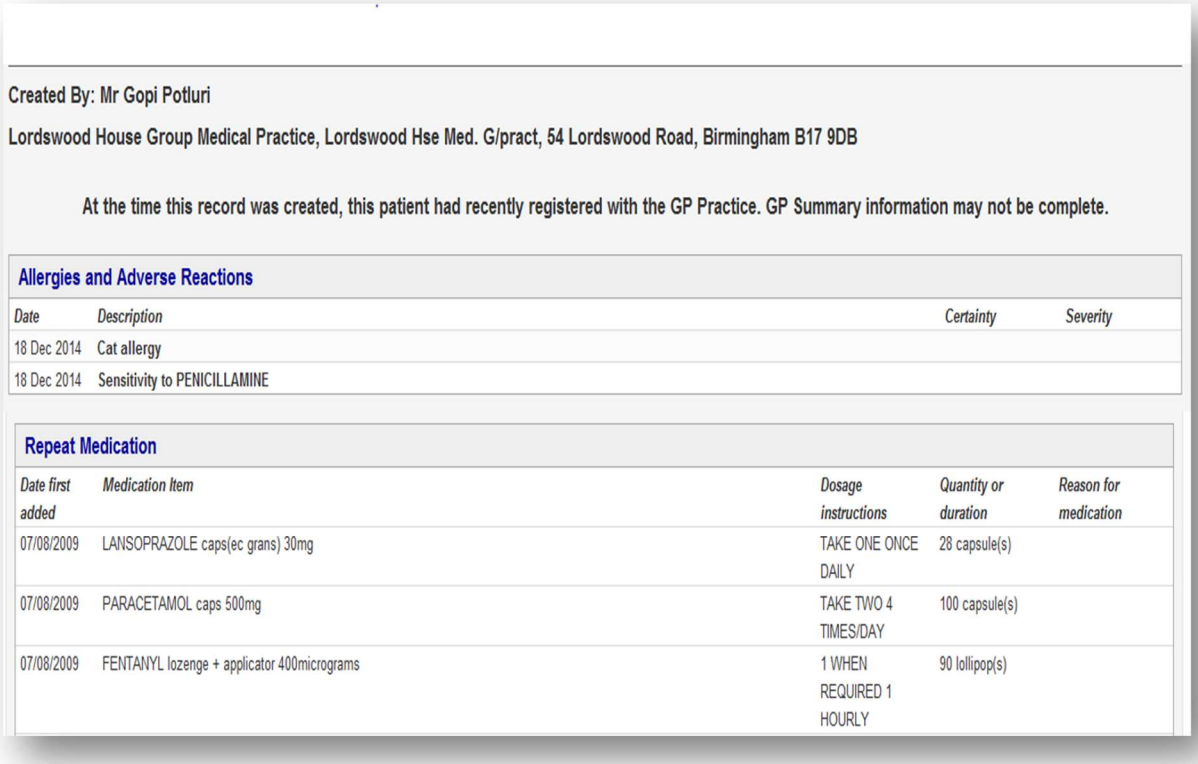
Reported barriers to access from the POC project included:

- No valid reason to access as relationship and communication with local GP practices deemed to negate the need
- Users losing confidence in the system due to technical issues that took time to resolve
- Usability of the system, in particular lack of integration with existing pharmacy software
- Belief that SCR is intended only to support emergency or out-of-hours care (HSCIC, 2015).

The HSCIC concluded that there was considerable demand for SCR access within the community pharmacy sector and that providing access had genuine potential to ease pressure on other parts of the healthcare system (HSCIC, 2015). Consultation and engagement with professional and patient organisations formed part of the POC project. Endorsements for the project were provided by the Royal Pharmaceutical Society (RPS) as well as by patient groups such as Diabetes UK, Asthma UK, Patients Association and National Voices (HSCIC, 2015).

3.3.2 Design of the Summary Care Record

SCR sits on a dedicated web portal to which the user must navigate. This requires the user to leave their primary pharmacy software program. Sample screenshots of the user interface are provided as Figure 3.1 which show information available to the user when they access a patient's SCR.



Created By: Mr Gopi Potluri

Lordswood House Group Medical Practice, Lordswood Hse Med. G/pract, 54 Lordswood Road, Birmingham B17 9DB

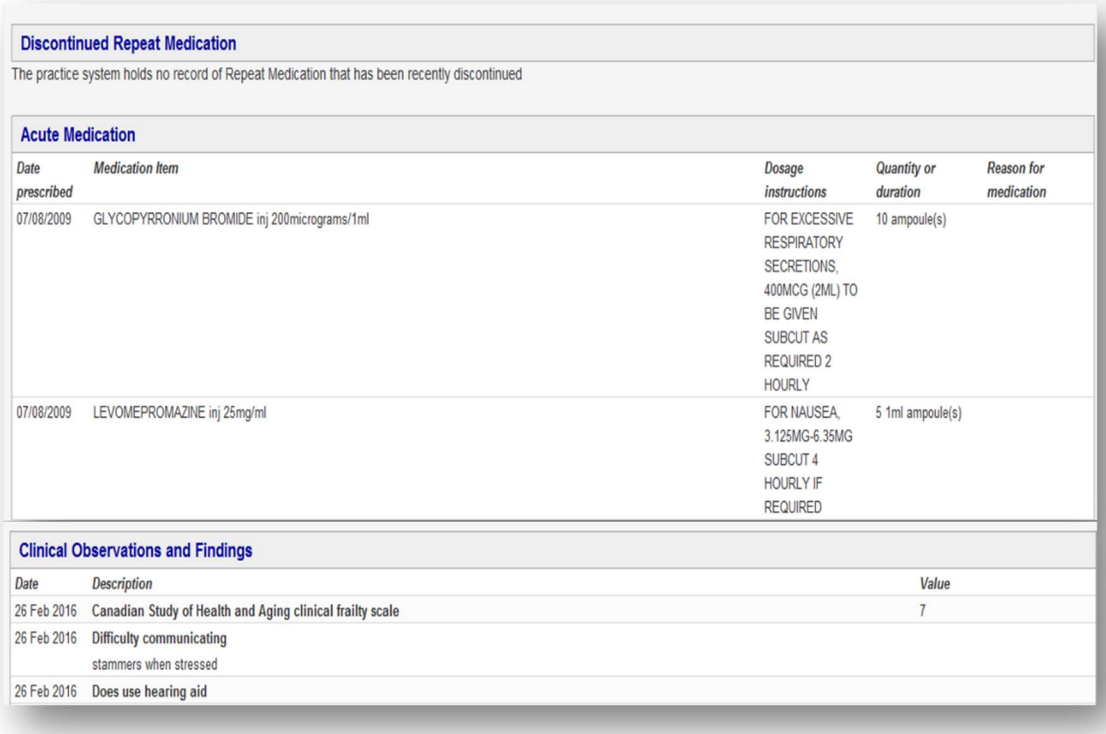
At the time this record was created, this patient had recently registered with the GP Practice. GP Summary information may not be complete.

Allergies and Adverse Reactions

Date	*Description*	*Certainty*	*Severity*
18 Dec 2014	Cat allergy		
18 Dec 2014	Sensitivity to PENICILLAMINE		

Repeat Medication

Date first added	*Medication Item*	*Dosage instructions*	*Quantity or duration*	*Reason for medication*
07/08/2009	LANSOPRAZOLE caps(ec grans) 30mg	TAKE ONE ONCE DAILY	28 capsule(s)	
07/08/2009	PARACETAMOL caps 500mg	TAKE TWO 4 TIMES/DAY	100 capsule(s)	
07/08/2009	FENTANYL lozenge + applicator 400micrograms	1 WHEN REQUIRED 1 HOURLY	90 lollipop(s)	



Discontinued Repeat Medication

The practice system holds no record of Repeat Medication that has been recently discontinued

Acute Medication

Date prescribed	Medication Item	Dosage instructions	Quantity or duration	Reason for medication
07/08/2009	GLYCOPYRRONIUM BROMIDE inj 200micrograms/1ml	FOR EXCESSIVE RESPIRATORY SECRETIONS, 400MCG (2ML) TO BE GIVEN SUBCUT AS REQUIRED 2 HOURLY	10 ampoule(s)	
07/08/2009	LEVOMEPROMAZINE inj 25mg/ml	FOR NAUSEA, 3.125MG-6.35MG SUBCUT 4 HOURLY IF REQUIRED	5 1ml ampoule(s)	

Clinical Observations and Findings

Date	Description	Value
26 Feb 2016	Canadian Study of Health and Aging clinical frailty scale	7
26 Feb 2016	Difficulty communicating stammers when stressed	
26 Feb 2016	Does use hearing aid	

Figure 3.1: Screenshots of test patient Summary Care Record

Pharmacists currently have read-only access to SCRs, with write-access only available to GPs. There have been calls from pharmacist representative organisations including the Royal Pharmaceutical Society for write-access to be extended to pharmacists (Andalo and Sukkar, 2015). This would mean details about interactions within pharmacies can be captured within the record and viewed by other stakeholders involved in a patient's care. The All-Party Pharmacy Group (APPG) has stated in a report published in February 2017 that providing pharmacists with write-access is the "*next logical step*" and doing so would "*improve patient care by enabling pharmacists to play an even greater role in the provision of care and also allow other healthcare professionals to be aware of interventions made by pharmacists*" (APPG, 2017).

3.3.3 Access Security

Access to SCR must only take place when there is a clinically valid reason to do so – this is described as a 'Legitimate Relationship' (LR) (HSCIC, 2015). Patient consent must be obtained within the pharmacy (known as Permission to View or PTV) and each organisation must have clear, documented processes set out for how this consent is captured (NHS, 2017). Consent can be verbal or written, and can be required to be captured just once or on each occasion access is required. There is also the facility to access the record without obtaining consent in what are termed 'emergency situations' (NHS, 2017).

There are clearly defined requirements that need to be in place before SCRs can be accessed within community pharmacies. These are outlined in Table 3.2.

Table 3.2: Requirements for SCR access in community pharmacy (NHS, 2017)

Role	Requirements
Pharmacist or pharmacy technician	1. Have a functioning smartcard (which is also used to control access to the Electronic Prescription Service (EPS)) 2. Complete online training and obtain a certificate of completion 3. Be aware and follow the organisation's PTV process 4. Request that access to SCR is added as a role to their smartcard through completion of an online form 5. Locum pharmacists must also enter the unique identifying code of the pharmacy in which they are working each time they access SCR
SCR governance person (SCRGP)	1. Have a functioning smartcard 2. Complete online SCRGP training through the NHS Digital website 3. Request that SCRGP role is added to their smartcard
Pharmacy requirements	1. Appoint at least one SCRGP 2. Implement Standard Operating Procedures covering SCR use and monitoring by SCRGP 3. Complete online 'Acceptable Use Agreement' 4. Ensure that the NHS 'Health and Social Care Information Centre Identity Agent' that is required to access to any national and local services has been installed on all pharmacy computer systems 5. Complete the NHS Information Governance (IG) toolkit within the last financial year (available at https://www.igt.hscic.gov.uk/) 6. Check that SCR functions correctly on pharmacy systems by: a. Testing access to SCR via the NHS spine portal, using a test NHS patient number b. Checking technical requirements (as per NHS standard system settings) c. Troubleshooting technical requirements 7. Routine monitoring of SCR completed by SCRGP

3.3.3.1 Monitoring Access

There must be at least one SCRGP in each organisation, and NHS Digital recommend a minimum of two people are appointed (NHS, 2017). They must carry out access monitoring using a central system called the 'Alert Viewer' (HSCIC, 2015). Alerts are generated each time a patient's SCR is accessed and prompts the SCRGP to confirm access was justified or identify potential inappropriate access. The frequency of this monitoring is not defined and must be decided upon by each organisation, although suggested guidance has been produced that suggest 5-10% of alerts are checked on a monthly basis (Pharmacy Voice 2016). Likewise, no set guidance has been issued to date regarding types of alerts

that should be investigated, but there is a requirement to review patterns of access to identify potential anomalies. Such anomalies could include higher than average levels of access by particular users or repeated access to the same patient's SCR (Pharmacy Voice 2016). Resource for this role needs to be considered in the implementation planning for SCR. In the POC project described earlier, this was estimated to require at least one hour per month per pharmacy (HSCIC, 2015).

3.3.3.2 Determining Legitimate Relationship Status

As previously mentioned in section Users are required to have a 'Legitimate Relationship' with a patient before they can access their SCR. The Royal Pharmaceutical Society has developed a decision support tool to help pharmacists establish if a LR and genuine clinical need exists before accessing an SCR. This is available on their website (https://www.rpharms.com/resources/ultimate-guides-and-hubs/electronic-health-records-ehr).

The question of liability and SCRs is important, and needs to be addressed. Professional indemnity insurance for pharmacists now covers SCR access (PSNC, 2017b) but the liability associated with access or non-access of information in a patient's SCR has yet to be fully defined, and is likely to happen over time through official guidelines that in turn may be refined by case law following a dispute (Andalo and Sukkar, 2015). Take for example the scenario where a patient who is allergic to penicillin presents with a prescription to a pharmacy for the first time. What is the pharmacist's liability if they don't check the SCR where information about this allergy is available and the patient subsequently experiences an allergic reaction? It is prudent that details of any interventions involving SCR access, including how the information was used, are recorded on the patient's record locally (Andalo and Sukkar, 2015). This will have a follow-on impact on workload and considerations should be given as to how pharmacy software systems can be developed not just to make SCR access interoperable, but also to how they will facilitate recording of interventions in a seamless and intuitive manner that is easily incorporated into workflow (Ludwick and Doucette, 2009).

3.4 Implementation of Summary Care Record in Community Pharmacy

The POC project reported an average time period of four months to implement SCR within participating pharmacies. Training for users took the form of both individual and group sessions, and there was no significant difference between either method in terms of a user's ability to access SCR. However, both had their merits – group sessions provided opportunity for networking and demonstration of clinical leadership, while individual training enabled greater level of reassurance that the user understood how to use the system and allowed issues to be resolved quickly. All parties involved agreed that materials to support training and implementation were critical enablers. In addition, availability of on-the-

ground resource to lead the implementation had a significant impact on successful outcomes, as did strong project leadership and ability to shared best practice (HSCIC, 2015).

3.4.1 Use of Summary Care Record and the Quality Payments Scheme

Roll-out following the POC project has been progressing with pace – in December 2016, 50% of pharmacies had been provided with access (Pharmaceutical Journal 2017) and by April 2017, 93% of pharmacies had access to SCR, with the required training completed by more than 24,000 pharmacy professionals (NHS Digital, 2017b). Both CPs and pharmacy technicians can be authorised to access SCRs (RPS, 2016).

To encourage adoption of SCR by community pharmacy, in March 2016 pharmacies were paid a once off allowance of £200 when SCR was accessed for the first time within the pharmacy. Subsequently, the *'Community Pharmacy Quality Payments Scheme'* was introduced in December 2016 as part of contractual changes to pharmacy in the NHS that aimed to develop a community pharmacy service more clinically focussed and better integrated with primary care. This sets out a number of criteria for CPs to meet in order to avail of payments under headings of 'clinical effectiveness', 'patient safety' and 'patient experience' (PCC NHS England, 2017). One of the areas for which these payments can be claimed is access to SCR. At two points per year, pharmacies who have shown a total increase in access to SCRs over a set time period are eligible to claim for Quality Payments up to £1280 per annum (PSNC, 2017a). According to NHS guidance, the aim of the Quality Payments linked to SCR is "*to encourage pharmacies to access information about the patient to support clinical decision making*" (PCC NHS England, 2017). Data up to April 2017 show that of the 11,069 pharmacies with SCR access, 92% had increased usage on the previous period and therefore qualified for the Quality Payment. The system was accessed an average of 11.8 times per pharmacy in the six months to April 2017, compared with 7.9 for the previous six months (excluding those who did not access at all). The total number of times the system was accessed within community pharmacy more than doubled (40,786 to 88,560) in the same period (NHS Digital, 2017a).

There is precedent for incentivising HIT adoption in the United States, where use of shared EPRs has increased significantly over the last ten years (Veronin, 2015). This was accelerated following the introduction of the 'Affordable Care Act' and the 'Health Information Technology for Economic and Clinical Health' (HITECH) Act, resulting in HIT such as shared EPRs becoming a national priority in the USA (Blumenthal 2009). There are now up to $29 billion in federal incentives for 'meaningful use' of shared EPRs. 'Meaningful use' refers to the use of HIT (such as shared EPRs) not only for gathering and storing information, but also for tracking and improving specific outcomes (Kern et al., 2013, Mamlin and Tierney, 2016). This has driven significant progress, with a survey carried out in the US in 2014

showed that 83% of the 18,575 physicians surveyed currently use a shared EPR system, compared with 74% in 2012 (Kane and Chesanow, 2016).

3.4.2 Impact on Pharmacy

Access to SCR for CPs in England has been broadly well received by representative organisations and is viewed as a progressive step in enabling CPs to contribute to better quality of care and improved outcomes for patients (RPS, 2016, PSNC, 2017b, Andalo and Sukkar, 2015).

As it is still a developing area for the profession, and there is limited international experience, the impact of liability for accessing or not accessing available information is still relatively unchartered territory (Andalo and Sukkar, 2015). However, indemnity insurers in England have confirmed that SCR access is provided for in professional indemnity policies (assuming all relevant guidelines and SOPs are adhered to), and they recognise the potential benefits they bring to play on practice and delivery of care (PSNC, 2017b).

3.5 Healthcare and Community Pharmacy in Ireland

The health system in the Republic of Ireland is a mixed public/private model. Policy is set by the Department of Health and delivery and management is the responsibility of the Health Service Executive (HSE). Every resident in Ireland can access care through the public system, with 46% of the population also availing of private health insurance. Thirty-eight percent of the population hold a medical card which entitles them to free healthcare services, although a dispensing levy applies to prescription medicines (PSI, 2016).

Ireland has 5,636 registered pharmacists (90% of whom are CPs) and more than 1,800 community pharmacies (PSI, 2016). The pharmacy market was deregulated in 2002 and there is a relatively high number of pharmacies per capita in Ireland at 4.05 per 10,000 (PSI, 2016). Community pharmacies in Ireland are regulated by the Pharmaceutical Society of Ireland (PSI) and are contracted by the HSE to dispense medication under a variety of state schemes. They are typically private contractors and also dispense medication to patients who are not entitled to subsidisation (Redmond et al., 2016). A number of additional health services such as vaccinations and emergency hormonal contraception can also be provided in community pharmacies. CPs have recently been provided with access to 'Healthmail', a secure clinical email service (Healthmail, 2017). A national electronic prescribing solution is not yet in place across primary care in Ireland.

3.6 An Overview of eHealth in Ireland

Almost one third of the total health budget in Ireland has been estimated to be spent on handling, collecting, looking for and storing information (HIQA 2013). An effective, safe health system is reliant on information being accessible in a timely manner. This information must in turn be accurate, relevant, consistent, understandable and complete (HIQA, 2013). HIT is a key enabler of making this information available when and where it is needed. However, Ireland's national healthcare spend on HIT is 0.85% of the total health budget, compared to the EU average of 2-3% (DoH, 2015). This has resulted in an infrastructure that is highly fragmented and siloed. For the reasons mentioned in Chapter 1 in relation to increasing healthcare costs and spiralling demand, there was an imperative to act and develop a cohesive and integrated strategy for eHealth in Ireland, based on standards and international best practice (HIQA, 2013). In recognition of this, the Department of Health published the eHealth Strategy for Ireland in 2015 and established eHealth Ireland (DoH, 2015).

3.6.1 eHealth Ireland

eHealth Ireland is the arm of the HSE responsible for the coordination of eHealth within the Irish health system. Its mission statement is "*to ensure that eHealth is properly implemented in Ireland as a National Infrastructural Investment and that the benefits to the Irish people and the state are maximised*" (DoH, 2015). The Chief Executive Officer (CEO) of eHealth Ireland is also the Chief Information Office (CIO) for the HSE. Since its inception, eHealth Ireland has published a number of key documents and set out plans for a range of strategic programmes that are in various stages of development and roll-out (eHealth Ireland, 2015b, eHealth Ireland, 2015a, eHealth Ireland, 2016b).

3.6.2 eHealth Ireland's Plans for a National Electronic Health Record

A national Electronic Health Record (EHR) has been identified by HSE National Directors and clinical leaders as a key capability requirement for the future delivery of healthcare. It is described by eHealth Ireland as "*a fundamental cornerstone for the delivery of high quality, comprehensive and accurate information in a timely manner for the provision of patient centred, effective and efficient care*" (eHealth Ireland, 2017b). The Office of the Chief Information Officer (OOCIO) has been leading preparatory work to identify the overall direction for a national EHR. This has included extensive engagement with eHealth industry vendors and other stakeholders. In addition, an assessment of the current system landscape in the HSE has been undertaken (eHealth Ireland, 2015a).

It is envisaged that the national approach to EHR will deliver operational systems within Hospital Groups and Community Healthcare Organisations, as well as supporting broader health and wellbeing

objectives. The EHR proposed for Ireland will contain four components which are represented in Figure 3.2 (eHealth Ireland, 2017b). These are:

1. The National Shared Record
2. Acute operational systems
3. Community operational systems
4. Integration across these components that also allows access and contribution by other healthcare providers such as GPs, community pharmacy and private hospitals.

As one of the core components of an EHR for Ireland, it is proposed that the shared EPR (the National Shared Record) will contain key patient data from a range of operational solutions, and support clinical collaboration between organisations and care settings (eHealth Ireland, 2015a).

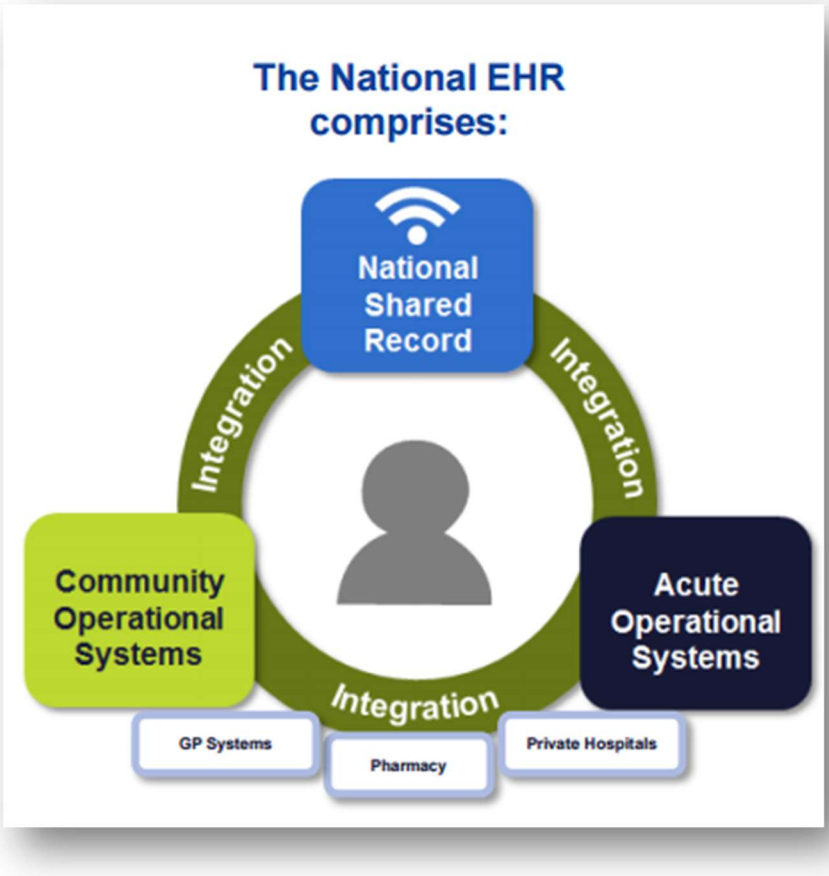


Figure 3.2: Proposed national EHR for Ireland (eHealth Ireland, 2016a)

3.6.3 The National Shared Record – Progress to Date

The development of the National Shared Record is the remit of the Shared Record Programme within eHealth Ireland. Vendor engagement sessions were carried out in September 2016 to analyse market capability. The programme for the National Shared Record is being defined, with top level definition of functional requirements already developed through engagement with clinical and ICT stakeholders (eHealth Ireland, 2016c). These include:

- Patient data collaboration and coordination
- Workflow
- Patient information
- Audit and access
- Consent

A key enabler of the EHR, and in turn, the National Shared Record, will be the Individual Health Identifier (IHI). This is a number that uniquely identifies each person who has used or may use a health or social care service in Ireland. It will be used to safely identify patients and enable the linking of their health records from different health systems to give a complete medical history. A commencement order was signed on 30 May 2017 to make the IHI operational (eHealth Ireland, 2017d).

3.6.4 Pharmacy in Ireland and eHealth

The Pharmaceutical Society of Ireland's (PSI) *Future Pharmacy Practice in Ireland* document recommends that pharmacy should be incorporated in the development of national IT systems. Similarly, it highlights that any future development of pharmacy IT systems should consider integration within the wider health system (PSI, 2016).

The PSI also supports the development of a National Shared Record, highlighting advancements in technology as a key enabler of future pharmacy practice, facilitating shared patient care and information. They suggest that to fully implement and support medicines management throughout the patient pathway, shared EPRs need to be accessible to all healthcare providers, suggesting that this would help to resolve current communication failings at TOCs (PSI, 2016).

As mentioned in section 3.5, in April 2017, CPs in Ireland were provided with access to 'Healthmail'. 'Healthmail' is a secure clinical email service provided by 'Three', funded by the HSE and governed by eHealth Ireland. It allows clinical information about patients to be shared between different care settings, albeit in an unstructured format (Healthmail, 2017). Initially access was provided to GPs to allow sharing of information between primary and secondary care. This is being extended to additional healthcare providers, starting with CPs (eHealth Ireland, 2017a).

When considering technical readiness of community pharmacy for shared EPR access, it is important to note that there is no standardisation or certification of pharmacy IT systems in Ireland, whereas 95% of GP practices are using a system certified by the national General Practice Information Technology (GPIT) group (eHealth Ireland, 2017c, ICGP 2016).

3.7 Conclusion

While Ireland lags behind other countries with regards to investment and progress in eHealth, this provides benefits in terms of being able to apply learnings from initiatives elsewhere as systems are developed (eHealth Ireland, 2016a). With delivery of a National Shared Record for every citizen being a key deliverable of eHealth Ireland, understanding insights and best practice from the development and implementation of SCRs in England may be valuable in informing future progress in this area.

Chapter 4 - Research Design and Methodology

4.1 Introduction

This chapter outlines the methodological approach adopted to answer the research question. It first provides rationale for selecting the research question. Next, it provides an overview of the reasons for choosing questionnaires as the primary research tool and describes the development, piloting and dissemination of the questionnaires. It proceeds to describe how the responses from the questionnaires were analysed and the approach to data management and quality and finishes with a conclusion.

4.2 Rationale for the Research and Chosen Research Methods

As outlined in Chapters 2 and 3, CP access to shared EPRs is emerging internationally. However, progress is this area is in its infancy and published evidence on the need, design, use and implementation of shared EPRs for CPs is limited. This, in addition to plans for CPs to be provided with access to the National Shared Record for Ireland, provides support for research to be carried out in this area.

Self-administered online questionnaires were the primary research methods chosen for this dissertation. Research by questionnaires provides "*a quantitative or numeric description of trends, attitudes or opinions of a population by studying a sample of that population*" (Creswell, 2014). Although questionnaires being carried out using the Internet is a comparatively new research method, the associated dynamics and challenges are comparable with the extensively studied mail surveys (Fowler, 2014). Online questionnaires have the advantage of being low-cost and can facilitate quick responses. They also allow for dissemination to a wide audience, although are limited to internet/email users (Fowler, 2014).

4.3 Setting and Study Population

The primary research took place in the community pharmacy setting in England and Ireland. Two questionnaires were developed, one for CPs in England and the other for CPs in Ireland. All CPs registered and practising in Ireland were eligible to complete the Ireland questionnaire. All CPs registered and practising in England and who had completed the requisite training for SCR access were eligible to complete the England questionnaire (regardless of whether they had used the system).

4.4 Development of the Questionnaires

The questionnaires were designed using the online survey tool Qualtrics™. Questionnaire design principles outlined in the TCD School of Computer Science and Statistics research ethics application were followed, as well as relevant aspects of the *'Checklist for Report Results of Internet E-Surveys'* ('CHERRIES') (Eysenbach, 2004). The usability and flow of the questionnaire were tested before dissemination using the test functionality in Qualtrics™.

A participation information sheet was provided as an introduction to both questionnaires which provided a brief background to the research and intended purpose of the questionnaire. Informed consent was required for the respondent to access the questionnaire and was obtained via a consent declaration. If the respondent did not consent, they were automatically exited from the questionnaire and no data were collected. Participants were advised that the questionnaire was anonymous and personal data, including Internet Protocol (IP) addresses, would not be collected. They were also advised that all questions were optional.

In an effort to keep the questionnaire as concise and relevant as possible to the respondent and their experience, adaptive questioning through the use of skip and display functionality was employed. The questions were a combination of multiple choice questions, ranking questions (using a Likert scale), and open free-text questions. Back and forward buttons were included to allow respondents to review their answers and they were informed that their data would not be included for analysis if they exited the questionnaire before completion. They were also provided with an expected time for completion which from piloting the questionnaires was known to be approximately ten minutes.

Respondents were given the option to contact the researcher via email if they required a debrief on the outputs of the research. They were also informed of the potential for further publication (e.g. in scientific journals) and of the results being shared with interested parties. The participation information sheets and consent declarations are included as Appendices B and C.

4.4.1 Questionnaire Content

The questionnaires were developed to support the research question and were grounded on findings from the literature presented in Chapter 2. They were tailored to each jurisdiction. Core content of both questionnaires consisted of basic demographics, experience, role and place of work. The questionnaire for pharmacists in Ireland sought to explore CP's willingness and readiness for shared EPRs. The questionnaire for pharmacists in England aimed to find out the experience and opinions of CPs on SCR in terms of how it is being used, what it is like to use, how it could be used in the future, how they found the training and implementation process and how it has impacted on their role.

There were two questions common to both questionnaires. These looked at the additional information CPs would like to have about patients and with whom they would feel comfortable sharing data. Exported versions of both questionnaires are included as Appendices D and E.

4.4.2 Questionnaire Review and Pilot

Initial drafts of both questionnaires were refined and amended based on feedback from dissertation supervisors, colleague pharmacists, fellow researchers, employees of the Irish Pharmacy Union and an employee of the pharmacy chain Boots in the UK, who was involved in the roll-out of SCR access for employee pharmacists of Boots in England. Both questionnaires were piloted by three CPs, with further amends made based on feedback received. Data from the pilot activity were not collected or included in the analysis.

4.4.3 Administration of Questionnaires and Collection of Data

Once finalised for dissemination, anonymous links to both questionnaires were created and distributed via email and social media (LinkedIn, Twitter, Facebook, WhatsApp, online CP fora). A link to the English questionnaire was also uploaded to an online pharmacist forum for employee pharmacists of Boots UK. An email list of pharmacists employed by Boots Ireland was used to distribute the link to this population. A reminder email was sent three weeks later. Links to the questionnaire were left open from 3 April 2017 to 16 May 2017.

4.5 Ethics Approval

Ethics approval was granted by the School of Computer Science and Statistics at Trinity College Dublin (Appendix F).

4.6 Data Management

Completed questionnaires were exported from Qualtrics™ to IBM SPSS (Statistical Package for Social Studies) Version 24 for the purpose of data analysis. Data were stored on a password protected PC that was only accessible to the lead researcher in accordance with TCD data governance policy. As no personally identifiable information was captured, the data were not subject to Data Protection legislation. They will be retained for a period of five years after which point they will be deleted.

4.6.1 Quality Control

Data were cleaned and checked for errors. No errors were found. Data did not need to be redacted as respondent or third party identifiable information was not contained in any of the free-text responses.

4.6.2 Quantitative Data Analysis

All statistical analyses were computed using IBM SPSSS with graphs and tables created in Microsoft Excel 2016. To enable sub-group comparison within the England questionnaire, respondents were split into users and non-users of SCRs. The user group was further split into frequent users (those accessing once a week or more) and infrequent users (those accessing less than once a week). Data from questions that were common to both questionnaires were also combined to allow comparison of responses between CPs in Ireland and England.

Individual questions were appraised in the context of the number of responses received. In the interest of clarity and to allow testing for statistical significance, responses to a number of questions that contained Likert scales were collapsed from a five-point to a three-point scale (Appendix G). Frequency statistics were used to summarise categorical variables. Differences between sub-groups and between England and Ireland respondents across a range of variables was assessed using *'Chi-square Test'* or *'Fisher's Exact Test'* for independence as appropriate.

Number of reasons identified for which SCRs have been accessed (range 0 – 14) was examined among frequent and infrequent users. Data in this variable were assessed for normality using the '*Shapiro Wilks Goodness of Fit Test'*. Data were found to be not normally distributed and therefore were analysed non-parametrically. A '*Mann Whitney U Test'* was employed for this analysis, with number of reasons SCRs have been accessed as the dependent variable and frequency group as the independent variable. All statistical tests were carried out using a 5% level of significance.

4.6.3 Qualitative Data Analysis

There were a number of free-text questions contained in both questionnaires as well as free-text options within multiple choice questions to allow the respondent to provide suggestions or opinions other than those provided. Functionality within Qualtrics™ was employed to carry out inductive thematic analysis of these free-text responses to identify themes in the data.

4.7 Conclusion

This chapter presents the research methods employed in completion of the dissertation. Strengths and limitations of the chosen research methods are presented in the general strengths and limitations section in Chapter 6.

Chapter 5 – Results

5.1 Introduction

This chapter presents the results from the two questionnaires. It first presents details about the respondents and then describes the findings under the 'need, design, use and implementation' conceptual framework described in Chapter 2.

5.2 Questionnaire Responses and Characteristics of Respondents

A total of 258 questionnaires were completed. Of these, 201 responded to the Ireland questionnaire and 57 responded to the England questionnaire. One respondent contacted the researcher via email, requesting a debrief on the outputs of the research.

Characteristics of the respondents are presented in Table 5.1.

Table 5.1: Characteristics of respondents in Ireland (n = 201) and England (n = 57)

Key characteristics	CP Ireland n *(%)*	CP England n *(%)*
Gender	201	56
Male	69 *(34.3)*	24 *(42.9)*
Female	132 *(65.7)*	32 *(57.1)*
Years of registration	201	57
0-3	55 *(27.4)*	4 *(7)*
4-10	91 *(45.3)*	17 *(29.8)*
11-20	32 *(15.9)*	11 *(19.3)*
21+	23 *(11.4)*	25 *(43.9)*
Hours of work	201	57
Full-time	177 *(88.1)*	38 *(66.7)*
Part-time	24 *(11.9)*	19 *(33.3)*
Location of pharmacy*	201	56
Inner city	37 *(18.4)*	13 *(23)*
Small town/rural	53 *(26.4)*	26 *(46.4)*
City suburbs	79 *(39.3)*	16 *(28.6)*
Large town	64 *(31.8)*	16 *(28.6)*
Other	6 *(3)*	5 *(8.9)*
Current role (CP Ireland)	201	
Superintendent pharmacist	7 *(3.5)*	
Supervising pharmacist	82 *(40.1)*	
Superintendent and supervising pharmacist	7 *(3.5)*	
Non-supervising pharmacist based in one pharmacy	63 *(31.3)*	
Locum pharmacist	31 *(15.4)*	
Other	11 *(5.5)*	
Current role (CP England)		57
Store based pharmacist		35 *(61.4)*
Relief/locum pharmacist		14 *(25.6)*
Other		8 *(14)*

**More than one option could have been selected*

5.3 Need for Shared Electronic Patient Records in Community Pharmacy

The following section will present results from questions that sought to explore the need for shared EPRs to support community pharmacy practice.

5.3.1 Hospital Discharge Prescriptions (Ireland)

More than two thirds of CPs in Ireland (69.5%, n = 139) reported being presented with hospital discharge prescriptions daily with 92% (n = 183) being presented with them twice a week or more. More than three quarter of respondents (78%, n = 152) needed to contact prescribers in hospitals at least once a week in relation to queries on these prescriptions, with 61% (n = 119) finding it difficult or very difficult to resolve such queries. In ranking the reasons why these queries are difficult to resolve, contacting prescribers was most problematic, followed by difficulty identifying who the prescriber is and medical records not being accessible within the hospital at the time of the query (Fig. 5.1). When asked about their most recent hospital prescription query, just 7.2% (n = 14) had resolved the query within one phone call, with more than a third of queries (36.4%, n = 71) taking more than one day to resolve.

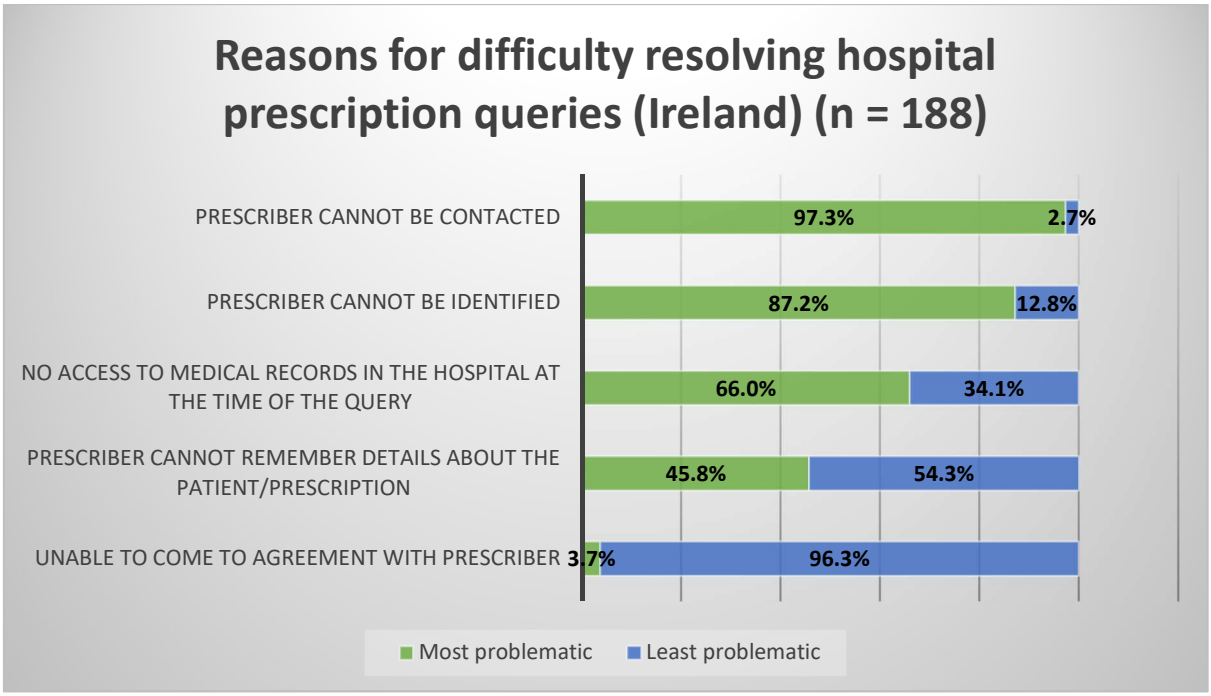


Figure 5.1: Reasons for difficulty resolving hospital prescription queries (Ireland)

5.3.2 Emergency Supply Requests (Ireland)

Emergency supply requests were received once a week or more by 70.7% (n = 142) of respondents. Insufficient information available resulted in 70.3% (n = 137) refusing to provide an emergency supply in the last six months. For more than half of these (56.9%, n = 78), access to the patient's medication history could have changed their decision.

5.3.3 OTC Medication Requests (Ireland)

More than three quarters of respondents (78%, n = 153) had refused an OTC medicine sale in the past six months because of a concern about a potential drug-drug interaction for a patient who was not known to them. Of these, 45.6% (n = 70) could have sold the medicine if they had access to the patient's medication history.

5.3.4 Medication Misuse (Ireland)

Almost all respondents (94.4%, n = 185) have had concerns in relation to a patient about potential medication misuse in the last six months. Just under two thirds (63.2%, n = 117) stated that access to a medication history would have supported them in relation to these patients.

5.4 Use of Shared Electronic Patient Records

The following section presents the responses to questions that addressed the area of shared EPR use.

5.4.1 Frequency of Summary Care Record Access and Reasons for Access (England)

Of the 57 respondents, 86% (n = 49) currently access SCRs (from here on referred to as users). Of these, 47% (n = 23) accessed once a week or more, with 53.1% (n = 26) accessing less than once a week and 16% (n = 8) accessing less than once a month. For the purpose of analysis, those who access the system once a week or more were categorised as frequent users (n = 23) and those who access less than once a week were categorised as infrequent users (n = 26).

Of the eight respondents who had not used the system (from here on referred to as non-users), seven had completed the requisite training. Of those, five didn't have the correct access on their NHS smartcard. The remaining two respondents hadn't yet encountered a need to access SCRs.

Respondents had more frequently accessed SCRs for new patients than regular patients (44.9%, n = 22 vs 12.2%, n = 6), with 42.9% (n = 21) having accessed SCRs for both new and regular patients. A Chi-square test for independence found that a significantly larger proportion of frequent users had accessed SCRs for both new and regular patients compared to infrequent users (56.5%, n = 13 vs 30.8%, n = 8, χ^2 (2, n = 49) = 7.22, p = .03, Cramers V = .38).

Participants were asked to choose from a list of 14 options, reasons for which they have accessed SCRs. The mean number of reasons users have accessed SCRs is 3.29 (SD ± 2.18). Numbers of reasons for access were further analysed among frequent and infrequent users. A Mann Whitney U test revealed

a significant difference between the numbers of reasons identified among frequent users (Mean = 4.3, SD ± 2.01, n = 23) and infrequent users (Mean = 2.38, SD ± 1.94, n= 26), U = 119, z = -3.70, p <.001, r = .53.

SCRs are mainly being used to support core pharmacy services (i.e. relating to provision of medicines). The most common reason for which users have accessed SCRs is to support requests for emergency supply of medication. Other commonly reported reasons for access were to confirm if a medication has been discontinued, to provide an answer regarding a repeat prescription query and to query a suspected error on a prescription (Fig. 5.2). The most common enhanced service that SCRs have been used to support is Medicines Use Review (MUR).

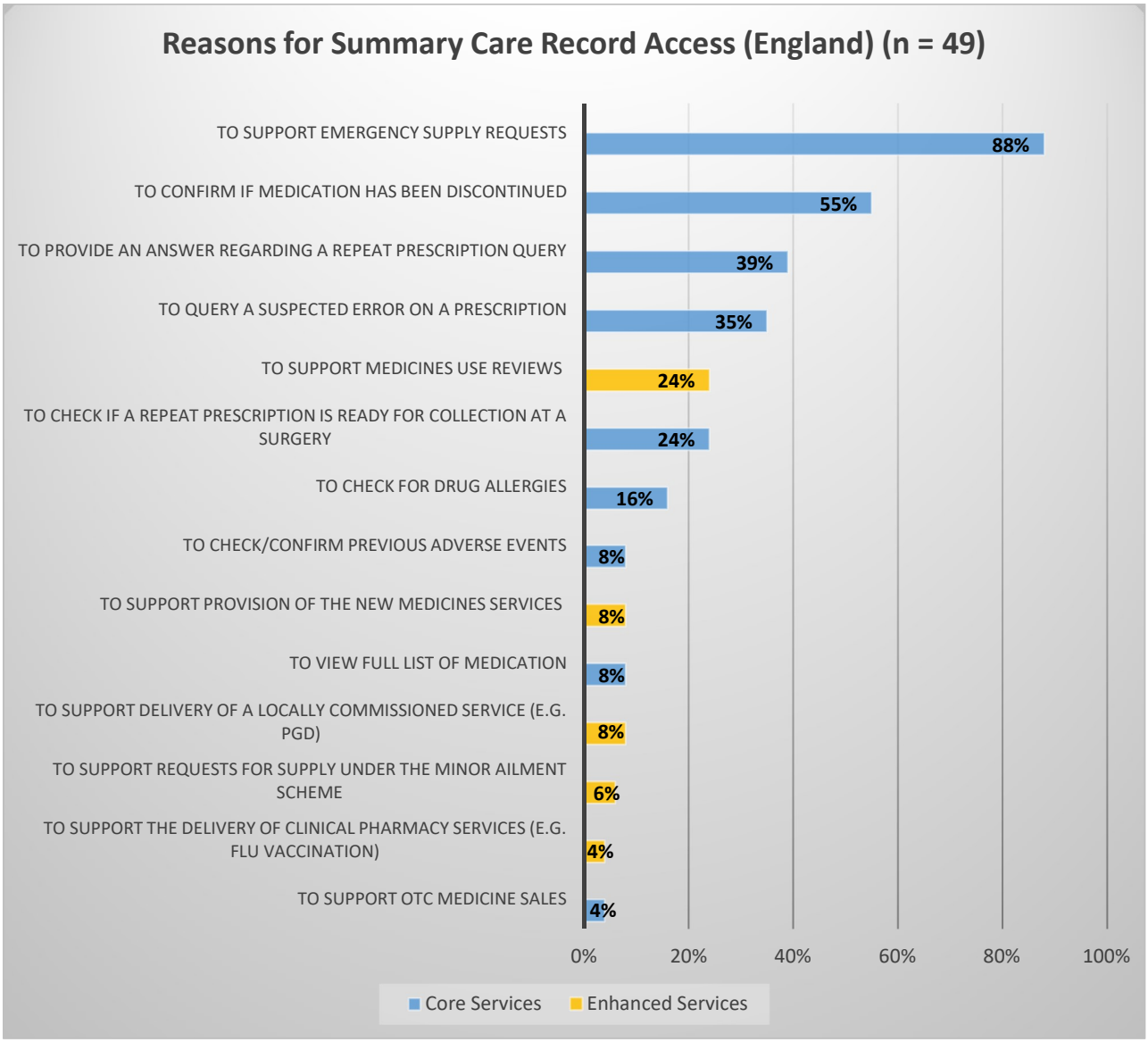


Figure 5.2: Reasons for SCR Access (England)

5.4.2 Potential Barriers to Accessing Shared Electronic Patient Records (Ireland)

The most prevalent barriers reported by CPs in Ireland that might prevent them from accessing additional information about patients in shared EPRs were: workload burden, fear of litigation, concerns about data security and lack of sufficient IT equipment (Fig. 5.3).

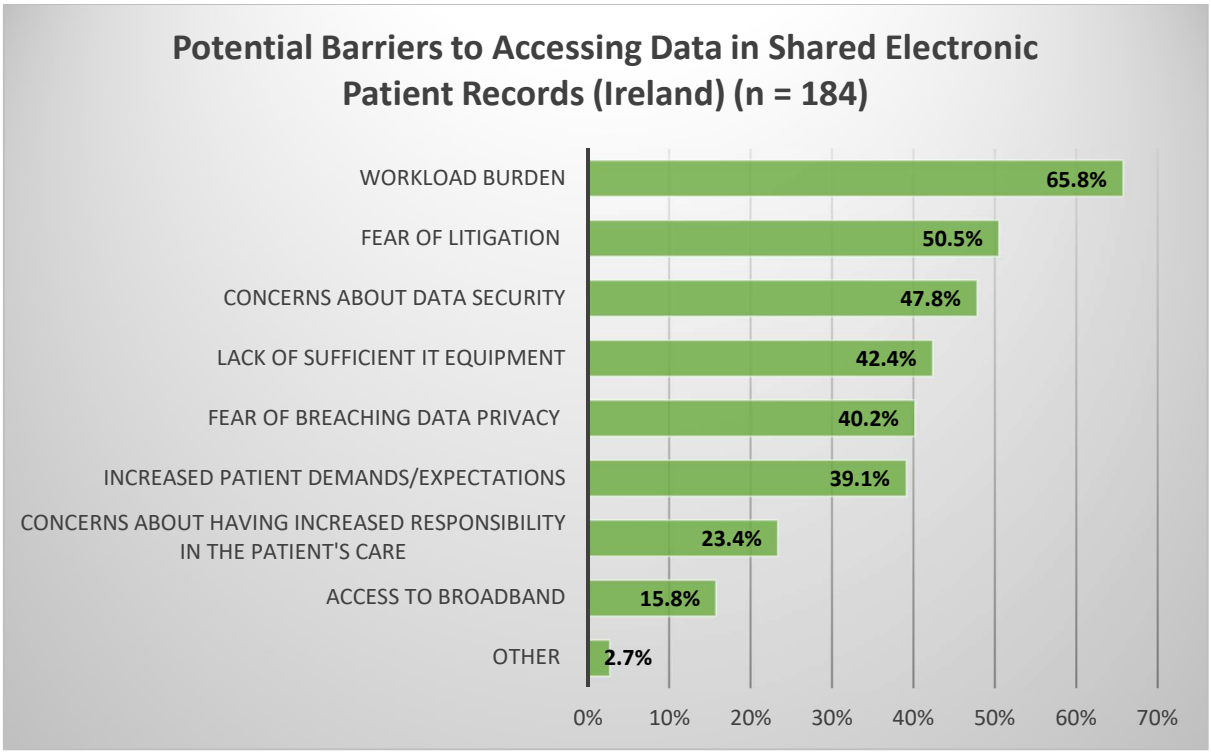


Figure 5.3: Potential barriers to accessing data in shared electronic patient records (Ireland)

5.5 Design of Shared Electronic Patient Records

The following section describes responses to questions that examined the design of shared EPRs, and is presented under the headings of system design, content and controls.

5.5.1 System Design

5.5.1.1 Opinion on Ease of Access, Speed and Usability of Summary Care Record (England)

More than half of users perceived that the SCR portal was easy to access and easy to use (Fig. 5.4). A greater proportion of frequent users perceived the system as easy to use when compared to infrequent users (78.3%, n = 18 vs 34.6%, n = 9). A Chi-square test for independence found this difference to be significant, χ^2 (2, n = 49) = 9.69, p = .008, Cramers V = .45.

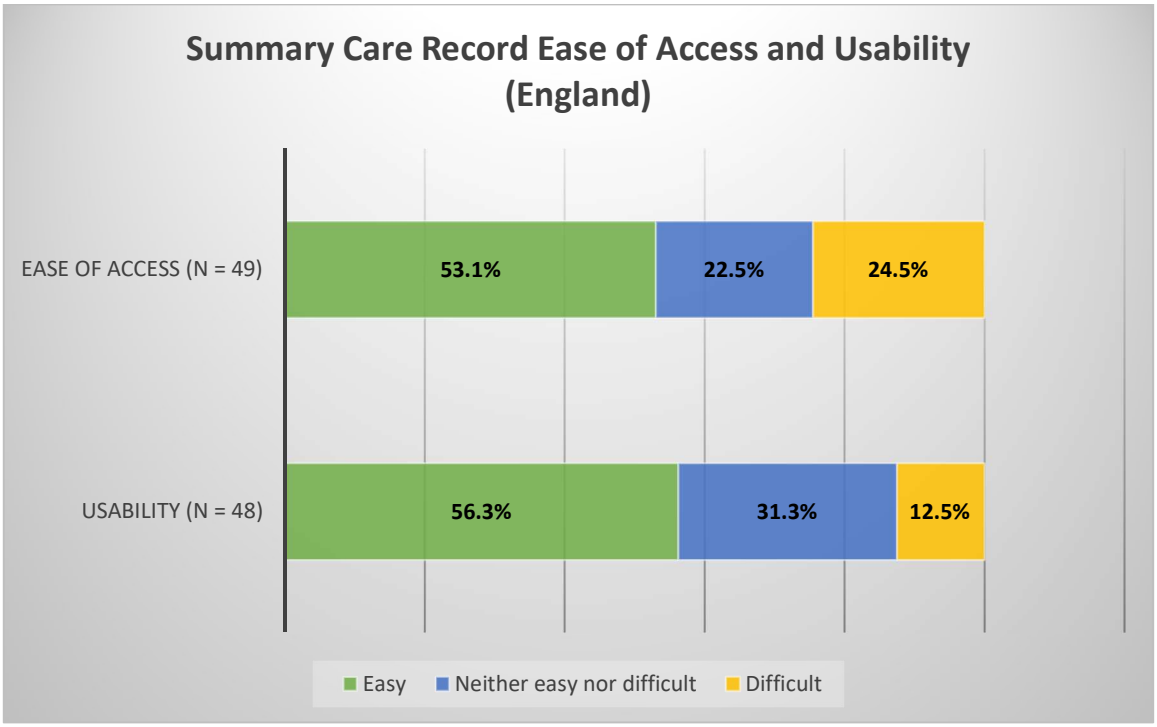


Figure 5.4: Summary Care Record ease of access and usability (England)

The speed of the system was rated on a five point Likert scale as average or worse by 81.7% (n = 40) with the remainder (18.7%, n = 9) rating it as fast. Ratings on speed were similar for frequent and infrequent users.

The most common themes from free-text questions which asked for insights into how ease of access and usability of the system could be improved related to the user interface/design (n = 14) and the process for recording the reason for access (n = 9). The most common suggestions for improving system speed related to IT infrastructure (n = 6) and user interface/design (n = 4).

A selection of free-text responses is presented below:

User Interface/Design

"Sometimes you have to read through a lot of unnecessary information".

"Reduce the number of screens to be navigated".

"Simplify the instructions screen".

"Too slow to load and too many pages to click through before getting to needed data".

Recording Reason for Access

"…need to make the box where you type your reason for accessing SCR more obvious".

"Make it clearer that pharmacists must provide a reason for access"

IT Infrastructure

"Have better Wi-Fi and hardware in the pharmacy".

"Quicker connection".

5.5.2 Content and Quality of Information in Summary Care Records (England)

Overall, the information that has been accessed through SCRs was rated as very useful by 65.3% of users (n = 32) with the remainder rating it as slight useful (34.7%, n = 6). A greater proportion of frequent users (82.6%, n = 19) perceive the data they've accessed through SCRs as very useful compared with 50% (n = 13) of infrequent users. A Chi-square test for independence (with Yates Continuity Correction) indicated this difference was significant, χ^2 (1, n = 49) = 4.38, p = .04, phi = -.34. Errors in data held in SCRs had been identified by five users, all of whom contacted the patient's GP to resolve the issue.

Perceived usefulness of the standard data available within SCR broken down into its individual components is presented in Fig. 5.5. Current repeat medications, discontinued repeat medications and acute medication in last six months were rated highest by users.

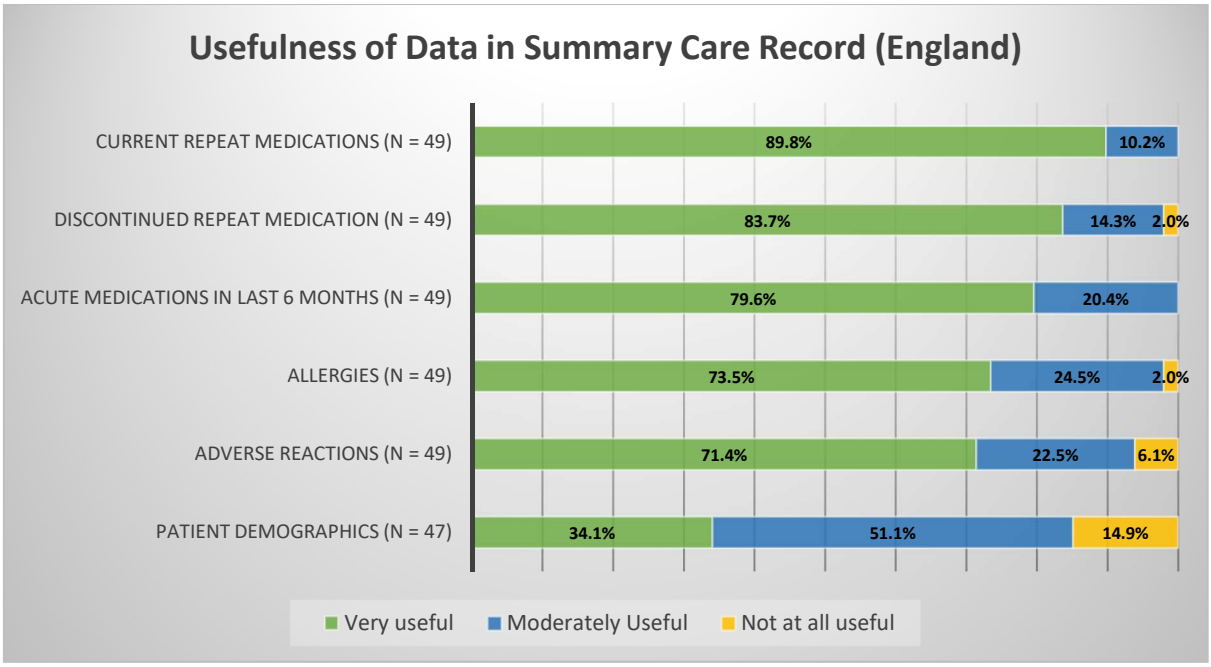


Figure 5.5: Usefulness of Data in Summary Care Record (England)

Information about medication changes, dose changes and indication for treatment were the pieces of information not currently available within SCRs that both users and non-users would most like to access (Fig. 5.6).

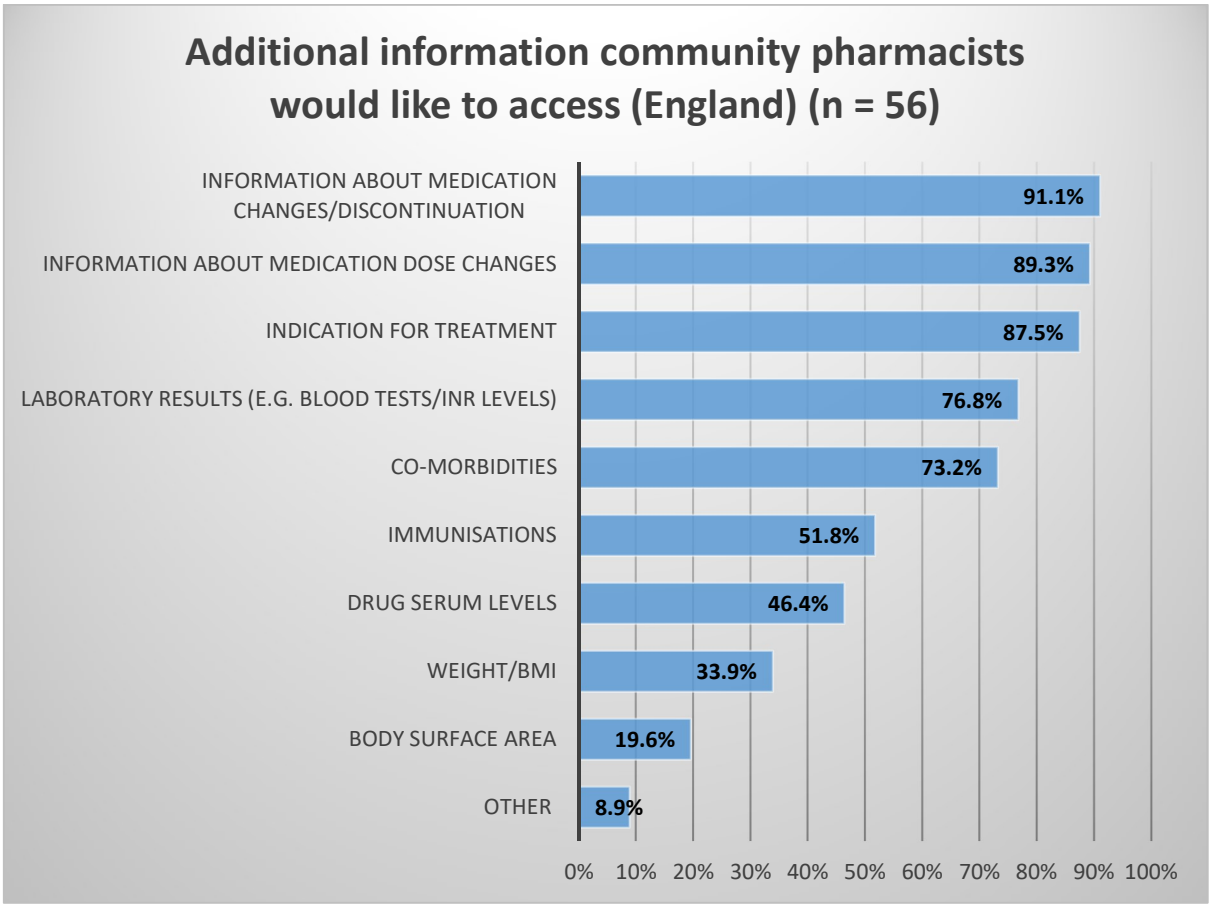


Figure 5.6: Additional information community pharmacists would like to access (England)

5.5.3 Content of Shared Electronic Patient Records (Ireland)

5.5.3.1 Information Accessible to Community Pharmacists

The most common pieces of information that CPs in Ireland would consider useful and are likely to access in shared EPRs are dispensed and prescribed medication lists, rationale for medication/dose changes, medication allergies, indication for treatment and co-morbidities (Fig. 5.7). Results of responses to this question are also included as a table in Appendix H.

The other pieces of information respondents listed as being useful are contact details (e.g. for the patient and anyone involved in their care) (n = 16), medical history (including medical procedures) (n = 14), medication abuse/misuse history (n = 11) and OTC medication use (n = 11).

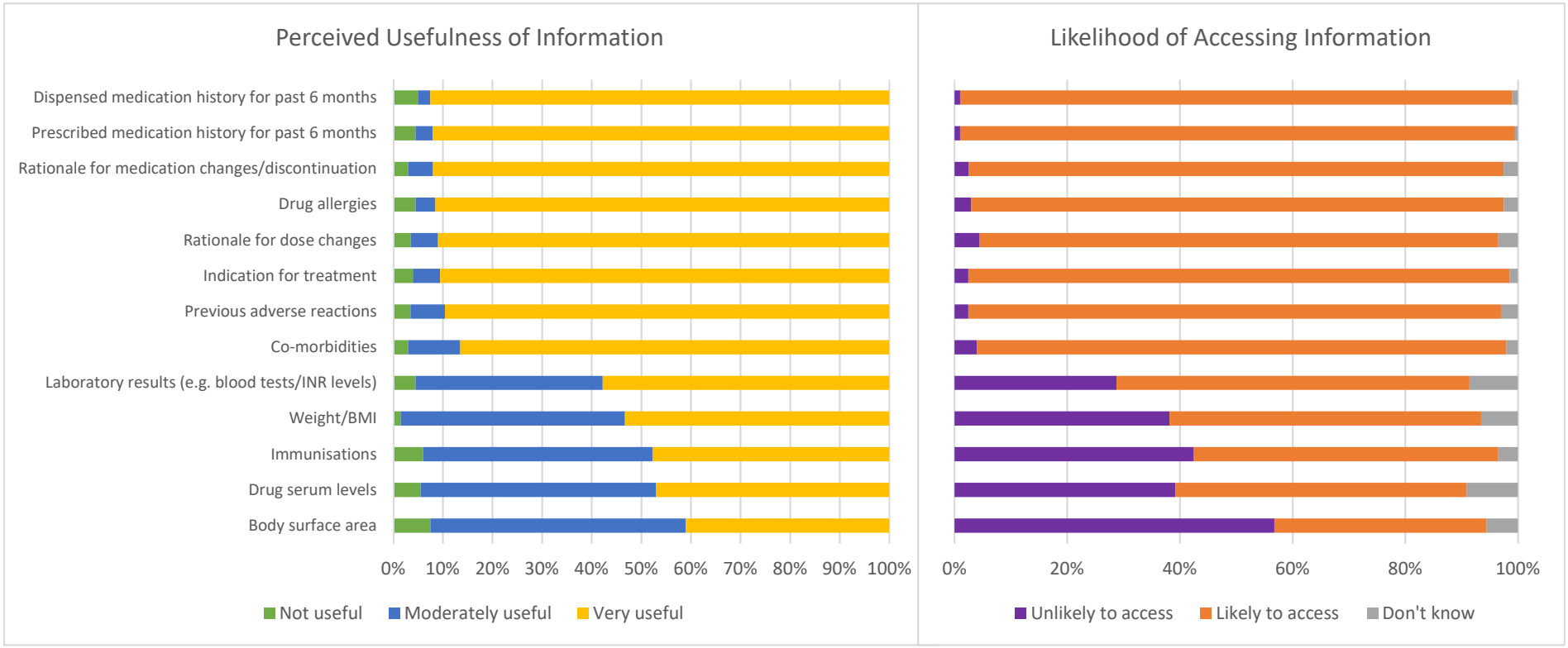


Figure 5.7: Community pharmacist opinion on additional patient information (Ireland)

5.5.4 Information Sharing by Community Pharmacists (Ireland)

CPs in Ireland reported a strong willingness to share information from their systems with other users in shared EPRs, with all six suggested parameters provided in the question being selected by the vast majority of respondents (Fig. 5.9). Other pieces of information respondents suggested should be shared related to OTC medication sales (n = 6), information about medication compliance (n = 3) and medication misuse/abuse (n = 3).

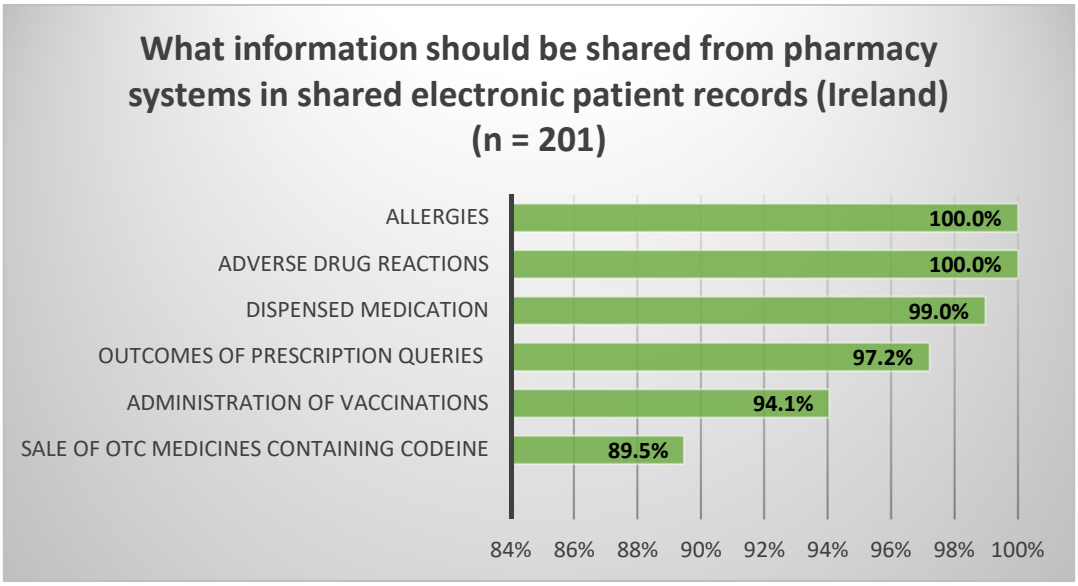


Figure 5.8: Information that should be shared from pharmacy systems in shared electronic patient records (Ireland)

5.5.5 Consent and Controlling Access to Shared Electronic Patient Records (England)

Of those who have accessed SCRs in England (n = 49), 77.6% (n = 38) have not had any difficulty deciding if it was appropriate to access. Of those who have had difficulty, 88.9% (n = 8) said it was because they were unsure on how to decide if there was a legitimate clinical need to access.

Five respondents had employed the 'Emergency Access' option (where consent could not be obtained at the time access was required). Reasons cited as to why this option was selected were because the patient was not available in the pharmacy or via telephone (n = 3) or did not have capacity to provide consent (n = 3). One user had used this option to access a record for a care home resident.

The majority of respondents (71.9%, n = 41) were in favour of write-access being extended to users other than GPs. The most frequently selected groups they believed write-access should be extended to were hospital pharmacists, hospital based doctors, CPs and nurses (Fig. 5.10).

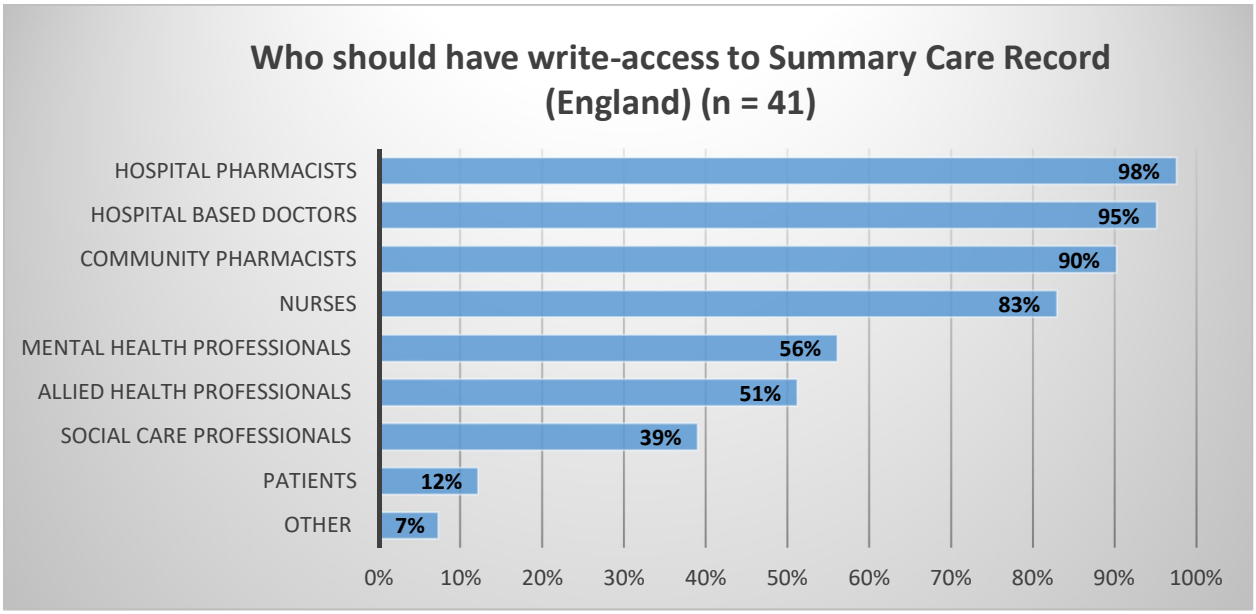


Figure 5.9: Who should have write-access to Summary Care Record (England)

5.5.6 Consent and Controlling Access to Shared Electronic Patient Records (Ireland)

All respondents (100%, n = 199) thought CPs should be able to access shared EPRs, with 48.7% (n = 97) suggesting Registered Pharmaceutical Assistants (Qualified Assistants) should be able to access it and 31.7% (n = 63) believing pharmacy technicians should be able to access it.

Just under two thirds of CPs in Ireland (62.5%, n = 125) believe consent to access shared EPRs should be captured in writing, 23.5% (n = 47) believe it should be captured verbally with the remainder (14%, n = 28) unsure.

From a list of six provided options, the most important controls that respondents would like to have in place before being provided with access to shared EPRs were clear guidelines on data privacy and consent, controls in relation to data security and professional liability insurance that covered access (Fig. 5.11).

In addition, the majority of respondents (79.1%, n = 159) believe they would need additional clinical training to support shared EPR access if the information provided was beyond their current scope of practice.

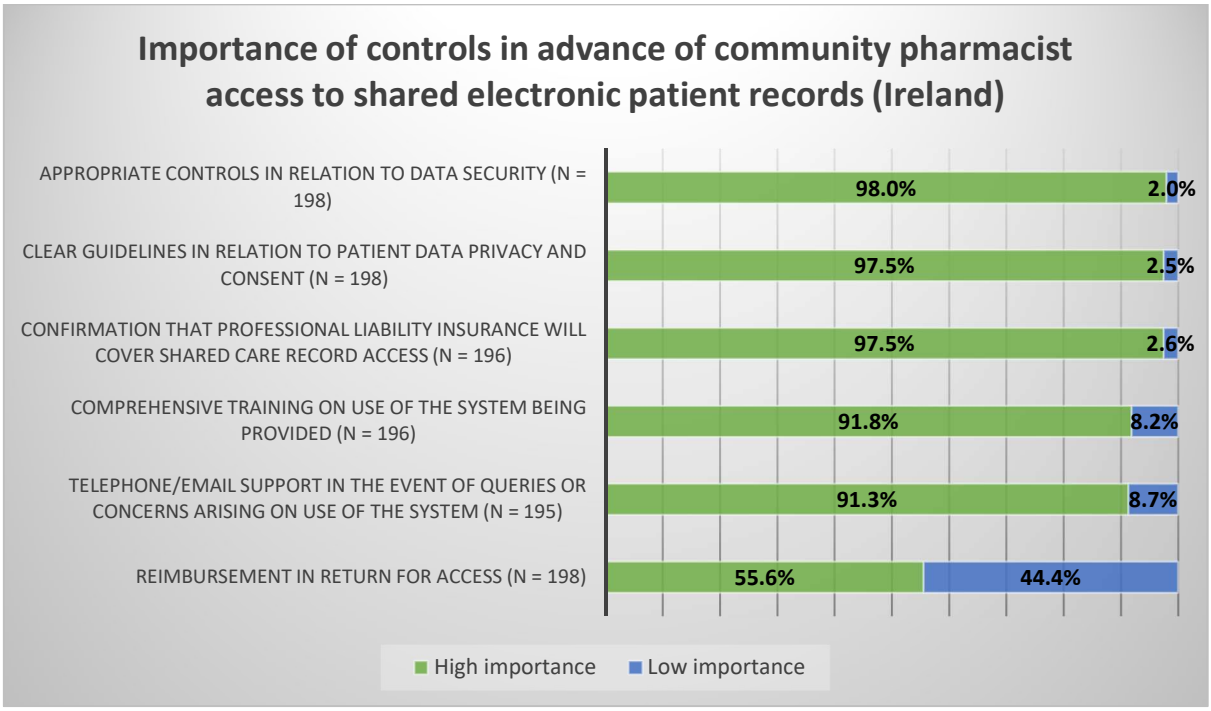
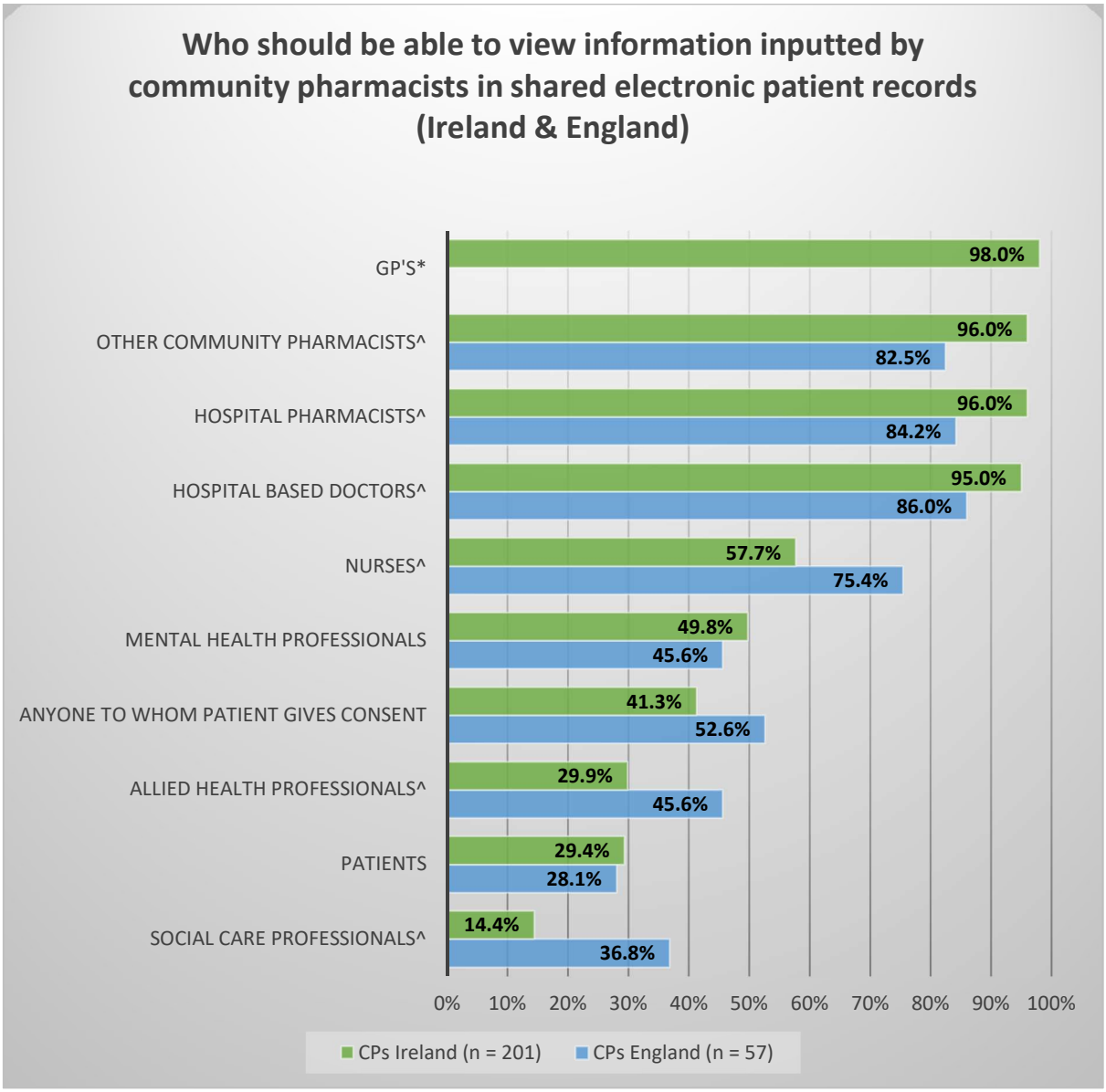


Figure 5.10: Importance of controls in advance of community pharmacist access to shared electronic patient records (Ireland)

5.5.7 Viewing Information Shared from Pharmacy Systems (Ireland and England)

The vast majority of CPs in Ireland identified that GPs, other CPs, hospital based pharmacists and hospital based doctors should be able to view information shared from pharmacy systems. CPs in England selected hospital based doctors, hospital pharmacists, other CPs and nurses as the most common responses to the same question. Less than a third of respondents in both countries think patients should be provided with access to data shared from their systems. A Chi-square test for independence found differences between respondents in Ireland and England were significant ($p < .05$) for other CPs, hospital pharmacists, hospital based doctors, nurses, allied health professionals and social care professionals (Fig 5.12).



**CPs in England were not given the option of selecting GPs for this question as GPs in England currently have full access to SCR including write-access*

^Chi-square test indicated that differences between CPs in Ireland and England were significant for these populations($p < .05$)

Figure 5.11: Who should be able to view information inputted by community pharmacists in shared electronic patient records? (Ireland and England)

5.6 Implementation of Summary Care Record (England)

The next section provides an overview of respondents' views on the implementation of SCR access and are presented under the headings of training, impact on role, benefits and drawbacks of access and experience post-implementation.

5.6.1 Views on Training Provided in Advance of Summary Care Record Access (England)

When asked how they would rate the training provided before being provided with SCR access, the opinion of users and non-users were broadly similar, with 59% (n = 33) rating it as good or very good and 27% (n = 23) rating it as fair or poor. The majority agreed that the training was tailored to their role, and that they had sufficient time to complete the training. Less than two thirds were given the opportunity to provide feedback on the training (Fig 5.12). One third of users (32.5%, n = 16) reported a high level of confidence in introducing SCR access into their practice having completed the training. The remainder (67.5%, n = 33) rated their confidence as moderate or worse.

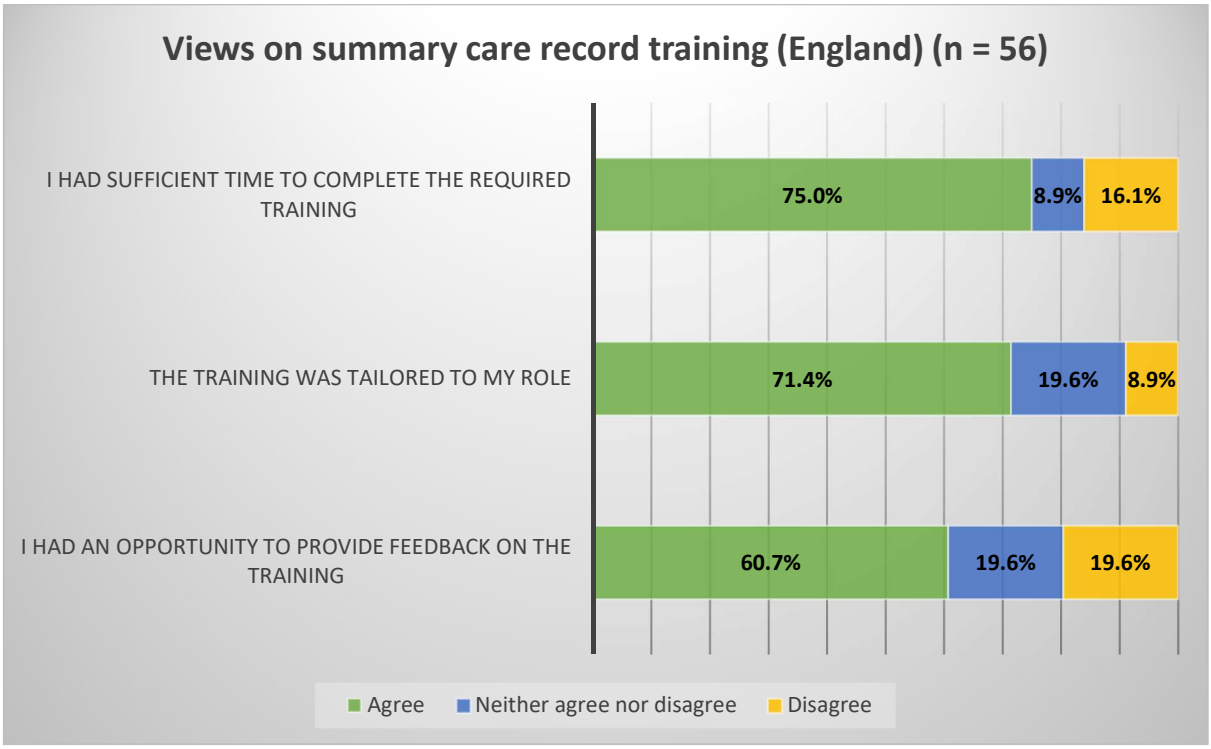


Figure 5.12: Views on Summary Care Record training (England)

5.6.2 Impact of Summary Care Record Access for Community Pharmacists (England)

The biggest perceived benefit of SCR access reported by CPs in England was on quality of care (Fig. 5.14). Other areas that users reported as having improved are level of involvement in care, efficiency of service and job satisfaction. Three users identified their job satisfaction as worse since being provided with access to SCR. A Chi-square test for independence (with Yates Continuity Correction) indicated significant difference between frequency of use and perceived impact on service efficiency since being provided with access to SCRs, with 91.3% of frequent users (n = 21) reporting an

improvement compared with 50% (n = 13) of infrequent users, χ2 (1, n = 258) = 7.95, p = .005, phi = -.45.

Relationship with GPs was reported to be the same for the majority of users since being provided with SCR access. However, 51% of users (n = 25) need to contact GPs less often since being provided with SCR access. A greater proportion of frequent users (82.6%, n = 19) need to contact GPs less often when compared to infrequent users (23.1%, n = 6). A Chi-square test for independence indicated this difference to be significant, χ2 (2, n = 49) = 20.22, p < .001, Cramers V = .64.

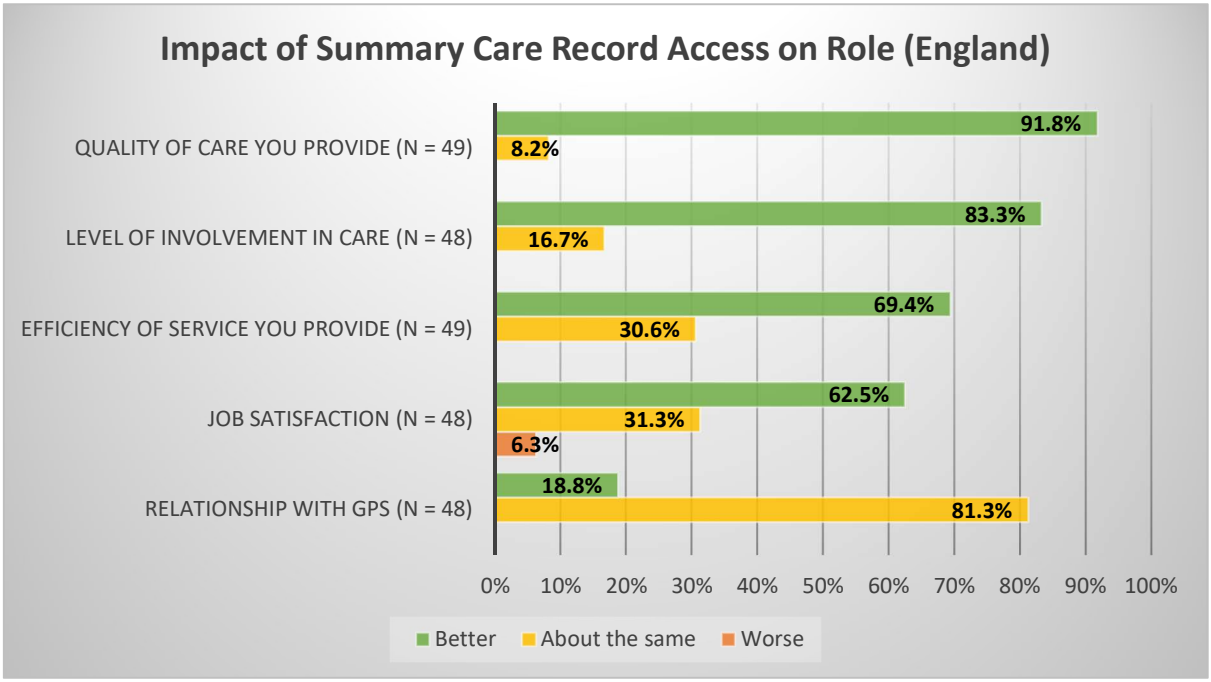


Figure 5.13: Impact of Summary Care Record access on role of community pharmacists (England)

5.6.2.1 Benefits of Summary Care Record Access (England)

The themes that emerged from the free text responses as the main benefits to SCR access were being able to support emergency supply requests (n = 15), information being accessible out-of-hours (n = 13) and improved quality of care (n = 9).

Supporting emergency supply requests

"Easier and safer to make emergency supplies when patient does not regularly attend your pharmacy and has no records on their PMR of the drug being requested".

"Ability to issue emergency supplies out-of-hours with confidence"

Information accessible out-of-hours and improved quality of care

"The ability to ascertain what medication a patient is currently taking when they come to see me pre- and post-surgery opening times".

"Being able to provide accurate advice quickly, especially at weekends. This enables better decision making and improved care for the patient".

"Ability to provide care for patients who are not regular to your pharmacy".

"Quicker patient care for effective clinical decision making".

5.6.2.2 Drawbacks of SCR access (England)

The themes identified in relation to drawbacks to SCR access were technical/usability issues (n = 9), the limited information available (n = 5), concerns about the process for gaining consent (n = 4) and the fact that pharmacists have read-only access (n = 3).

Technical issues

"Too many (SCRs) can't be found. (Patient) may not have given permission to surgery. May have changed address and can't precisely remember previous address".

"It is quite time consuming and slow to use".

"Inconsistency of obtaining access due to software/IT problems".

Limited information available

"I've found there isn't much benefit for current patients. It doesn't state the reason why a medicine is discontinued or what it's prescribed for, therefore clinical benefit for access is minimal".

"There have been a couple of occasions where I regretted accessing it as it didn't answer my query".

"Limited information available. I work as a GP Pharmacist when not working in community and full access to 'problems', 'investigations', 'consultations' and 'documents' would be enabling".

"Emergency supplies for non-regular patients is the only benefit"

Concerns about process for gaining consent/inappropriate access

"At the beginning there was a lot of worry about access and privacy and getting it wrong. They seem to have calmed down about that now and the patients have been fine".

"It's a slight concern at present that the nature of the training vs NHS expectation of use appears to be starkly different and is leading to confusion amongst pharmacists whether access should be a last resort or become routine practice".

"Made to feel like (I) am asking to view the crown jewels".

5.6.3 Experience of Users Post-implementation of Summary Care Record Access (England)

Just over half of users know where to go if they have a query in relation to SCR access and less than half know how to log a technical query in relation to the system. The majority of users had never been asked for feedback on the system and more than half do not know how they can provide feedback if they wish to do so (Fig. 5.14).

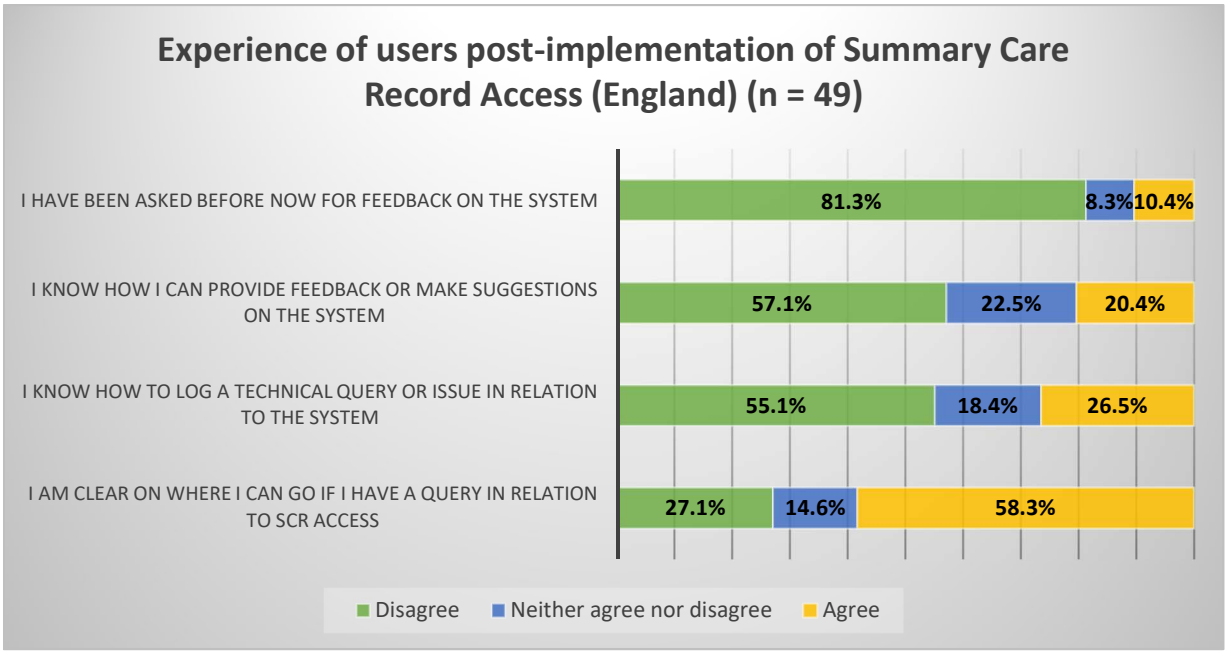


Figure 5.14: Experience of users post-implementation of Summary Care Record access (England)

5.6.4 Suggestions to Support Development of Shared Electronic Patient Record Access for Community Pharmacists (Ireland)

Views were expressed by 23 respondents in relation to the development of shared EPR access for CPs in Ireland. The main themes that emerged from these free text responses were in relation to consent

and controls (n = 15), impact on workload (n = 5), importance of integration with existing pharmacy IT systems (n = 4) and scope of practice (n = 4).

Consent & controls

"Any system would have to have patient consent built in at the early stages so that pharmacists would not have to seek consent every time they wished to access a record".

"In relation to consent it should be by unique pin access - patient gets sent message to request access, unique pin for service provider gets sent to patient's mobile phone and this pin is then given to service provider to grant access for a time period e.g. 12 months".

"I think getting consent in the pharmacy might be an issue. If people gave consent in GPs surgery it might be better but there will be a problem then with those that misuse OTC meds"

"I think an electronic signature by the patient would be sufficient. Paperwork needs to be avoided. An electronic trail definitely should be enough".

Impact on workload

"My main concern would be current workload and speed of accessing this system especially working in environment when pressure is placed on me by both patient and employer to serve quickly. Other than this concern would be really happy to see (shared EPRs) introduced and would benefit practice"

"Consideration may need to be given to the level of the workload increases this may lead to and how this would be supported in a community pharmacy environment. On the other hand, one may find that having access to such records actually frees up time as information is more readily available and queries can be resolved more quickly".

Integration with pharmacy IT systems

"If dispensing software could link to the electronic patient record to save time for inputting information such as drugs dispensed, which I envisage would be the majority of input for community pharmacists. Inputting this info twice would be very time consuming and difficult in a busy pharmacy".

"An automatic upload of information from (pharmacy system) to the (shared EPR) rather than manual typing of information would reduce workload".

Scope of practice

"We must be careful that we don't run before we can walk with respect to clinical judgement. Increased access to such data can place unreasonable expectations on what we have been trained and upskilled to do. It must be appropriate and necessary with clear agreements for communication.
It is inevitable that the PSI would have to issue 'guidelines' and it is important that any such guidelines should not place additional barriers beyond those already considered appropriate by those who develop the system".

"I believe that any information accessed by a pharmacist should be appropriate to their practice and I do not believe that information such as blood serum levels or test results should be made available as this will only raise patient expectations that pharmacists could and should interpret this information for them when it is more appropriately the role of other healthcare professionals to do so".

5.7 Conclusion

This chapters presents the results from the two questionnaires under the heading of need, use, design and implementation. These will now be discussed in Chapter 6 in the context of existing evidence from the literature.

Chapter 6 – Discussion, Recommendations and Conclusion

6.1 Introduction

The key findings from the primary research outlined in Chapter 5 are now summarised. Implications for practice, policy and research are then discussed in the context of these findings and existing evidence to answer the research question. A summary of recommendations for the development of CP access to shared EPRs will then be presented under the 'need, design, use, implementation' conceptual framework presented in Chapter 2.

6.2 Key Findings

CPs in Ireland would like more information about dispensed and prescribed medication, allergies, diagnoses and rationale for therapy changes. Deficiencies in information are negatively impacting their practice. All respondents believed CPs should have access to shared EPRs. However, their concerns about the implications of this access for their workload and the profession need to be addressed.

Sharing health information has the potential to improve safety, efficiency and quality of care for patients (Moore et al., 2011). CPs in England are reporting that access to additional information through SCRs is improving a number of areas of practice, with a greater effect reported among those using the system frequently. They rate information relating to medication history as most useful. However, CPs in England think SCR is limited in its current form. This is both in terms of who has write-access as well as the information it contains. They would like to have write-access and the majority wish for information about medication changes, diagnoses and laboratory results.

Although the majority of respondents to the England questionnaire have used SCR, there was marked variation in frequency of access among users. Frequent use in turn correlates with increased application of the system and positive opinions on its benefits. Support of emergency supply provision, information being accessible out-of-hours and improved quality of care are the main reported benefits of SCR access.

CPs in Ireland and England indicate a strong willingness to share information from their systems with other pharmacists and doctors. In general, CPs in England appear to be more conservative about the prospect of sharing such information than their counterparts in Ireland.

CPs in England views on the training prior to being provided with SCR access were mixed, and their level of confidence was not high prior to introduction. Although they have some concerns and suggestions on how SCRs could be improved, only 10% had been asked for feedback on the system.

6.3 Implications for practice

The research sought to ascertain whether is a need for shared EPRs to support community pharmacy. Findings from the literature and primary research indicate that there is a clear need for improved information-sharing in practice, with benefits already demonstrated on the role that HIT can play as an enabler in this regard (Mekonnen et al., 2016).

6.3.1 Access to Information

Prescription queries at hospital discharge are recognised as problematic for CPs in Ireland and this correlates with existing evidence, with discharge prescription identified by both CPs and GPs as the biggest source of error in practice (Redmond et al., 2016). The majority of respondents to the Ireland questionnaire receive hospital discharge prescriptions daily and they frequently generate queries, potentially delaying treatment. This is consistent with previous findings (Braund et al., 2014, Paulino et al., 2004, Grimes et al., 2016). Pharmacists believe they have an important role in improving TOCs (Gibson, 2015). However, timely access to accurate, up to date information is needed to support this (Coiera, 2011). Findings from this research endorse pharmacists using HIT to working cross-functionally and facilitate communication with other health professionals to improve TOCs.

CPs in Ireland reported that emergency supply requests, OTC medicine requests and supporting patients suspected of misusing medication are areas of practice they encounter frequently and this is in keeping with evidence elsewhere (Bates et al., 2017, Morecroft et al., 2015, Cooper, 2011). Incomplete or unavailable information impacts on quality and efficiency of care for these patients (Hagemeier et al., 2016, Cooper, 2011, O'Neill et al., 2002) and findings from this research suggest that access to additional information, specifically full medication history, could support better care.

An unexpected finding among CPs in Ireland was the theme of respondents strongly suggesting a role for shared EPRs to support the recording and viewing of OTC medicine purchases, in particular those containing codeine. Codeine is a medication with a number of uses, but is most commonly found as a secondary ingredient in compound preparations for mild to moderate pain. It is available without prescription in many countries, including Ireland, and is frequently associated with dependence and overuse, although the extent of this is poorly understood (Foley et al., 2016). In Ireland, purchases can only be made under the direct supervision of a pharmacist and it cannot be directly marketed to the public. Despite these controls, is estimated that use is increasing and the development of real-time monitoring of medicines containing codeine has been recommended (Van Hout et al., 2014). There is international precedent in this regard. The MedsAssist system was introduced in Australia in March 2016 as a clinical decision support tool to help pharmacists identify patients at risk of misusing OTC medicines containing codeine through real-time recording and monitoring of purchases (The Pharmacy

Guild of Australia, 2016). Therefore, there may be merit in incorporating such functionality into a shared EPR system for Ireland, although feasibility of such functionality would need to be assessed.

An important and novel aspect of this research was understanding CPs willingness to share information taken from their systems with others, as it is not believed that this has been studied previously. CPs in both countries are strongly in favour of sharing information in shared EPRs with doctors and pharmacists. This is positive to note, as pharmacy systems are a reliable source of information on whether medication prescribed has been dispensed to patients and CPs already receive requests to provide information held on their systems to other healthcare providers (e.g. to support Medication Reconciliation at hospital admission) (Quélennec et al., 2013, Karapinar-Çarkıt et al., 2014).

In general, CPs in Ireland are more willing to share information than their counterparts in England. The exceptions to this were nurses, allied health and social care professionals, for whom CPs in England indicate a higher preference for sharing. However, less than a third of respondents from either country think patients should be able to view information taken from pharmacy systems. This is interesting considering that a patient portal has been suggested for the EHR for Ireland (eHealth Ireland, 2015b). This view from CPs may be worth understanding in further detail, as well as understanding the views of other health professionals, before advancing with its development.

6.3.2 Use of Shared Electronic Patient Records

Tracking use of HIT after implementation is important, as some users may adopt less slowly or have specific issues with the system (Nanji et al., 2011). An emergent theme from this research indicates an association between more frequent access and increased application of SCR to practice. This mirrors a strong correlation identified between use and benefits of shared EPRs in general (Dobrev et al., 2010).

It was found that SCRs are primarily being accessed by CPs in England to support core services relating to medicines' provision, rather than in the delivery of enhanced services. It is worth noting that the finding in relation to frequent users accessing SCRs for a greater number of reasons than infrequent users is replicated across core and enhanced services. Barriers to adoption of HIT are well reported and it is important to understand which (if any) of these may be affecting frequency of access among CPs in England (Boonstra et al., 2014, Castillo et al., 2010, Cresswell et al., 2010, Greenhalgh et al., 2010a, Littlejohns et al., 2003, Shekelle et al., 2006, Wears and Berg, 2005).

Supporting emergency supply requests was reported in the England questionnaire as the reason SCRs are most commonly being used, which is consistent with findings from the proof of concept pilot described in Chapter 3. It was purported that providing SCR access to CPs in England could reduce pressure on other areas of the health system (HSCIC, 2015). Considering that emergency supply

provision through pharmacy reduces pressure on out-of-hours services and improves medicines' adherence (Morecroft et al., 2015), it may be reasonable to assume that these benefits are already being realised in practice. However, the size of this effect has not been measured and warrants further research.

One of drivers of successful HIT adoption identified has been the incentivisation of use (Dobrev et al., 2010) with examples internationally where use of HIT is linked with reimbursement (PCC NHS England, 2017, Blumenthal 2009). This study found that just over half of CPs in Ireland reported that it is important to link access of shared EPRs with reimbursement. This link with SCR access to Quality Payments did not feature as a benefit or drawback to access by CPs in England. It could be inferred that reimbursement of this nature is perhaps less important to CPs than to healthcare organisations.

6.4 Implications for Policy

As evidenced by Beasley et al (2011) implementation of large scale HIT systems needs to consider the associated sociotechnical transformation if they are to be successful. The main concerns of CPs in Ireland reported in this research regarding future use of shared EPRs are impact on workload, having sufficient IT equipment and increased demands from patients. They consider it important that issues of increased liability, data privacy, data security and training be addressed before being provided with access. As suggested by Goundrey-Smith, development of systems designed to support sharing of patient data must ensure areas such as these are addressed (2013).

It is evident that a systematic approach was taken in the development of governance procedures for SCR access in England and as a result there are robust controls in place (NHS, 2017). Findings from this study showed that the majority of CPs using SCR are clear about when it is appropriate to access a patient's SCR and how to obtain consent. However, fear of inappropriate access and surveillance has been reported as a barrier to use (Greenhalgh et al., 2010b) and this was identified as an issue for a number of users.

This study identified lack of write-access for users other than GPs as a drawback to SCRs. Evidence suggests that lack of up-to-date or complete information limits shared EPRs usefulness (Coiera, 2011). Reliability of information dictates that read and write-access to shared EPRs should therefore be available across primary and secondary care providers (Moore et al., 2011). It is positive to note that extending SCR write-access to other users is planned for England.

Despite access to shared EPRs not yet available on a national scale in Ireland, CPs recognise the importance of consent to access to such records being captured, with the majority believing this should be captured in writing. As argued by Greenhalgh, the consent model chosen for shared EPRs is an

important consideration, as well as the workload and resource impact that capturing consent will have (2008).

6.4.1 Content of Shared Electronic Patient Records

The information currently contained within SCRs is considered very useful by two thirds of users, with this increasing to four out of five of frequent users. Information about prescribed medication (repeat, acute and discontinued) is rated highest. Data quality is reported as good by the majority, although errors had been identified by some. Evidence shows that keeping scope narrow and defined is more likely to lead to successful implementation of HIT systems (Eason and Waterson, 2013).

However, CPs in England would like access to more information. Details about why medication was changed or stopped, information about diagnoses and laboratory results are the pieces of information they would most like to have.

Information CPs in Ireland consider most useful in a shared EPR relates to medication prescribed and dispensed, rationale for medication and dose changes, drug allergies and diagnoses. They are very likely to access this information if it were available to them. This is consistent with findings from previous studies (Munday et al., 1997, Grimes et al., 2012, Urban et al., 2013). Evidence suggests that providing CPs with information of this nature is beneficial to patient care (Scullin et al., 2007).

6.4.2 User Feedback on System Design

Previous evidence suggest that system design and functionality are important considerations in the development and implementation of successful HIT systems (Ludwick and Doucette, 2009). The findings from this research found that a quarter of CPs in England find the SCR system difficult to access and usability is rated positively by just over half of users. Speed of the system appears to be a concern, with four out of five users perceiving it to be moderate or worse. As demonstrated in the findings of this research, users are a valuable source of feedback on system and should be consulted in an official capacity on generating suggestions for system improvement.

6.4.3 Implementation

Considering the level of investment and organisational change associated with implementation of large scale HIT systems (Blumenthal, 2009), evaluation and review are important steps that should be built into the implementation process, allowing continuous improvements to be made and lessons learned to be applied to future projects (Shekelle et al., 2006).

6.4.3.1 Training

Although the majority of users thought the training in advance of SCR access was tailored to their role and they had sufficient time to complete it, the overall rating was less positive and less than two thirds were asked for feedback on the training provided. Only a third of users felt very confident about introducing SCR access into their practice afterwards, although reasons for this are unclear. Training is recognised in the literature as an important driver of successful adoption, and should be budgeted for accordingly in planning for implementation of large scale HIT systems such as shared EPRs (Creswell, 2014, Nanji et al., 2011).

Just over a quarter of users know how to log a technical issue in relation to the system. Although there are no published data on the extent of technical problems with the SCR system since launch, this awareness of how to log issues needs to be addressed as evidence suggests that technical issues and system outages results in reduced confidence or perceived value in systems, thereby impacting on successful adoption (Greenhalgh et al., 2010a).

6.4.3.2 Impact on role

CPs in England say that additional information being available through SCR access is improving efficiency, quality and involvement in care for patients and job satisfaction for them. These are all benefits of shared EPRs identified in literature (Dobrev et al., 2010). Efficiency of care was reported significantly better by frequent users, emphasising the 'use drives benefits' argument. It is important to note that three users perceive their job satisfaction to be worse since being provided with access to SCRs and it would be worth investigating whether finding is replicated in a larger sample size. SCR access is reducing the frequency of GP contact for half of users and this effect increases significantly with more frequent access, without impacting negatively on their relationship with GPs. This implies that SCR access is providing information that previously would have required direct contact with GPs, emphasising the potential beneficial effect shared EPR access can have on efficiencies of care.

Scope of practice was expressed as a concern by a number of CPs in Ireland in considering the development of shared EPR access and four out of five respondents said they would need additional clinical training. This emphasises the recommendation of involving clinical users as part of a multidisciplinary team for successful development and implementation of HIT systems (Ludwick and Doucette, 2009).

6.5 Implications for Research

The impact of CP access to SCR on the wider health system would be interesting to calculate. For example, for all the times it has been accessed to support emergency supply requests, what is the potential saving on out-of-hours care or what benefits are experienced by patients from improved

continuity of prescribed treatment? Following from this, further qualitative research into the impact of SCR access on the role of users and the factors influencing this would be valuable to understand.

The SCR Governance Person role, which is tasked with monitoring and investigating access of SCRs in the English setting is an interesting approach to access-security and it would be worth understanding if this role is meeting requirements in practice. Future research could look at who is filling this role, how it impacts on their other role(s) and responsibilities and if the time allotted to the carrying out the role is sufficient. Linked to this is the question of how access is being monitored in the independent pharmacy setting, where there may only be one pharmacist working, resulting in a potential scenario of self-regulation.

With the introduction of quality payments linked to SCR access, another area of future research could be the conflict that may exist between clinical and commercial responsibilities in community pharmacy and the potential inter-professional tension this can create. This is both from other providers (e.g. GPs have expressed reservations about CPs playing a greater clinical role in patient care) (Grimes et al., 2012, Bidwell and Thompson, 2015) and payers, who may have concerns about incentivisation of SCR access leading to inappropriate focus on securing payments as opposed to focus on optimising patient outcomes and quality of care.

6.6 Strengths of the Research

The research topic of shared EPRs in community pharmacy is an area that is progressive and has not been extensively studied, particularly in the Irish healthcare setting. With the development of a shared EPR (the National Shared Record) part of eHealth Ireland's roadmap, it is hoped that having robust evidence and recommendations as presented in this research will prove valuable.

Because implementation of SCR access for CPs in England has happened recently, it was an opportune time to ask this population about their views on training and implementation. Similarly, because write-access for pharmacy is part of future plans, it is useful to have asked them their views of the system without write-access as it will allow for comparison at a later stage.

The 'need, design, use, implementation' conceptual framework that has been developed is grounded in research and covers the important areas that should be considered in the development of HIT systems while at the same time being straightforward enough to allow it to be understood by a broad audience. It is also flexible enough to allow it to be applied to HIT system development in general and can be used iteratively through the implementation and evaluation stages.

6.6.1 Strengths of Chosen Methodology

Choosing Qualtrics™ as the platform for the questionnaires meant they could be completed on PC, laptop or smart-phone. It also meant input error of data was eliminated and data extracted easily to SPSS for analysis. As social media was employed to disseminate the questionnaires, it meant that they were made available to a wide audience. There was a good response rate (201) to the questionnaire for CPs in Ireland.

6.7 Limitations of the Research

With roll-out of CP access to SCR in England still ongoing, and access only being available for approximately 18 months, the full potential impact on practice may not yet be apparent. In addition, there was a relatively low response rate (57) to the England questionnaire, although response numbers were sufficient to allow testing for signifiance. At the time the questionnaires were being developed, analysis of available information indicated that adoption and usage of SCR by CPs in England was low and the researcher therefore expected that a significant proportion of respondents to the questionnaire would not yet have used the system. A number of questions were created specifically for non-users for this reason. However, usage subsequently increased significantly, most likely due to linking access to quality payments. It would have therefore been useful to understand reasons for infrequent use rather than non-use, with specific questions developed for infrequent users. However, because frequency of use was captured, this allowed analysis of responses split by frequent and infrequent users which somewhat mitigated this limitation.

6.7.1 Limitations of the Chosen Methodology

The use of online surveys can be subject to bias due to the 'volunteer effect' (where respondents self-select) (Eysenbach, 2004). The area of research may therefore have attracted a higher proportion of CPs with strong views (either positive of negative) on HIT and the sharing of EPRs, than would be representative of the general population. For the England questionnaire, respondents with either particularly positive or negative opinions on SCR may have been motivated to respond more so than those without a strong opinion. As the questionnaires were distributed via an anonymous web link and no identifiable information was collected, there was the possibility for respondents to complete the questionnaire more than once. This is a common concern for online questionnaires (Eysenbach, 2004). Also, because they needed to be completed online, access to technology (computer/tablet/smart-phone) was required. CPs with limited access or who are less confident in using technology may therefore have been less inclined to complete the questionnaire or may not have been aware of its existence.

Response rates for internet based questionnaires is typically low (Eysenbach, 2004) and cannot be accurately determined due to the indiscriminate nature of dissemination. Because social media was used to disseminate the questionnaires to a wider audience, there was a possibility that people other than CPs could have completed them. To mitigate this risk, the respondents were asked to declare they were a CP on the consent declaration section of the questionnaires.

6.7.2 Positionality and Potential for Bias in the Research

Positionality refers to an individual's position in relation to a specific area of research in the context of their world-view and experience (Foote et al., 2011). The researcher believes that there is potential for HIT to act as an enabler to improved care outcomes and this may have impacted on the approach to this research. As a CP with over ten years' experience in the Irish pharmacy setting, the researcher has experienced first-hand the challenges and frustrations of poor information transfer in practice. It is the researcher's opinion that CPs timely access to more complete information about patients has the potential to improve quality, efficiency and safety of patient care within community pharmacy and across care transitions, and that there is valuable information contained within community pharmacy records that could be shared with other providers. However, in recognition of this potential bias, the researcher took a balanced approach and ensured that evidence for both benefits and drawbacks of HIT were included in the research and presentation of the findings.

The expectation of the researcher in setting out to complete this dissertation was that TOCs would form the basis of the majority of the research in terms of need for and potential benefits of shared EPRs. However, as the research progressed and findings from the questionnaires were analysed, it became clear that there were also other areas of practice where there was a need for information contained in shared EPRs and the presentation of the findings was adapted to reflect this.

6.8 Summary of Recommendations

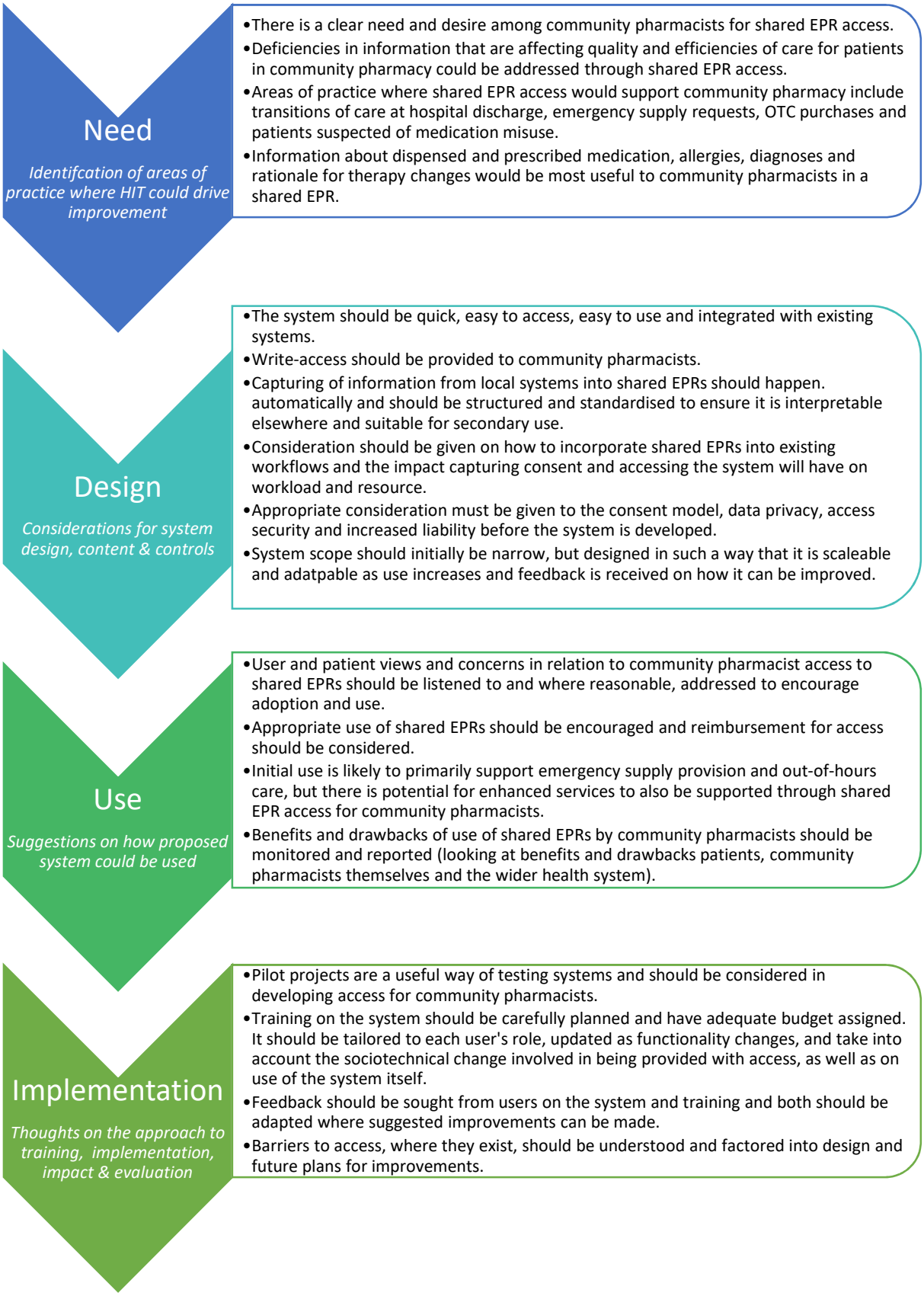


Figure 6.1: Summary of recommendations

6.9 Conclusion

It is evident that there is an imperative to improve quality of care for patients as they transition through healthcare. Sharing relevant health information about patients through HIT systems such as shared EPRs is a key enabler of this and their development and implementation should be encouraged and welcomed.

The extension of SCR access to CPs in England is a positive development that recognises the importance of this population in the provision of patient care as a key member of the primary care team. However, the lack of write-access to the record outside of the GP surgery is a weakness of the system and it is important for this to be addressed. Only then will the full benefits of improved care transitions supported by shared EPRs begin to be realised.

This research has shown that a clear need exists for shared EPR access for CPs. There are a variety of ways in which shared EPRs could be used within community pharmacy to benefit patients and practice, with initial improvements likely to be in efficiency of care and access to information out-of-hours. The design of shared EPRs must consider the user interface and experience, content of the record and access security. Implementation must be carefully planned, assign sufficient time and budget to training and evaluate progress and impact on users on an ongoing basis. There needs to be multidisciplinary cooperation across the health system, with strong political leadership, clear policy and strategy, involvement of clinical users at all stages, and consensus on the planned approach if this is to be achieved.

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Appendix A – Search Strategy, Sample Results and Critical Thinking Tool

Search strategy

Databases and journals searched	PubMed, Embase, Scopus, Google Scholar, Lenus, Innovations in Pharmacy, The Pharmacy Journal
Search terms used	Medical Error, Medication Errors (Mesh), Dispensing Error, Drug Error, Adverse drug event, Discrepancies, Patient Safety, Medication Safety, Care Transitions, Hospital (Mesh), Secondary Care, Primary Care, Acute care, Ambulatory Care, Admission, Discharge Patient Transfer (Mesh), Medication Reconciliation (Mesh), Med Rec, Medication list, Medication Therapy Management, Pharmacist, Community Pharmacist, Community Pharmacy Services (Mesh), Hospital Pharmacist, Pharmacy Services, Dispensing Pharmacies (Mesh), Summary Care Record, Electronic Health Record (Mesh), Medical Records (Mesh), Discharge Summaries, Patient Discharge Summaries (Mesh), Pharmacist Access (to narrow result), Liability, Legal (Mesh), Responsibility, Accountability, Risk, Roll-out, Training, Resistance, Change, Behaviour, Implementation, Implementation failure, Implementation best practice
Criteria	Language: English Years: 2006-2017
Types	• Studies and reviews published in peer reviewed journals • Previous dissertations relevant to the topic, reports • Publications, standards and policy documents from Irish & UK health websites (such as PSI, HPRA, HIQA, DoHC, NHS) • Forward searching and backward searching of publications cited elsewhere (which resulted in papers pre-2006 being included for review)

Examples of Searches

Pub Med (Using Mesh Search Terms)

Search	Add to builder	Query	Items found	Time
#49	Add	Search **"Medical Errors"[Mesh]**	96708	12:36:37
#14	Add	Search **"Electronic Health Records"[Mesh]**	11536	12:35:35
#45	Add	Search **"Medical Records"[Mesh]**	126189	12:35:03
#41	Add	Search **("Medication Errors"[Mesh]) AND "Medication Reconciliation"[Mesh] AND ("last 10 years"[PDat])**	612	12:15:33
#40	Add	Search **("Medication Errors"[Mesh]) AND "Medication Reconciliation"[Mesh]** Filters: **published in the last 10 years**	612	12:04:46
#39	Add	Search **("Medication Errors"[Mesh]) AND "Medication Reconciliation"[Mesh]** Filters: **published in the last 5 years**	495	12:02:53
#37	Add	Search **("Medication Errors"[Mesh]) AND "Medication Reconciliation"[Mesh]**	612	12:02:27
#38	Add	Search **((("Medication Errors"[Mesh]) AND "Medication Reconciliation"[Mesh])) AND "Community Pharmacy Services"[Mesh]) AND "Pharmacies"[Mesh]**	0	12:02:21
#36	Add	Search **("Open Access Publishing"[Mesh]) AND "Patient Discharge Summaries"[Mesh]**	0	12:01:42
#35	Add	Search **("Patient Discharge Summaries"[Mesh]) AND "Liability, Legal"[Mesh]**	1	12:00:51
#34	Add	Search **("Community Pharmacy Services"[Mesh]) AND "Patient Discharge Summaries"[Mesh]**	2	12:00:16
#33	Add	Search **(("Community Pharmacy Services"[Mesh]) AND "Pharmacies"[Mesh]) AND "Patient Discharge Summaries"[Mesh]** Schema: **all**	0	11:59:25
#32	Add	Search **(("Community Pharmacy Services"[Mesh]) AND "Pharmacies"[Mesh]) AND "Patient Discharge Summaries"[Mesh]**	0	11:59:24
#31	Add	Search **((("Community Pharmacy Services"[Mesh]) AND "Pharmacies"[Mesh]) AND "Medication Reconciliation"[Mesh]) AND "Medication Errors"[Mesh]**	0	11:57:58
#30	Add	Search **(("Electronic Health Records"[Mesh]) AND "Patient Discharge Summaries"[Mesh]) AND "Medication Reconciliation"[Mesh]**	5	11:31:04
#26	Add	Search **"Patient Discharge Summaries"[Mesh]**	122	11:24:20
#24	Add	Search **"Liability, Legal"[Mesh]**	14940	11:23:40
#19	Add	Search **"Medication Reconciliation"[Mesh]**	612	11:21:13
#16	Add	Search **"Hospitals"[Mesh]**	238243	11:20:27
#11	Add	Search **"Community Pharmacy Services"[Mesh]**	3394	11:17:56
#9	Add	Search **"Pharmacies"[Mesh]**	6931	11:17:35
#7	Add	Search **"Medication Errors"[Mesh]**	13367	11:16:58
#4	Add	Search **"Patient Transfer"[Mesh]**	6633	11:16:13

Embase

PICO Search - 219 results

'hospital discharge'/exp OR 'discharge planning' OR 'discharge, hospital' OR 'hospital discharge' OR 'patient discharge' AND ('medication therapy management'/exp OR 'drug therapy management' OR 'medication management' OR 'medication reconciliation' OR 'medication therapy management') AND ('medication error'/exp OR 'drug administration error' OR 'drug administration errors' OR 'medication error' OR 'medication errors')

'Six Questions to Trigger Critical Thinking' Tool

Where did you find the information? Did you just 'come across' it? Or did you access it through a systematic search?	**What** is it and **what** are the key messages or results/findings? Is it a research study, professional opinion, discussion, website or other?
How has the author/speaker come to their conclusions? Is their line of reasoning logical and understandable? If you are looking at research or a review of research, how was it carried out? Was it done well? Do the conclusions reflect the findings?	**Who** has written/said this? Is the author/speaker an organisation or individual? Are they an expert in the topic? Could they have any bias? How do you know?
When was this written/said? Older key information/sources may still be valid, but you need to check if there has been more recent work.	**Why** has this been written/said? Who is the information aimed at - professionals or patient/client groups? What is the aim of the information?

Six questions to trigger critical thinking (Aveyard, Sharp & Woolliams 2011; adapted from Woolliams et al 2009)

Appendix B - Information Sheets for Prospective Questionnaire Respondents

Questionnaire 1: Pharmacists in Ireland

Please note: The below information was included as the introductory page visible to the participant when they click on the URL for the questionnaire. A Print button was also added to allow the respondent to easily print the information if they wished to do so.

Introduction

Thank you for taking the time to participate in this questionnaire. It will take approximately 10 minutes to complete. The responses you provide will support a research project that is looking at the important considerations for the design, use and implementation of electronic shared patient record access for community pharmacists.

Background to the questionnaire

The ability to record and share key information on patients' interaction across organisations and care settings is a key component of eHealth. It provides benefits to patients, service users, carers, health and social care professionals and wider stakeholders in the health system. An Electronic Health Record (EHR), which is the cornerstone of the eHealth Strategy for Ireland, facilitates the sharing of this information. One of the core components of an EHR for Ireland will be the National Shared Record. This will allow electronic patient records to be shared across care settings. It is hoped that your responses will prove useful in shaping the design and implementation of the National Shared Record for Ireland and how community pharmacists may use it.

Responses will be aggregated for the purposes of analysis and treated confidentially. You have been invited to participate in this questionnaire as you are a community pharmacist. Identifiable information, including your IP address or email address will not be collected. All data collected will be stored and processed on a password protected PC and in accordance with the Data Protection Act 1998 and 2003. It will be retained for a period of five years. Please do not name third parties in any open text field of the questionnaire. Any such replies will be anonymised. In the extremely unlikely event that illicit activity is reported, I will be obliged to report it to appropriate authorities.

You can move forward or backwards through the survey to edit your answers by clicking on the directional arrows. You can exit the survey at any time and all questions are optional. If you exit before completing the survey, your answers will not be submitted for analysis.

The lead researcher on this project is Dan Burns, MPSI, pharmacy operations manager with Boots Ireland. The research project being carried out in part fulfilment for an MSc in Health Informatics at Trinity College Dublin. The outputs of the research may also be submitted for further publication e.g. for research journals and conferences. They may also be shared with interested parties such as Health Ireland, Boots and the Irish Pharmacy Union to support the development of electronic shared patient record access for community pharmacists. If you have any questions about any aspect of this

Please click >> to proceed

Questionnaire 2: Pharmacists in England

Please note: The below information was included as the introductory page visible to the participant when they click on the URL for the questionnaire. A Print button was also added to allow the respondent to easily print the information if they wished to do so.

Introduction

Thank you for taking the time to participate in this questionnaire. It will take approximately 10 minutes to complete. The responses you provide will support a research project that is looking at the important considerations for the design, use and implementation of electronic shared patient record access for community pharmacists.

Background to the questionnaire

This questionnaire is aimed at community pharmacists in England to understand their views and experience of Summary Care Records (SCRs). It is suitable for pharmacists who have used SCRs and those who have not used SCRs to complete the questionnaire.

The roll-out of Summary Care Record (SCR) access to community pharmacists in England is already well progressed. For users of the system it is hoped that your insight and experience of SCRs will be valuable for other jurisdictions where such systems are not yet in place. It will also be useful to understand how the system is impacting on your day to day practice and how you found the training and implementation process. For those who are not using SCRs, it will ask about your reasons for not doing so and your general views on the topic.

Responses will be aggregated for the purposes of analysis and treated confidentially. Identifiable information, including your IP address or email address, will not be collected. All data collected will be stored and processed on a password protected PC and in accordance with the Data Protection Act 1998 and 2003. It will be retained for a period of five years. Please do not name third parties in any open text field of the questionnaire. Any such replies will be anonymised. In the extremely unlikely event that illicit activity is reported, I will be obliged to report it to appropriate authorities.

You can move forward or backwards through the survey to edit your answers by clicking on the directional arrows. You can exit the survey at any time and all questions are optional. If you exit before completing the survey, your answers will not be submitted for analysis.

The lead researcher on this project is Dan Burns, pharmacist and pharmacy operations manager with Boots Ireland. The research project being carried out in part fulfilment for an MSc in Health Informatics at Trinity College Dublin. The outputs of the research may also be submitted for further publication e.g. for research journals and conferences. They may also be shared with interested parties such as eHealth Ireland, Boots and the Irish Pharmacy Union to support the development of electronic shared patient record access for community pharmacists. If you have any questions about any aspect of this questionnaire, or require a debriefing after the research has been completed, please contact me at burnsda@tcd.ie.

Please click >> to proceed

Appendix C – Consent Declaration

(A print button was added to the online version of this declaration to allow the respondent to easily print a copy of the consent declaration if they wished to do so. The respondent needed to select Yes or No to proceed. If no was selected, they were automatically exited from the questionnaire. The consent declaration was the same for both questionnaires).

Please read the following declaration and if you are happy to proceed, click yes. (Please note if you click 'No', you will automatically be exited from the questionnaire and your participation will not be recorded).

Declaration:

• I am 18 years or older and am competent to provide consent.

• I am a community pharmacist

• I have read, or had read to me, an introduction to this questionnaire providing information about this research and this consent form. I know that I can ask questions in advance of completing the questionnaire by contacting the researcher by email: burnsda@tcd.ie. Where applicable, all my questions have been answered to my satisfaction and I understand the description of the research that is being provided to me.

• I agree that the data from my responses is used for scientific purposes and I have no objection that this data is published in scientific publications in a way that does not reveal my identity.

• I understand that if I make illicit activities known, these will be reported to appropriate authorities.

• I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

• I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.

• I understand that my participation is fully anonymous and that no personal details about me will be recorded.

• As completion of this questionnaire requires use of a computer monitor, I understand that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.

Do you wish to proceed?

- ○ Yes
- ○ No

Appendix D – Questionnaire for Community Pharmacists in Ireland Exported from Qualtrics™

Demographics

What is your gender?

- ❍ Male (1)
- ❍ Female (2)

Years of registration as a pharmacist

- ❍ 0-3 (1)
- ❍ 4-10 (2)
- ❍ 11-20 (3)
- ❍ 21+ (4)

What is your current role?

- ❍ Superintendent pharmacist (1)
- ❍ Supervising pharmacist (2)
- ❍ Superintendent and supervising pharmacist (6)
- ❍ Non-supervising pharmacist based in one pharmacy location (3)
- ❍ Non-supervising pharmacist working in more than one pharmacy location (e.g. locum pharmacist) (4)
- ❍ Other (5)

Do you work on a full-time or part-time basis?

- ❍ Full-time (1)
- ❍ Part-time (2)

Which of the following best describes the location(s) of the pharmacy/pharmacies in which you currently work? (You may choose more than one option)

- ❑ Inner city (1)
- ❑ Small town/rural (2)
- ❑ City suburbs (3)
- ❑ Large town (4)
- ❑ Other (5)

The next set of questions will look to understand certain areas of your practice that may be supported by access to information contained in a National Shared Record.

How often do you dispense hospital prescriptions

- ❍ Daily (1)
- ❍ 2-3 times a week (2)
- ❍ Once a week (3)
- ❍ Less than once a week (4)
- ❍ Not applicable (6)

Condition: Not applicable Is Selected. Skip To: On average, how often do you receive ....

On average, how often do you need to contact prescribers in hospitals to discuss a query on a prescription?

- ❍ Daily (1)
- ❍ 2-3 times a week (2)
- ❍ Once a week (3)
- ❍ 2-3 times a month (4)
- ❍ Once a month or less (5)

In general, how easy or difficult do you find resolving queries on hospital prescriptions?

- ❍ Easy (1)
- ❍ Somewhat difficult (2)
- ❍ Neither easy nor difficult (3)
- ❍ Difficult (4)
- ❍ Very difficult (5)

Thinking about your most recent query on a hospital prescription, how long did it take to resolve?

- ❍ Within one phone call (1)
- ❍ Within the same day (more than one phone call required) (2)
- ❍ More than one day (3)
- ❍ More than one week (4)
- ❍ It was not resolved to my satisfaction (5)
- ❍ I can't recall (6)

If you have experienced difficulty in resolving queries on hospital prescriptions, which of the following reasons do you consider to be the most problematic? (Please drag and drop your answers in order from 1-5, with 1 being the most problematic and 5 being the least problematic)

_____ Prescriber cannot be contacted (1)
_____ Prescriber cannot be identified (5)
_____ Prescriber cannot remember details about the patient/prescription (2)
_____ No access to medical records in the hospital at the time of the query (3)
_____ Unable to come to agreement with prescriber (4)

On average, how often do you receive requests for emergency supplies of prescription only medicines for patients who have not previously had prescriptions dispensed in your pharmacy?

- ❍ Daily (1)
- ❍ 2-3 times a week (2)
- ❍ About once a week (3)
- ❍ Less than once a week (4)
- ❍ Not applicable (5)

Condition: Not applicable Is Selected. Skip To: In the last six months, have you refu....

In the last six months, have you refused an emergency supply request because you did not have the information required to assure yourself that it was appropriate to supply?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Can't recall (3)

Display This Question:
If In the last six months, have you refused an emergency supply request because you did not have the information required to assure yourself that it was appropriate to supply? Yes Is Selected

On the occasion(s) where an emergency supply was refused, would access to the patients' medication history have changed the decision?

- ❍ Yes (1)
- ❍ Maybe (2)
- ❍ No (3)

In the last six months, have you refused the sale of an OTC medicine because of concern about potential drug-drug interaction(s) for a patient on prescription medication who does not have their prescription dispensed in your pharmacy?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Can't recall (4)
- ❍ Not applicable (5)

Condition: Not applicable Is Selected. Skip To: In the past six months, have you had ....Condition: Can't recall Is Selected. Skip To: In the past six months, have you had ....

Display This Question:

If In the last six months, have you refused the sale of an OTC medicine because of concern about pot... Yes Is Selected

On the occasion(s) where you refused the sale of an OTC medicine, would access to the patient's medication history have changed the decision?

- ❍ Yes (1)
- ❍ Maybe (2)
- ❍ No (3)

In the past six months, have you had concerns about potential medication misuse regarding a patient presenting to your pharmacy?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Can't recall (3)
- ❍ Not applicable (4)

Condition: Can't recall Is Selected. Skip To: End of Block.Condition: Not applicable Is Selected. Skip To: End of Block.

Display This Question:

If In the past six months, have you had concerns about potential medication misuse regarding a patie... Yes Is Selected

On the occasion(s) where you have had concerns about medication misuse, would access the patient's medication history (other than that available within your pharmacy) have supported you in relation to this patient?

- ❍ Yes (1)
- ❍ Maybe (2)
- ❍ No (3)

It is planned that every citizen in Ireland will have an Electronic Health Record (EHR). A core component of this will be the National Shared Record. It is proposed that this record will contain key

patient data from a range of systems to support patient care between organisations and across care settings.

This final set of questions will ask about your views on electronic shared patient records, including what type of information you think they should include, how you might use them and how access should be controlled

Consider you were provided with access to patient data through a National Shared Record. Rate the usefulness of the following pieces of information in supporting your practice if they were available

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)
Indication for treatment (1)	❍	❍	❍	❍	❍
Co-morbidities (2)	❍	❍	❍	❍	❍
Drug allergies (3)	❍	❍	❍	❍	❍
Previous adverse reactions (4)	❍	❍	❍	❍	❍
Immunisations (5)	❍	❍	❍	❍	❍
Prescribed medication history for past 6 months (6)	❍	❍	❍	❍	❍
Dispensed medication history for past 6 months (7)	❍	❍	❍	❍	❍
Rationale for medication changes/discontinuation (8)	❍	❍	❍	❍	❍
Rationale for dose changes (9)	❍	❍	❍	❍	❍
Weight/BMI (10)	❍	❍	❍	❍	❍
Body surface area (11)	❍	❍	❍	❍	❍
Laboratory results (e.g. blood tests/INR levels) (12)	❍	❍	❍	❍	❍
Drug serum levels (13)	❍	❍	❍	❍	❍

How likely do you think it is that you would access this information about patients if it were available to you within a National Shared Record?

	Unlikely to access (1)	Likely to access (2)	Very likely to access (3)	Don't know (4)
Indication for treatment (1)	❍	❍	❍	❍
Co-morbidities (2)	❍	❍	❍	❍
Drug allergies (3)	❍	❍	❍	❍
Previous adverse reactions (4)	❍	❍	❍	❍
Immunisations (5)	❍	❍	❍	❍
Prescribed medication history for past 6 months (6)	❍	❍	❍	❍
Dispensed medication history for past 6 months (7)	❍	❍	❍	❍
Rationale for medication changes/discontinuation (8)	❍	❍	❍	❍
Rationale for dose changes (9)	❍	❍	❍	❍
Weight/BMI (10)	❍	❍	❍	❍
Body surface area (11)	❍	❍	❍	❍
Laboratory results (e.g. blood tests/INR levels) (12)	❍	❍	❍	❍
Drug serum levels (13)	❍	❍	❍	❍

Are there any other pieces of information about patients that you would consider useful if you had them available other than those listed above? (Please list as many as you wish)

For the following patients/situations, please rate the usefulness of having access to additional information such as that listed above

	Not useful (1)	Useful (2)	Extremely useful (3)
All patients who attend your pharmacy (1)	❍	❍	❍
Patients who present at your pharmacy for the first time to have a prescription dispensed (2)	❍	❍	❍
Any patients presenting with a hospital prescription (3)	❍	❍	❍
Patients with multiple co-morbidities and/or complex medication needs (4)	❍	❍	❍
To support requests for emergency supplies (5)	❍	❍	❍
Patients requesting to purchase OTC medication who are also taking regular prescription medication (6)	❍	❍	❍
Patients whom you suspect of misusing medication (7)	❍	❍	❍
Other (please specify) (8)	❍	❍	❍

Which team members in the pharmacy should be able to access a National Shared Record? (Select all that apply)

- ❑ Pharmacists (1)
- ❑ Registered Pharmaceutical Assistants (Qualified Assistants) (2)
- ❑ Pharmacy Technicians/Dispensers (3)

Do you believe you need to undergo additional training to support your practice if you had access to patient information such as diagnoses, blood tests or drug serum levels?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Don't know (3)

If community pharmacists had access to a National Shared Record, which of the following information would you think should be inputted into the record from the local pharmacy system and shared with other users?

	Should be captured (1)	Should not be captured (2)	Don't know (3)
Dispensed medication (1)	❍	❍	❍
Adverse drug reactions (2)	❍	❍	❍
Allergies (3)	❍	❍	❍
Administration of vaccinations (4)	❍	❍	❍
Sale of OTC medicines containing codeine (5)	❍	❍	❍
Outcomes of prescription queries discussed with prescribers (6)	❍	❍	❍
Other (7)	❍	❍	❍

Which of the following populations should be able to view the information inputted by community pharmacists in a National Shared Record? (Select any/all that apply).

- ❑ Other community pharmacists (10)
- ❑ GPs (1)
- ❑ Hospital based doctors (2)
- ❑ Hospital pharmacists (3)
- ❑ Nurses (4)
- ❑ Other allied health professionals (e.g. physiotherapists, occupational therapists) (5)
- ❑ Mental health professionals (e.g. psychologists, counsellors) (6)
- ❑ Social care professionals (e.g. social workers) (7)
- ❑ Anyone to whom the patient gives consent (20)
- ❑ Patients (8)
- ❑ Other (please specify) (9) _____

Might any of the following prevent you from accessing a National Shared Record? (Select any/all that apply)

- ❑ Workload burden (1)
- ❑ Concerns about having increased responsibility in the patient's care (2)
- ❑ Fear of litigation (e.g. if accessed information was not interpreted/used correctly) (3)
- ❑ Fear of breaching data privacy (e.g. if a patient's record was deemed to have been accessed inappropriately) (4)
- ❑ Concerns about data security (5)
- ❑ Increased patient demands/expectations (6)
- ❑ Lack of sufficient IT equipment (7)
- ❑ Access to broadband (8)
- ❑ Other (please specify) (9) _____

Please rate the importance of the following being in place before you would access a National Shared Record

	Not important (1)	Somewhat important (2)	Important (3)	Very important (4)
Appropriate controls in relation to data security (1)	❍	❍	❍	❍
Clear guidelines in relation to patient data privacy and consent (2)	❍	❍	❍	❍
Reimbursement in return for access (3)	❍	❍	❍	❍
Comprehensive training on use of the system being provided (4)	❍	❍	❍	❍
Telephone/email support in the event of queries or concerns arising on use of the system (5)	❍	❍	❍	❍
Confirmation that professional liability insurance will cover Shared Care Record access (6)	❍	❍	❍	❍

How do you think patient consent to access National Shared Records should be recorded in the community pharmacy setting?

- ❍ Verbal consent (1)
- ❍ Written consent (2)
- ❍ Don't know (3)

Do you have any additional comments that you think would be useful in supporting the development of community pharmacist access to shared electronic patient records?

You have now reached the end of the questionnaire. Please click >> to submit your responses.

If you wish to exit without submitting, you can do so by closing your browser window now and your responses will not be included for analysis.

Appendix E – Questionnaire for Community Pharmacists in England Exported from Qualtrics™

Demographics

What is your gender?

- ❍ Male (1)
- ❍ Female (2)

Years of registration as a pharmacist

- ❍ 0-3 (1)
- ❍ 4-10 (2)
- ❍ 11-20 (3)
- ❍ 21+ (4)

What is your current role?

- ❍ Store based pharmacist (1)
- ❍ Relief/locum pharmacist (2)
- ❍ Other (3)

Do you work on a full-time or part-time basis?

- ❍ Full-time (1)
- ❍ Part-time (2)

Which of the following best describes the location(s) of the pharmacy/pharmacies in which you currently work? (You may choose more than one option)

- ❑ Inner city (1)
- ❑ Small town/rural (2)
- ❑ City suburbs (3)
- ❑ Large town (4)
- ❑ Other (5)

The next set of questions will ask about your experience of Summary Care Records (SCRs)

Do you currently access Summary Care Records (SCRs) through the NHS portal within your pharmacy?

- ❍ Yes (1)
- ❍ No (2)

Condition: No Is Selected. Skip To: End of Block.

How often to you typically access the SCR portal?

- ❍ Daily (1)
- ❍ 2-3 times a week (2)
- ❍ Once a week (3)
- ❍ 2-3 times a month (4)
- ❍ About once a month (5)
- ❍ Less than once a month (6)

For which types of patients have you accessed the SCR portal? (Select one or both options)

- ❑ Patients who regularly attend my pharmacy (1)
- ❑ New patients when they present to my pharmacy for the first time (2)

Display This Question:

If For which types of patients have you accessed the SCR portal? (Select one or both options) Patients who regularly attend my pharmacy Is Selected

And For which types of patients have you accessed the SCR portal? (Select one or both options) New patients when they present to my pharmacy for the first time Is Selected

Which types of patients do you access SCRs for more often? (Select one)

- ❍ Patients who regularly attend my pharmacy (1)
- ❍ New patients when they present to my pharmacy for the first time (2)
- ❍ Frequency of access is similar for both patient types (3)

What reason(s) have you had to access SCRs for patients in your pharmacy? (Please select any/all that apply)

- ❑ To support a request for an emergency supply (1)
- ❑ To support a request for supply under the Minor Ailment Scheme (2)
- ❑ To query a suspected error on a prescription (3)
- ❑ To confirm if a medication has been discontinued (4)
- ❑ To provide an answer regarding a repeat prescription query (5)
- ❑ To check if a repeat prescription is ready for collection at a surgery (6)
- ❑ To support delivery of a locally commissioned service (e.g. supply of medicines on a NHS Patient Group Direction) (7)
- ❑ To check for a drug allergy (8)
- ❑ To support provision of the New Medicines Services (NMS) (9)
- ❑ To check/confirm a previous adverse event (10)
- ❑ To support the delivery of a clinical pharmacy service (e.g. flu vaccination) (11)
- ❑ To support a Medicines Use Review (MUR) (12)
- ❑ Other (please specify) (13) _____

Have you ever had difficulty deciding if it was appropriate for you to access a patient's SCR?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Can't recall (3)

Display This Question:

If Have you ever had difficulty deciding if it was appropriate for you to access a patient's SCR? Yes Is Selected

Why did you find it difficult to decide if it was appropriate for you to access? (Select one of more options)

- ❑ Unsure on how to decide if there was a legitimate clinical need to access (1)
- ❑ Unsure of correct process in relation to obtaining patient consent (2)
- ❑ Unsure of how to record patient consent (3)
- ❑ Other (please specify) (4) _____

Have you ever had reason to gain access to a patient's SCR using the Emergency Access option (i.e. where consent could not be obtained at the time access was required)?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Can't recall (3)

Display This Question:

If Have you ever had reason to gain access to a patient's SCR using the Emergency Access option (i.e... Yes Is Selected

Please select the situation(s) which have resulted in you selecting this option. (Select all that apply)

- ❑ Patient was not available in the pharmacy or via telephone to provide consent (1)
- ❑ Patient did not have capacity to provide consent (2)
- ❑ Patient did not speak English (3)
- ❑ Other (please explain) (4) _____

Have you completed the Centre for Pharmacy Postgraduate Education (CPPE) online SCR training?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Don't know (3)

Condition: No Is Selected. Skip To: End of Block.Condition: Don't know Is Selected. Skip To: End of Block.

Display This Question:

If Have you completed the Centre for Pharmacy Postgraduate Education (CPPE) online SCR training? Yes Is Selected

Do you have the correct Role Based Access Control (RBAC) added to your smartcard profile?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Don't know (3)

Condition: No Is Selected. Skip To: End of Block.Condition: Don't know Is Selected. Skip To: End of Block.

Display This Question:

If Have you completed the Centre for Pharmacy Postgraduate Education (CPPE) online SCR training? Yes Is Selected

And Do you have the correct Role Based Access Control (RBAC) added to your smartcard profile? Yes Is Selected

What are the reason(s) why you have not accessed the SCR portal to date? (Select any/all that apply)

- ❑ Too busy (1)
- ❑ Haven't needed to (2)
- ❑ It is difficult to access (3)
- ❑ It is difficult to use (4)
- ❑ IT performance issues (e.g. computer too slow) (5)
- ❑ IT access issues (e.g. not enough computers in the pharmacy) (6)
- ❑ Broadband access/speed issues (7)
- ❑ It does not align well with my workflow process (8)
- ❑ Based on advice from colleague pharmacists (9)
- ❑ Don't see the value in doing so (10)
- ❑ I'm not clear when it is appropriate for me to access (11)
- ❑ I'm concerned about increased responsibility associated with access (12)
- ❑ Fear of litigation if accessed information is not interpreted/used correctly (13)
- ❑ Fear of disciplinary action if access was deemed to be inappropriate (14)
- ❑ Other (please specify) (15) _____

Display This Question:

If Have you completed the Centre for Pharmacy Postgraduate Education (CPPE) online SCR training? Yes Is Selected

And Do you have the correct Role Based Access Control (RBAC) added to your smartcard profile? Yes Is Selected

What, if anything, would increase the likelihood of you accessing the SCR portal?

Display This Question:

If Have you completed the Centre for Pharmacy Postgraduate Education (CPPE) online SCR training? Yes Is Selected

How would you rate the training you received in advance of being granted access to the SCR portal?

- ❍ Very good (1)
- ❍ Good (2)
- ❍ Fair (3)
- ❍ Poor (4)
- ❍ Very poor (5)

Display This Question:

If Have you completed the Centre for Pharmacy Postgraduate Education (CPPE) online SCR training? Yes Is Selected

In relation to the training provided, do you agree or disagree with the following statements?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The training was tailored to my role (1)	❍	❍	❍	❍	❍
I had sufficient time to complete the required training (2)	❍	❍	❍	❍	❍
I had an opportunity to provide feedback on the training (3)	❍	❍	❍	❍	❍

Currently only GPs can input information to a patient's SCR (so-called 'write-access). Do you think any other populations should be able to input information to SCRs?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Don't know (3)

Display This Question:

If Currently only GPs can input information to a patient's SCR (so-called 'write-access). Do you thi... Yes Is Selected

Which of the following populations do you think should be able to input information to SCRs? (Select any/all that apply)

- ❑ Community pharmacists (1)
- ❑ Hospital based doctors (2)
- ❑ Hospital pharmacists (3)
- ❑ Nurses (4)
- ❑ Other allied health professionals (e.g. physiotherapists, occupational therapists) (5)
- ❑ Social care professionals (e.g. social workers) (6)
- ❑ Mental health professionals (e.g. psychologists, counsellors) (7)
- ❑ Patients (8)
- ❑ Other (please specify) (9) _____

Which of the following groups should be allowed to view information inputted by community pharmacists into SCRs? (Select any/all that apply)

- ❑ Other community pharmacists (1)
- ❑ Hospital based doctors (2)
- ❑ Hospital pharmacists (3)
- ❑ Nurses (4)
- ❑ Other allied health professionals (e.g. physiotherapists, occupational therapists) (5)
- ❑ Social care professionals (e.g. social workers) (6)
- ❑ Mental health professionals (e.g. psychologists, counsellors) (7)
- ❑ Patients (8)
- ❑ Anyone to whom the patient gives consent (9)
- ❑ Other (please specify) (10) _____
- ❑ None of the above (11)

Which of the following would you like to have routinely available within the SCR portal to support your practice? (Select any/all that apply)

- ❑ Indication for treatment (1)
- ❑ Co-morbidities (2)
- ❑ Information about medication changes/discontinuation (3)
- ❑ Information about medication dose changes (4)
- ❑ Immunisations (5)
- ❑ Weight/BMI (6)
- ❑ Body surface area (7)
- ❑ Laboratory results (e.g. blood tests/INR levels) (8)
- ❑ Drug serum levels (9)
- ❑ Other (please specify) (10) _____

You have now reached the end of the questionnaire. Please click >> to submit your responses.

If you wish to exit without submitting, you can do so by closing your browser window now and your responses will not be included for analysis.

How would you rate the SCR portal in terms of ease of access?

- ❍ Extremely difficult (1)
- ❍ Somewhat difficult (2)
- ❍ Neither easy nor difficult (3)
- ❍ Somewhat easy (4)
- ❍ Extremely easy (5)

Are there any suggestions you would make to improve ease of access?

How would you rate the SCR portal in terms of speed of access?

- ❍ Extremely slow (1)
- ❍ Somewhat slow (2)
- ❍ Average (3)
- ❍ Somewhat fast (4)
- ❍ Extremely fast (5)

Are there any suggestions you would make to improve speed of access?

How would you rate the SCR portal in terms of usability (i.e. how easy it is to use?)

- ❍ Extremely difficult (1)
- ❍ Somewhat difficult (2)
- ❍ Neither easy nor difficult (3)
- ❍ Somewhat easy (4)
- ❍ Extremely easy (5)

Are there any suggestions you would make to improve usability? (i.e. to make it easier to use?)

How has SCR access impacted your role?

	Much worse (1)	Somewhat worse (2)	About the same (3)	Somewhat better (4)	Much better (5)
Quality of care you provide (1)	❍	❍	❍	❍	❍
Efficiency of service you provide (2)	❍	❍	❍	❍	❍
Level of involvement in care (3)	❍	❍	❍	❍	❍
Job satisfaction (4)	❍	❍	❍	❍	❍
Relationship with GPs (5)	❍	❍	❍	❍	❍

Since being provided with SCR access, which of the following statements is true?

- ❍ I need to contact GPs more often (1)
- ❍ I need to contact GPs less often (2)
- ❍ There has been no real difference in how often I need to contact GPs (3)

What has been the main benefit (if any) of having access to Summary Care Records?

What has been the main drawback (if any) of having access to Summary Care Records?

Currently only GPs can input information to a patient's SCR (so-called 'write-access'). Do you think any other populations should be able to input information to SCRs?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Don't know (3)

Display This Question:

If Currently only GPs can input information to a patient's SCR (so-called 'write-access). Do you thi... Yes Is Selected

Which of the following populations do you think should be able to input information to SCRs? (Select any/all that apply)

- ❑ Community pharmacists (1)
- ❑ Hospital based doctors (2)
- ❑ Hospital pharmacists (3)
- ❑ Nurses (4)
- ❑ Other allied health professionals (e.g. physiotherapists, occupational therapists) (5)
- ❑ Social care professionals (e.g. social workers) (6)
- ❑ Mental health professionals (e.g. psychologists, counsellors) (7)
- ❑ Patients (8)
- ❑ Other (please specify) (9) _____

Which of the following groups should be allowed to view information inputted by community pharmacists into SCRs? (Select any/all that apply)

- ❑ Other community pharmacists (1)
- ❑ Hospital based doctors (2)
- ❑ Hospital pharmacists (3)
- ❑ Nurses (4)
- ❑ Other allied health professionals (e.g. physiotherapists, occupational therapists) (5)
- ❑ Social care professionals (e.g. social workers) (6)
- ❑ Mental health professionals (e.g. psychologists, counsellors) (7)
- ❑ Anyone to whom the patient gives consent (8)
- ❑ Patients (9)
- ❑ Other (please specify) (10) _____
- ❑ None of the above (11)

How would you rate the training you received in advance of being granted access to the SCR portal?

- ❍ Very poor (1)
- ❍ Poor (2)
- ❍ Fair (3)
- ❍ Good (4)
- ❍ Very good (5)

Based on the training and information provided in advance of roll-out, please rate your level of confidence in introducing Summary Care Record access into your practice?

- ❍ No confidence (1)
- ❍ Slight confidence (2)
- ❍ Moderate confidence (3)
- ❍ High confidence (4)

In relation to the training provided, do you agree or disagree with the following statements?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The training was tailored to my role (1)	❍	❍	❍	❍	❍
I had sufficient time to complete the required training (2)	❍	❍	❍	❍	❍
I had an opportunity to provide feedback on the training (3)	❍	❍	❍	❍	❍

In general, how would you rate the usefulness of the information you have accessed through the SCR portal?

- ❍ Not at all useful (1)
- ❍ Slightly useful (2)
- ❍ Moderately useful (3)
- ❍ Very useful (4)
- ❍ Extremely useful (5)

Have you identified any errors in data you have accessed through the SCR portal?

- ❍ Yes (1)
- ❍ No (2)

Display This Question:

If Have you identified any errors in data you have accessed through the SCR portal? Yes Is Selected

What action, if any, have you taken when you have identified an error in the data?

Please rate the standard information currently available through the SCR portal in terms of its usefulness

	Not at all useful (1)	Slightly useful (2)	Moderately useful (3)	Very useful (4)	Extremely useful (5)
Patient demographics (1)	❍	❍	❍	❍	❍
Allergies (2)	❍	❍	❍	❍	❍
Adverse reactions (3)	❍	❍	❍	❍	❍
Acute medications in last 6/12 months (4)	❍	❍	❍	❍	❍
Current repeat medications (5)	❍	❍	❍	❍	❍
Discontinued repeat medication (6)	❍	❍	❍	❍	❍

Which of the following additional information would you like to have routinely available within the SCR portal to support your practice? (Select any/all that apply)

- ❑ Indication for treatment (1)
- ❑ Co-morbidities (2)
- ❑ Information about medication changes/discontinuation (3)
- ❑ Information about medication dose changes (4)
- ❑ Immunisations (5)
- ❑ Weight/BMI (6)
- ❑ Body surface area (7)
- ❑ Laboratory results (e.g. blood tests/INR levels) (8)
- ❑ Drug serum levels (9)
- ❑ Other (please specify) (10) _____

Do you agree or disagree with the following statements?

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I am clear on where I can go if I have a query in relation to SCR access (1)	❍	❍	❍	❍	❍
I know how to log a technical query or issue in relation to the system (2)	❍	❍	❍	❍	❍
I know how I can provide feedback or make suggestions on the system (3)	❍	❍	❍	❍	❍
I have been asked before now for feedback on the system (4)	❍	❍	❍	❍	❍

You have now reached the end of the questionnaire. Please click >> to submit your responses.

If you wish to exit without submitting, you can do so by closing your browser window now and your responses will not be included for analysis.

Appendix F – Likert Scale Questions Collapsed for Analysis in Results

Question	Original scale	Collapsed scale
Q2.6 Ireland questionnaire **If you have experienced difficulty in resolving queries on hospital prescriptions, which of the following reasons do you consider to be the most problematic?** • Unable to come to agreement with prescriber • Prescriber cannot remember details about the patient/prescription • No access to medical records in the hospital at the time of the query • Prescriber cannot be identified • Prescriber cannot be contacted	Respondent was asked to rank the reasons in order of 1 to 5, with 1 being most problematic and 5 being least problematic.	Reported as 1 to 3 being most problematic, and 4 and 5 being least problematic.
Q7.3 England questionnaire **How would you rate the SCR portal in terms of speed of access?** **Q7.5 England questionnaire** **How would you rate the SCR portal in terms of usability (i.e. how easy it is to use?)**	1. Extremely difficult 2. Somewhat difficult 3. Neither easy nor difficult 4. Somewhat easy 5. Extremely easy	1. Difficult 2. Neither easy nor difficult 3. Easy
Q7.3 England questionnaire **How would you rate the SCR portal in terms of speed of access?**	1. Extremely slow 2. Somewhat slow 3. Average 4. Somewhat fast 5. Extremely fast	1. Slow 2. Average 3. Fast
Q9.7 England questionnaire **Please rate the standard information currently available through the SCR portal in terms of its usefulness**	1. Not at all useful 2. Slightly useful 3. Moderately useful 4. Very useful 5. Extremely useful	1. Not at all useful 2. Moderately useful 3. Very useful
Q3.2 Ireland questionnaire **Consider you were provided with access to patient data through a National Shared Record. Rate the usefulness of the following pieces of information in supporting your practice if they were available**	Rating 1 to 5 with 1 being not at all useful and 5 being extremely useful	1 - Not useful 2&3 - Moderately useful 4&5 - Very useful
Q4.2 & 9.3 England questionnaire **In relation to the training provided, do you agree or disagree with the following statements?** **The training was tailored to my role** **I had sufficient time to complete the required training** **I had an opportunity to provide feedback on the training**	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Somewhat agree 5. Strongly agree	1. Disagree 2. Neither agree nor disagree 3. Agree
Question 4.2 Ireland questionnaire **Please rate the importance of the following being in place before you would access a National Shared Record**	1. Not important 2. Somewhat important 3. Important 4. Very important	1&2 – Low importance 3&4 – High importance
Q7.7 England questionnaire **How has SCR access impacted your role?**	1. Much worse 2. Somewhat worse 3. About the same 4. Somewhat better 5. Much better	1&2 – Worse 3 – About the same 4&5 Better

Appendix G - Community Pharmacist (Ireland) Opinion on Additional Patient Information

	Not useful		Moderately useful		Very useful		Unlikely to access		Likely to access		Don't know	
	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*
Indication for treatment	4.0%	*8*	5.5%	*11*	90.6%	*182*	2.5%	*5*	96.0%	*193*	1.5%	*3*
Co-morbidities	3.0%	*6*	10.5%	*21*	86.5%	*173*	4.0%	*8*	93.9%	*186*	2.0%	*4*
Drug allergies	4.5%	*9*	4.0%	*8*	91.5%	*183*	3.0%	*6*	94.5%	*189*	2.5%	*5*
Previous adverse reactions	3.5%	*7*	7.0%	*14*	89.6%	*180*	2.5%	*5*	94.5%	*190*	3.0%	*6*
Immunisations	6.0%	*12*	46.2%	*92*	47.7%	*95*	42.5%	*85*	54.0%	*108*	3.5%	*7*
Prescribed medication history for past 6 months	4.5%	*9*	3.5%	*7*	92.0%	*185*	1.0%	*2*	98.5%	*195*	0.5%	*1*
Dispensed medication history for past 6 months	5.0%	*10*	2.5%	*5*	92.5%	*185*	1.0%	*2*	98.0%	*196*	1.0%	*2*
Rationale for medication changes/discontinuation	3.0%	*6*	5.0%	*10*	92.0%	*184*	2.5%	*5*	94.9%	*187*	2.5%	*5*
Rationale for dose changes	3.5%	*7*	5.5%	*11*	91.0%	*181*	4.5%	*9*	92.0%	*184*	3.5%	*7*
Weight/BMI	1.5%	*3*	45.2%	*90*	53.3%	*106*	38.2%	*76*	55.3%	*110*	6.5%	*13*
Body surface area	7.5%	*15*	51.5%	*103*	41.0%	*82*	56.8%	*113*	37.7%	*75*	5.5%	*11*
Laboratory results (e.g. blood tests/INR levels)	4.5%	*9*	37.7%	*75*	57.8%	*115*	28.8%	*57*	62.6%	*124*	8.6%	*17*
Drug serum levels	5.5%	*11*	47.5%	*95*	47.0%	*94*	39.2%	*78*	51.8%	*103*	9.1%	*18*

Appendix H – Ethics Approval from TCD SCSS

Status | View | Assign Supervisor

Current Status	Submission date	Last Status Update	Academic Supervisor / Lead Researcher	Application Number
Approved	Wednesday, March 22, 2017 - 22:08	Monday, April 3, 2017 - 10:12	gstephen	20170317

No workflow transitions are possible at this time.

Final Comments from the Research Ethics Committee

Issues raised in past review are adequately addressed by this revision, your application has been approved. .

Status:
Approved