Communicating health information in primary care: a multidisciplinary exploration of patient, pharmacist, and physician decision-making

by

Kathryn Aviva Mercer

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Examining Committee Membership

The following served on the Examining Committee for this thesis. The decision of the Examining Committee is by majority vote.

External Examiner	Dr. Jason Perepelkin Associate Professor College of Pharmacy and Nutrition University of Saskatchewan
Supervisor	Dr. Kelly Grindrod Associate Professor School of Pharmacy University of Waterloo
Internal Member	Dr. Wasem Alsabbagh Assistant Professor School of Pharmacy University of Waterloo
Internal-external Members	Dr. Catherine Burns Professor Systems Design Engineering University of Waterloo
	Dr. Elena Neiterman Lecturer School of Public Health and Health Systems University of Waterloo

Author's Declaration

This thesis consists of material all of which I authored or co-authored. Please see Statement of Contributions included in the thesis.

This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

Kate Mercer was the sole author for Chapters 1, 2, and 7 which were written under the supervision of Dr. Kelly Grindrod and were not written for publication.

This thesis consists in part of four manuscripts written for publication. Exceptions to sole authorship of material are as follows:

Research presented in Chapters 3 and 4:

Dr. Kelly Grindrod and Dr. Catherine Burns were the primary co-investigators on Canadian Institutes of Health Research (CIHR) and TelusHealth grants which supported conducting this work. Dr. Lisa Guirguis, Dr. Jessie Chin, Dr. Maman Joyce Dogba, Dr. Lisa Dolovich, Dr. Line Guénette, Dr. France Légaré, Dr. Josephine McMurray were co-investigators on the grant and are co-authors on any publications relating to this work.

This research was conducted at the University of Waterloo by Kathryn Mercer under the supervision of Dr. Kelly Grindrod. Dr. Kelly Grindrod, Dr. Catherine Burns, Dr. Lisa Guirguis, Dr. Maman Joyce Dogba, Dr. Lisa Dolovich, Dr. Line Guénette, Dr. France Légaré, Dr. Josephine McMurray, and Kathryn Mercer contributed to study design and participant recruitment. Kathryn Mercer, Khrystine Waked, Jonathan Boersma, Damla Kerestecioglu, and Jessie Chin conducted the one-on-one semi-structured interviews. Kathryn Mercer, Khrystine Waked, and Drs. Kelly Grindrod and Lisa Guirguis were the primary coders, contributing to coding and analysis of all interviews. Catherine Burns, Dr. Jessie Chin, Dr. Maman Joyce Dogba, Dr. Lisa Dolovich, Dr. Line Guénette, Laurie Jenkins, Dr. France Légaré, Annette McKinnon, and Dr. Josephine McMurray participated in coding and analysis. Kathryn Mercer wrote the draft manuscripts, which all co-authors contributed intellectual input on.

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As lead author of these four chapters, I was responsible for contributing to conceptualizing study design, carrying out data collection and analysis, and drafting and submitting manuscripts. My coauthors provided guidance during each step of the research and provided feedback on draft manuscripts.

Abstract

Research has yet to clearly define how health care professionals' (HCPs) use and sharing of information influences how health decisions are made, both independently and collaboratively. Similarly, the manner in which patients use, interact with, and find health information is not fully, and how external influencers impact patient decision-making about health.

The overall goal of this thesis is to examine how and what information is being shared among patients, pharmacists, and physicians and how this information is used in decision making. Using a variety of methodologies, this research examined five areas of communication and decision-making: 1) How patients, pharmacists, and physicians currently make decisions as a healthcare team; how this information influences shared decision-making about patients' medications and health; and how this process can be improved through the use of electronic health records (EHRs); 2) How information is communicated among HCPs and between HCPs and patients; 3) What information patients seek out, collect and communicate to their HCPs; 4) How relationships influence professional collaboration and communication in healthcare; and 5) The scope of existing knowledge around including the reason for use on a prescription and how that influences the ways in which pharmacists make decisions.

This thesis consists of four papers that describe two studies. Three of the papers use data from a qualitative examination of ethnographic observations and structured or semi-structured interview methods to examine: 1) patients' medication decision-making with their pharmacists and physicians; 2) pharmacist and physician medication decision-making; and 3) how relationships between pharmacists and physicians influence collaboration. The final paper is a scoping review of the literature that characterizes the current body of research on how including the reason for use on a prescription impacts pharmacist decision making.

The first study examines how patients make decisions with their health care team, how information influences decision-making and how the process can be improved through EHRs. It revealed that different people play different roles when it comes to helping patients make decisions. The first of three papers emerging from the first study determined that while EHRs can support decision-making, more research is needed to further clarify perceptions of role and how to develop EHRs that are adaptive to varying user information needs. The second paper focuses on physician-pharmacists medication decision-making and examined how physician and pharmacist relationships influence collaboration and communication. It concluded that there is limited communication and collaboration between physicians and pharmacists around managing medications. Further, this research saw an emerging result about how relationships influence how and when collaboration and communication occur, resulting in the third paper which examined the relationships more closely. The fourth paper emerged from the need to better understand the current scope of research about including reason for use on a prescription that is sent to a pharmacist--an emerging area of interest from the original study.

Taken together, the chapters provide an emerging picture of how and what information is and should be communicated in healthcare and the factors that influence how information is shared. The findings reveal important common elements that have yet to be fully explored when it comes to information sharing, and these ultimately influence decision-making in health. The findings describe a complex environment of differing information needs among pharmacists, physicians, and patients and emphasize the importance of understanding specific knowledge that must be communicated. Future research should be designed to accommodate a robust multidisciplinary approach that allows us to examine how sharing and communicating health information changes as the influence of technology and the number of stakeholders involved in care increases. Future research should focus on helping HCPs develop multidisciplinary strategies for collaboration and information sharing, based on a shared understanding of each other's roles, priorities, and values.

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Dedication

For my Mom.

Thank you.

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List of Abbreviations

CBPR	Community Based Participatory Research
CIHR	Canadian Institutes of Health Research
EHR	Electronic Health Records
EMR	Electronic Medical Records
HCP	Healthcare Professional
IP-SDM	Interprofessional Shared Decision-Making
KTA	Knowledge to Action
KT	Knowledge Translation
MeSH	Medical Subject Headings
PAR	Participatory Action Research
PICO	Population, Intervention, Control, Outcome
PPMR	Pharmacy Practice Management System
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRISMA-SCR	Preferred Reporting Items for Systematic Reviews and Meta-Analyses – Scoping Reviews
SAHL-E	Short Assessment of Health Literacy-English
SDM	Shared Decision-Making
SPIDER	Sample, Phenomenon of Interest, Design, Evaluation, Research type
SPOR	Strategy for Patient Oriented Research

Chapter 1

Introduction

1.1 Introduction and Literature Summary

In the modern healthcare setting, it is fundamental for healthcare providers to make decisions by sharing information across their healthcare team. Though historically, physicians made most of the decisions about people's care without involving patients in any part of the process, and other caregivers had only a very minor role, the modern healthcare system is being redeveloped to focus on collaborative multidisciplinary care that involves the patient and other stakeholders.[1,2] As healthcare decision-making has grown to include input from practitioners other than physicians, the processes have become increasingly complex, and so too has the communication of information about care.[3] Exchanging information necessitates a shared language, a communication channel, a system of support, and a mutual understanding of values as well as process. In addition, the expectations of others involved in care have also changed around factors such as role expectations, information sharing, and communication.[4] Better ways are needed to facilitate this involvement, and to mitigate the challenges inherent in sharing the full range of information necessary to make sound decisions about health.[5] To combat a fragmented system in Canada and internationally, evolving ways of improving information sharing include the introduction of new medical decision-making models and a move towards electronic health records (EHRs).

Healthcare systems around the world are increasingly promoting the delivery of care in an integrated manner with multidisciplinary stakeholders working together to make health-related decisions.[6,7] As healthcare teams become increasingly multidisciplinary, information needs to be communicated to an increasing number of people who often have different information needs, contexts, and languages. As a foundational clinical skill for physicians and pharmacists, and along with a patient's own health literacy, communication of health information plays a pivotal role in people's ability to discuss their diagnosis, prognosis, and general health in meaningful ways.[8,9] However, if there is an expectation that patients and healthcare professionals (HCPs) will be making the most appropriate decisions about health, the information used to make these decisions must be communicated between each participant in health in a way they can understand and use.[10–12]

At a structural level the current systems in place do not facilitate effective information sharing between the various stakeholders in health. This creates downstream challenges when building institutional systems that facilitate sharing information. At a micro level, methods of teaching people how and what information must be shared are required.[13,14] The traditional *paternalistic* physician-centered model of medicine, though a long established model of healthcare, is increasingly losing ground as an optimal way to care for patients, in large part because it does not offer a space for engaging patients in their own care.[15] Historically, physicians were authorities who did not communicate with patients about either health information or their decision-making, and patients were intentionally not provided with information about their diagnosis or treatment.[16]

> *The question is often asked, why physicians do not write… prescriptions in English. The answer is obvious — that if they did, the patient would often be less benefited than he now is. There are very few minds which have sufficient firmness, during the continuance of disease, to reason calmly on the probable effects of remedies, and to compare their wonted action… The only state in which the mind can rest… during severe illness, is that of*

> *implicit reliance in the skill of the physician, and an entire acquiescence in the course adopted, without the slightest question or argument.*
> *Latin prescriptions. Boston Med Surg J 1833; 9:98-99*[16]

Similarly, in the paternalistic doctor-based approach to care, decision-making about medications and treatments was traditionally guided solely by the physician with information flowing in one direction, from physician to patient, without engaging other HCPs. Though fading, this traditional *paternalistic* doctor-centered belief that patients cannot and should not have access to any health information because they do not have the authority of a physician still lingers in modern healthcare interactions.

However, in general, this approach has been found to no longer be effective, given the complexity of the healthcare systems, which have evolved through the mounting use of modern technology and the growing specialization of professions.[17–19] Increasingly, every participant in healthcare follows a different modes of communicating health information, which can both facilitate and impede the success of sharing health-related information.[20,21] Researchers are becoming increasingly aware of what happens when there is an over-saturation of information, as well as the different ways different groups of people disseminate, communicate, and use information.[22] In healthcare, the intricacies around information sharing are demonstrated at micro, institutional, and structural levels. At the micro level, people need to be taught how and what information needs to be communicated in a way that makes sense to each group using the information. At the institutional level, there needs to be a way to facilitate sharing and communicating health information to align the languages people use to communicate and share information. Structurally, the healthcare systems in Canada are fragmented, and tools must be developed to support sharing information among stakeholders.

Availability of and access to health information is increasing, and people's ability to find, prioritize, understand, and share health information (and misinformation) influences how they interact with and share information.[23] Expectations today are that patients' knowledge about their conditions is limited only by their comfort level, which carries the inherent requirement that they are able to understand and navigate health choices.[7,15,24,25] Correspondingly HCPs are expected to stay on top of an over saturation of information about emerging research, best practices, new roles, and treatment options. Speier identified that *"information overload occurs when the amount of input to a system exceeds its processing capacity. Decision makers have fairly limited cognitive processing capacity. Consequently, when information overload occurs, it is likely that a reduction in decision quality will occur."*[26] This said, people must be allowed to control how much, and in what form information is delivered to them when they engage in making decisions about health.

At some point everyone has to make a decision about their health – to seek or not seek treatment, to take or not take medication, to find or not find health information. Most patients will willingly participate in making health decisions when given the option and a platform to do so, even when the decisions they are making are complex and difficult.[27,28] As healthcare needs increase, so too does the need for HCPs and patients to work together to improve continuity of care, patient monitoring, the identification of critical findings, and the promotion of education and learning opportunities. As of 2011, roughly one-third of Canadians were living with at least one significant chronic illness, with 12.9% of Canadians over the age of 20 living with two or more conditions, with the percentage rising as people age.[29] The Canadian Health Measures Survey identified that 41% of the participants had taken at least one prescribed medication within two days of being interviewed.[30] The use of a prescription drug rose from 12% among 6 to 14 year olds to 83% of 65-79 year olds.[30] In 2005, it was found that pharmacists on average dispensed 35 prescriptions per person aged 60-79, jumping to 74 prescriptions for persons aged 80 and older.[31] Managing the use of multiple medications is complicated, requiring a high level of health literacy among patients, who not only need to understand diagnosis and treatment, but also must effectively navigate the health system.[32] As well, miscommunications and misunderstandings among HCPs, and between HCPs and patients, result in many instances of people prescribed multiple medications having a higher risk of adverse drug events.[33]

Though the future of healthcare is moving to the embrace inter-professional activity and shared decision-making, there are obstacles to progress in this area. This thesis explores how and when communication and information sharing occurs among physicians, pharmacists, and patients. As well, it begins to investigate how EHRs can facilitate information sharing, and the information participants need and value to be able to fully participate in healthcare.

1.2 Health information seeking and sharing

In order to make decisions about their health, people first need to access the information required to make these decisions. This information can come from many sources, including HCPs, family, friends, online and print.[34] Health information-seeking behaviour refers to the different ways people find information related to their health and illnesses and dates back to the late 1980s when the theory first emerged.[35] With the rapid rise of the information age and subsequent ease of sourcing and using health information online, finding the answer to the question of how people obtain health information is not easy.[34–36] People will seek different types and amounts of information, with significant variance depending on their personal information needs. Non-professionals will most commonly seek out health-related information from a combination of sources including HCPs, family, peers, books, and the internet.[35,37] Similarly, HCPs will seek out health information from a variety of sources including patients, peers, clinical resources and online, while navigating the often overwhelming amount of information they need to process in the course of their professional practices.[38]

Health websites, including blogs and forums, give patients and caregivers a platform on which to communicate information and exchange anecdotal advice with others experiencing similar health issues. Studies have documented the benefit that these websites offer in terms of social and emotional support around many different diagnoses and experiences.[39–42] While research studies have not been done on whether and how online sources influence decision-making, there is evidence that prior experience influences how people make health decisions.[43,44] When considering non-traditional health information (online, family, and peers), it is important to be aware both that the narrative of other patient experiences can be very impactful, and that the material itself can vary greatly in its opinions, purpose and, evidence.

As internet access and availability of health information has increased, patients are increasingly bringing online health information to their HCPs, even though HCPs are unlikely to point patients towards online resources.[45] Hesse et al. determined that while patients are going to the internet to find health information, there is more trust in HCPs, which may be a result of patients struggling with the complexity of online health information.[46] However, despite a greater trust in the reliability of information from HCPs, patients continue to use online health information due to its convenience.[47]

1.3 Communicating health information

The communication of health information occurs by moving information between a patient, their physician(s), pharmacists, other HCPs, and other decision influencers (such as family and peers). Yet while science is able to provide increasingly precise information about health risks, benefits, and interventions, there is no current consensus on the most effective ways to communicate this information among the different people involved in a person's health. Moreover, there is a notable absence of studies that systematically compare different interventions in how health information is communicated, most notably in how the interventions relate to and impact inter-professional collaboration and decision-making. Better understanding how people process health information, which information is important to them, how perspectives changes information needs, and how to foster effective communication among the various participants in health, can help people make better healthcare decisions.

Aligned with issues around the communication of health information, clarification and communication around role and scope of practice is necessary among HCPs and between HCPs and patients. For example, roughly one third of Canadian seniors take five or more medications, which is why pharmacists must be viewed as a key partner in their circle of care.[30] As roles and scopes of practice change, the communication around who can and should do what as it relates to patient care must change as well.[4,48] Research has demonstrated that clinical services provided by pharmacists improve patient outcomes leading pharmacists across Canada to expand their clinical roles to include prescribing, de-prescribing medications and vaccinations in addition to their traditional dispensing roles.[49] Research has validated that including pharmacists within primary care and emergency care is beneficial, but there has not yet been significant research to assess how communication between HCPs is changing, and needs to change, given this expanded scopes of practice.[50,51] Developing a system that allows for the inclusion of pharmacists and other HCPs in the larger healthcare team first requires a foundational understanding of how, when and why HCPs and patients are communicating the information they use to make health decisions.

1.4 Healthcare professional information sharing and relationships

The traditional authoritative style of medicine, while an established and enduring aspect of healthcare, is increasingly losing ground as an acceptable way to care for patients in large part because it does not engage patients in their own care. New patient responsibilities also arise when care is fragmented and when healthcare technologies and practices do not (or cannot due to limitations stemming from privacy regulations) keep pace with the need to coordinate information.[52,53] However, efforts are underway to address this issue and movements such as interprofessional shared-decision-making have provided training and created tools aimed at improving patient-provider engagement.[54,55] These efforts show themselves in new ways of improving disease self-management and encouraging incentives for behavioural change as researchers develop interventions which include more inclusive health behaviours as a collaborative goal.[9,56,57]

Collaboration in healthcare improves patient outcomes, prevents adverse drug reactions, decreases mortality, optimizes medication use, and improves workflows.[58–61] Inherent in building multidisciplinary practices that are more collaborative is understanding how inter-professional relationships influence collaboration and communication. One key feature of these newer models is the inclusion of new ways of decision-making. Increasingly, to make healthcare decisions, HCPs must consider inter-professional roles as well as patient agency, engagement, and communication, all of which are vital to understanding how people experience and navigate their health from diagnosis through treatment.[10,62] Yet while a movement towards a more integrated multidisciplinary approach to healthcare is occurring, there are still significant gaps in communication due to the siloed approach to health services.[63,64]. While inter-professional literature focuses on individual practitioners or 'learning to work together' through education, research is needed into teamwork and collaborative relationships in healthcare settings.

1.5 Patient engagement, communication, and decision-making

One of the biggest barriers to engaging people in making health decisions is that there is no systematically identified range of behaviours expected of "engaged patients." New pharmaceuticals and devices are making it possible for people with chronic conditions to live longer and better. Yet, the reality of understanding, adhering to and managing the demands of a large number of drug and lifestyle recommendations for chronic conditions such as diabetes, asthma, and HIV, as well as acute illnesses, mean that the number of healthcare decisions that patients are asked to make can be prodigious.[12,65,66] Navigating multiple care providers, getting diagnostic tests, and adhering to complex treatment regimens, on top of finding the information necessary to make a decision about one's health, is often initially overwhelming. For example, when patients are prescribed a new medication, they first need to decide to fill the medication. Then, once they are home, they have to adhere to drug regimens (short- and long-term), dietary restrictions, and rehabilitation—often on their own or with 'touch-base' guidance that they must follow closely to reach optimal health.[67,68]

Judith Hibbard, a leading theorist, and researcher of patient engagement, measured people's attitudes about performing key behaviours that comprise engagement.[69] In her 2007 study, it was found that while respondents in a representative sample adopted new health-related behaviours, they were not confident they would be able to maintain them in the face of life stress or health crisis.[69] Hibbard presented evidence that there are four stages people go through while becoming able to manage their own health, including making health decisions, beginning with people not being aware they must play an active role in their health and end with their adopting new behaviours, even though this may include an awareness that they may feel unable to maintain these behaviours in the face of a crisis.[15,69,70] These data are part of the growing body of literature that documents the lag between the expectations of HCPs and the actual behaviours performed by individuals while in their care.

As a result, patients and caregivers find that they must take the initiative to coordinate and communicate information and services for themselves and their families—increasingly more so when managing multiple illnesses or chronic conditions.[71–73] The consequences of non-participation include preventable illness and suffering, suboptimal outcomes, and wasted resources. Research shows that when patients are actively engaged in their health, they are more likely to adhere to treatments, medications, and improve their overall well-being.[74–76] The growing body of research on health decision-making, patient engagement, and adherence is creating strong evidence that, while there is not a single approach to interventions that meet all needs, those that involve collaboration among HCPs, patients, and caregivers are more successful.[77] However, Eccles and others who have examined the difficulties of integrating understanding between HCPs and patients nevertheless identify the differences between behaviours of patients and HCPs, and identify the benefits of a generalizable framework around what influences behaviour, and ultimately decisions.[61,78]

Because all individuals have their own personal experiences and perspectives which shape how they think, perceive the world, and guide their beliefs, generalized frameworks for decision-making and information sharing are necessary to provide goals and context. Considerable research has examined the cognitive biases that influence decision-making.[79–81] To understand how a person makes a decision, first the perspectives of all those informing that decision must be understood.[82] After the perspectives of all external influencers are understood, we can move to understand the perspectives of individuals, and explore how their experiences and perceptions shape relationships.[82] It must be clearly understood that all decisions made related to treatment, healthcare, and health are motivated by a plethora of influences, many of them working at a subconscious level.

1.6 Electronic health records

At a structural level in health, a lack of a single platform that facilitates a collaborative approach to decision-making and information communication means that there is not an easy way for all involved in patient care to share information. To manage health requires HCPs and patients to be comfortable collecting, understanding, using, remembering and communicating a growing amount of health-specific knowledge. Many people are ill-equipped to do this.[83] The process becomes increasingly difficult when navigating the questions around who needs what information. For example, pharmacists require information on medication reason for use, which is difficult to ascertain when it is not included in a prescription. EHRs are a platform for all involved to access the information they require. The intent of EHRs is to support integrated healthcare by providing the entire medical team, ideally including the patient, with more information including lab tests results, radiology results, discharge summaries, and specialist notes.[84–86] EHRs have demonstrated many benefits including fewer medication errors, broader-based healthcare and, facilitated collaboration.[85,87]

The idea of inter-organizational, comprehensive, and patient-centred health records began in the 1990s in the United States, and is driven by the idea of supporting and improving healthcare.[88] While the basic idea has remained consistent, the terminology for the system has frequently changed: Personal Health Record (PHR), Online Health Record (OHR), Online Medical Record (OMR), Electronic Medical Record (EMR), and what is currently one of the more widely used terms, Electronic Health Record (EHR). EHRs are a networked, cross-institutional, and comprehensive collection of patient health data.[87] EHRs can include health information relevant to a patient's specific treatment as well as to their health in general. Ideally, patients have the ability to access, add to, and manage their own health data, making them active partners in their treatment and health decisions.[89]

In primary care, better decisions can come from understanding how health data stored within EHRs encourages collaboration and communication among patients and their entire care team, and how having access to this information can ultimately improve care.[54,90] Unfortunately, while Canada is lagging behind in the adoption of tools such as EHRs, their adoption does represent an opportunity to design and implement EHRs that are designed to support multidisciplinary and collaborative health decision-making.

Coordinating healthcare services across providers by facilitating information sharing also contributes to the ability to promote optimal care through incorporating effective decision-making tools into EHRs.[91,92] Health-related decisions, both those of a patient and a practitioner are complex, dynamic, and variable. HCPs must make critical and non-critical decisions where they are tasked with making effective decisions, all too often with missing information.[54] By making data more easily available to all those involved in a patient's care, including HCPs, allied health professionals, and patients, and by providing better-organized information and more timely access to health data, EHRs provide a strong platform that supports health communication and decisions.[93,94]

1.7 Decision-making in health

For patients and HCPs alike, healthcare decisions differ from most daily choices in that they may have significant consequences and involve a complicated mix of uncertainty and trade-offs. Uncertainties may arise about the validity of the diagnosis, the diagnosis itself, the accuracy of tests, and the effects of treatments and consequences for family, friends, and work.[34,36,95] With diverse and confounding factors such as often conflicting and difficult to understand information, it can be challenging for patients to comprehend all the options, let alone compare them. Health-care decisions are complex by nature and include influences from a variety of people and places, including online resources, physicians, pharmacists, family members, and peers.[96–98] As little as a century ago, a physician had only a narrow range of possible diagnoses, a small number of relatively simple tests, and a narrower range of treatments, many of which were ineffective. For example, the *Merck Manual of Diagnosis and Therapy* from 1899 was 192 pages, whereas the most recent 19th edition from 2011 runs to 3,754 pages.[99,100] Our ability to understand diseases and how to manage them has greatly increased, but along with increased knowledge comes increased complexity of health-care decisions. The 2001 Institute of Medicine report "Crossing the Quality Chasm" articulated the importance of making informed health decisions, particularly when the choices people face are complex and associated with a risk of death or major morbidity.[101]

HCPs and researchers focused on supporting healthcare decision-making have identified five key models: paternalistic, informed, interpretive, shared, and Inter-professional Shared Decision-Making (IP-SDM). [102–104] Despite some overlapping characteristics among the types, including information sharing and gradations over absolutes, the current consensus of opinion leans towards integrated decision models over the historic focus on physician-patient interactions with little or no reference to external influencers (e.g. nurses, pharmacists, family members, peers). The emergence of IP-SDM, which includes a broader range of participants, is changing the healthcare landscape. Figure 1-1 demonstrates the flow of information in the five types of decision-making models, which are discussed in more detail in the following sections.

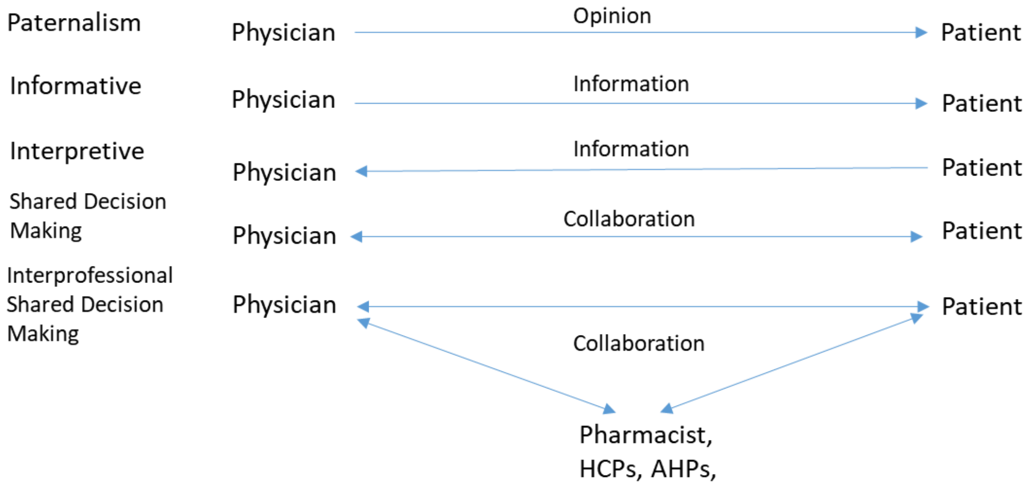

Figure 1-1 Types of Decision-Making

It must be clearly understood that all decisions made related to treatment, healthcare, and health are motivated by a plethora of influences, many of them working at a subconscious level.[105,106]

1.7.1 Decision-making models and information sharing

In the traditional *paternalistic* doctor-centered model, physicians use their skills to determine the patient's medical condition and the stage of the disease and then identify the appropriate medical tests and/or treatments that they favour.[107–109] Paternalistic decision-making is defined by a one-way flow of information, from doctor to patient, in the best case from available evidence and information, and is largely influenced by physician preference. The physician presents the patient with information that the physician considers best, without input from the patient about their lives, opinions, or values. Extreme versions of the paternalistic model even go so far as to not give the patient an option about when the treatment will commence.[104,110] The paternalist model assumes that the patient and the physician understand and share the same criteria for identifying the best treatment option and that the physician's opinion should lead as they are the expert. The physician is perceived as best able to discern what is in the patient's best interests, despite limited patient participation. However, Agarwal et al. have identified a recent paradigm shift in North American culture where autonomy is valued as much as professional expertise.[111] This shift created tension in communication between physicians and patients and the necessity for new models of communication and decision-making as a foundation for a patient-centered approach to care.

Similar to paternalistic decision-making, *informed* decision-making is also a one-way model, where information flows from the physician to the patient. According to Braddock et al. the majority of health decisions in the 1990s were informed.[112] The end goal of an informed decision-making interaction is for the patient to have all the information necessary to make a sound decision about the treatment they want, which the physician can then implement.[113–116] The physician thus needs to give the patient all relevant information, while being aware of other information a patient may have, such as that found online. Lewis and Pignone claim that the patients themselves tend to hold clear personal values around healthcare, and all they need to have in order to choose treatment are the medical facts provided by their physician.[117] The biggest risk associated with the informed model is that its ideal of patient autonomy in practice is often impossible to achieve. When faced with weighty decisions and unfamiliar situations, most people are unsure of what they want and often prefer an expert's opinion.[69]

In the *interpretive* model, which is an offshoot of the informed model, the goal of the interactions between practitioner and patient is to clarify the patient's values, thus helping elucidate what the patient wants.[104] In this model, the patient receives all available information about their diagnosis, as well as risks and benefits of treatments, and going a step beyond informative, the practitioner helps the patient articulate their values and then determines what interventions best help meet these values.[118]

While the paternalistic, interpretive, and informed models all emphasize that it is important to provide patients with adequate information, the *shared decision-making* model (SDM) seeks to bring mutual participation into the decision-making process, with both the practitioner and patient involved in the process.[112,119,120] Going back more than 20 years, SDM has called for collaborative partnerships between patients and providers, who can then deliberate about treatment together.[103] Studies show that communication, shared experience, and shared decisions-making enhances patient satisfaction, improve adherence to treatment, and ultimately improve patient outcomes.[121–124]

Weston argues that SDM forms the crux of patient-centred care, and Mulley, Trimble, and Elwyn also highlight "preference diagnosis" as a crucial step in recommending appropriate treatments to patients.[114,125] In SDM, discussion allows the patient's knowledge and preferences to be taken into account, along with the clinician's expertise. With information flowing both ways, instead of one way, the decisions they reach are an agreement with each other, informed by research (see Table 1-1).

Table 1-1 Different Types of Expertise

Clinician	*Patient*
Diagnosis	Experience of illness, current and past
Disease Origin	Personal and family values
Prognosis	Attitude to risk
Treatment Options	Attitude to side effects
Medications	Treatment preferences
Outcomes	Financial situation

Research has shown that SDM tools such as decision aids increase knowledge of options, reduce uncertainty, help patients feel informed, and clarify patient values to the doctor.[125–127] The potential for improved medication and treatment adherence is possible because the decision is made with the patient and the collaborative process can reduce the risk of decisional conflict and regret over time. [124,128–130]

While ongoing studies have found that patients prefer SDM to alternatives, it is emerging that actual patient behaviours demonstrate that the majority of patients still play a passive role in their health decisions.[9,43,130–135] Moreover, there are other influencers of treatment decisions to consider in addition to patients and physicians, including online health information sites, religion, family members, peers, and alternative medicine practitioners (such as naturopaths and chiropractors).[7,136–138]

The *inter-professional shared decision-making* (IP-SDM) model expands the original SDM model beyond the traditional dyad between patients and physicians to include fostering broader collaboration between HCPs. [97,139–141] IP-SDM aims to be the gold standard of medication and treatment decision-making. According to Légaré et al., IP-SDM involves two or more health professionals collaborating with the patient and/or caregivers to identify the best options and preferences.[55,77,142] A study by Zwarenstein et al. on practice-based interventions concluded that IP collaboration can improve both processes and outcomes in health.[143] Similarly, a 2008 Cochrane review about the effect of IP education supported this, noting that four out of six studies identified a positive effect on departmental culture, collaborative team behaviour, improved patient satisfaction, and reduced errors.[3]

As well as including broader healthcare teams, the IP-SDM model proposes the inclusion of family members and caregivers and takes into account the complexity of environmental influences on SDM including organizational, societal, cultural, and institutional factors.[97] The IP-SDM model has been used as a basis to develop interventions for specific decision-making situations including diabetes care, home care teams, inter-professional health teams, and healthcare chaplains.[7,144,145] Bujold *et al.* identify the seven-steps of patient-centred IP-SDM: (1) choose a decision to make and explore related options; (2) exchange information; (3) clarify values and preferences; (4) assess the feasibility of the decision; (5) choose the preferred decision option; (6) implement the decision; (7) assess the outcome.[146]

Other goals of IP-SDM are to create more opportunities for patients to take part in decision-making, to get their information needs met, to improve communication between patients and their healthcare teams, and to create consensus about a healthcare treatment.[139,147] Interventions aimed at encouraging an IP approach to SDM can improve the quality of collaboration with the goal of supporting decision-making in healthcare. By bridging gaps between the various health disciplines, patients, and other health stakeholders such as families, IP-SDM can change the current siloed approach to healthcare into something more collaborative and engaging.[148] Fostering integrated decisions made with a number of different health stakeholders creates a better chance of improving care, patient education and understanding, continuity of care, as well as offering patients the increased likelihood of receiving the care and the knowledge they request.[148]

While SDM and IP-SDM demonstrate significant advances in engagement and collaboration with a strong evidence background, there has been a lack of adoption into routine clinical practice.[149] To effectively implement IP-SDM in clinical practice clinicians need to better understand the foundational shift of SDM, and how it affects their patients and then extend this knowledge to IP-SDM and further understand how this affects patients as well as interprofessional collaborations.[145,149]

1.8 Research context

The research presented in this thesis is part of a larger multi-disciplinary research project with the following objective:

- To study how integrated and shared information, including but not limited to patient medical histories, dispensing records, and lab values can be effectively used for “safe” medication therapy management. We will analyze the current state of shared medication and health records across patients, CBPHC settings, home-care settings, and pharmacies, including types of information typically exchanged, best practices and tools that support IP-SDM for medications. It is important to understand how to use integrated EHRs for collaboratively managing medications, given the current initiative for integrating medical records at the provincial level in Ontario.

1.9 Research question and objectives

There is a limited but growing body of research into how collaboration among various HCP impacts patient care. Research suggests that interventions to promote SDM are more effective when they target patients and HCPs simultaneously, but more evidence is needed to actualize research interventions to successful practice implementation.

This thesis used a qualitative approach to answer the overarching research question:

- How do patients, physicians, and pharmacists understand and communicate patient-focused medication information to make health decisions?

In doing so, the research addressed five objectives:

1. To identify how patients, pharmacists, and physicians make decisions with their healthcare team; how this information influences shared decision-making about patients’ medications and health; and how this process can be improved through use and uptake of EHRs.

2. To examine how information is communicated among HCPs and between HCPs and patients.
3. To examine what information patients seek out, collect and communicate to their HCPs.
4. To understand how relationships influence collaboration and communication.
5. To understand the scope of existing knowledge around including the reason for use on a prescription and how that influences the ways in which pharmacists practice.

1.10 Chapter context

As part of building this foundational understanding, this thesis focuses on how and when patients, pharmacists, and physicians communicate about medication-related decisions and patient care. The insights gained are presented in parallel with understanding around what these groups want from EHRs to help them access, communicate and understand complex health information.

This thesis first provides an overview of background information to provide context, and is composed of 7 chapters in total. **Chapters 3, 4, and 5 consist of manuscripts accepted for publication, with Chapters 6 being submitted for publication,** which combine to answer the overarching research question. While Chapters 3, 4, 5 and 6 have been written as unique manuscripts, it should be noted that the results and learning from each were first integrated to answer the initial research questions in Chapters 3 and 4, and then the emerging findings from Chapter 4 comprised the papers that make up Chapters 5 and 6. Chapter 2 describes the methods used in all the chapters. Chapters 3 and 4 are qualitative analyses of how communication influences decision-making, answering research objectives 1 and 2. Chapter 5 emerged from a secondary analysis of the data used in Chapter 4 and offers exploratory insight into how working relationships influence communication and collaboration between physicians and pharmacists. One of the noteworthy findings of Chapter 4 is the importance pharmacists place on including a reason for use on, or along with, a prescription. Chapter 6 summarizes the existing scope of literature. Lastly, Chapter 7 concludes the findings from the manuscripts in Chapters 3, 4, 5, and 6, contextualizing the findings and identifying contributions and directions for future research.

Chapter 2

Methodological Approach

2.1 Introduction

It is important to clearly understand how people communicate information to make health decisions, as modern healthcare involves an increasing number of stakeholders who must communicate and coordinate with each other. Because the healthcare system is multifaceted, the methods used must address that complexity. The projects described in this thesis addresses the gap in research by exploring how people communicate health information, how the existence (or lack of) of relationships influences communication, and what information needs to be communicated for people to work collaboratively to reach health goals. This research used multidisciplinary mixed methods, with this thesis focusing on the qualitative research conducted. In addition to the four papers presented as part of this thesis, the data from this project has additionally resulted in further papers across other disciplines which is reflective of the overall multidisciplinary approach.[150–154]

Chapters 3 and 4 consist of a qualitative thematic analysis of factors that influence decision-making, grounded in a multidisciplinary team setting. Chapter 5 used a secondary thematic analysis from the data used in Chapters 3 and 4 to further explore the ways in which relationships influence decision-making and collaboration. Chapter 6 used scoping review methodology to better understand one of the findings from Chapter 4, and better understand the current scope of knowledge on the topic of communication, including the value of reason for use on a prescription. The following sections offer details into the research design and data collection.

2.2 Implementation Science, Knowledge Translation

Knowledge-for-action theories are all focused on knowledge and change and range across many fields. Ottoson identifies the theories behind knowledge-for-action as:

> *"Knowledge in some form (ideas, innovation, skills, or policy) moves in some direction (laterally, hierarchically, spreads, or exchanges) among various stakeholders (knowledge producers, end users, or intermediaries) and contexts (national, community, or organizational) to achieve some outcomes (intended benefits, unanticipated outcomes, or hijacked effects)."*[155]

Diffusion theory originated in communications theory, and is "the process by which an innovation is communicated through certain channels over time among the members of a social system".[156] Translation theory also originated in communication and has a focus on multidisciplinary multilevel knowledge for action. Knowledge utilization is the process of bringing an idea, technology, or practice into a clinical setting and is directly related to the awareness that evidence-based medicine and research do not consistently result in use and uptake in practice settings. Knowledge translation (KT) builds on knowledge utilization and was identified as both the science and art of bridging the "know-do gap" between gaining and using knowledge.[157] The research in this study represents an exploratory approach to building knowledge that can be used to guide the development of tools to better support communication around health decisions. By integrating knowledge users (physicians, pharmacists, information specialists, engineers, and patients) in a collaborative approach to the research process, the goal was to produce findings that are relevant to end-users.

The scientific study of knowledge translation is called Implementation Science, which Eccles and Mittman define as "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services".[158] Through focusing on a scientific study of methods that promote research findings into practice, implementation research looks to improve the quality and effectiveness of both organizational and health services.[158] Implementation science also often involves multi-disciplinary research teams and requires the research teams to have a strong knowledge of diverse theories.

Translating research into practice occurs through the diffusion of information. Historic theories of diffusion evolved from research that originally observed and tracked agrarian systems, into understanding how knowledge utilization can improve health and other social services.[156] Rogers's five-stage decision-making process identified in the Diffusion of Innovations is integral to any adoption process: (1) Knowledge → (2) Persuasion → (3) Decision → (4) Implementation → (5) Confirmation.[156] While Rogers's theory is focused on innovations, this thesis was aligned to his work in the awareness that a significant aspect of people's adoption of anything, be it EHRs or the process of communicating and collaborating in care, is that each participant needs not just information to understand the innovation itself, but also enough information to make a decision to use or adopt the innovation.

There has been a substantial body of research completed on EHRs, the uptake of new innovations, interprofessional collaboration, IP-SDM, and communicating health information.[59,73,159] From the Diffusion of Innovations theoretical perspective, the question of why this information has not been fully translated into practice perhaps concludes that it is because existing research has not yet provided enough information about how and why tools like EHRs can and should help facilitate communication and collaboration. This thesis also acknowledges that there is not currently a multidisciplinary theoretical framework guiding the overall research. While I draw upon the Diffusion of Innovations and Translation theories to varying degrees to guide the research, the project itself was developed to work in health, engineering, and business contexts At times, this has resulted in a tension between the underlying assumptions of each expert's research perspective and the theories being used.

2.3 Qualitative Research

The research in this thesis used the qualitative approach aligned with the pragmatic worldview. Qualitative research is used when we need an understanding of a complex situation in a way that is best established by "talking directly with people, going to their homes or places of work, and allowing them to tell the stories unencumbered by what we expect to find".[160] Lining up with the theories that inform this thesis, pragmatism focuses on practical implications of research, emphasizing research that addresses a problem.[161] Unless we more fully understand how decisions are made, we will not be able to sufficiently understand what influences decisions and ultimately understand how to improve the process. By gathering participant generated meanings and developing research that explores an under-researched area, the overarching project was designed to create information that informs healthcare reforms. The data gathered for this thesis was mixed-methods. This thesis specifically examines qualitative aspects of the data collected, with the research presented in Chapter 6 drawing elements of comparison between qualitative analysis and quantitative data gathered during surveys.

Qualitative data generates knowledge that is based on the human experience.[162] When trying to understand health decisions, there is a need to identify how people perceive understanding and communicating health information. By placing our research in the context of the lived experiences of patients, pharmacists and physicians, we were able to understand the phenomenon within the context in which it was occurring. This research was guided by overarching theories, but did not test them. The described research was part of a larger mixed-methods study on shared decision-making in the context of EHRs that included observations, interviews, and talk-alouds with patients, physicians in primary care, and pharmacists. This thesis focuses on the qualitative, semi-structured interviews with physicians and pharmacists.

2.4 Multidisciplinary Research

Alongside the professional and research perspectives, multidisciplinary research seeks to decrease the historic marginalization of research participants through efforts to include, support, and educate patients and other stakeholders.[163,164] Complexities of interacting with the healthcare system by nature require an approach to research that encourages working across different disciplines to incorporate as many of the areas both impacting and being influenced by this research as possible.[165] Multidisciplinary research aims to bring experts from different disciplines and perspectives together to explore research questions from diverse outlook.[164,166] While multidisciplinary research is highly promoted in many research areas, there is confusion around what it means, differing interpretations around research methods, and a dearth of research into building a theoretical framework to guide and facilitate multidisciplinary research.[164,167,168] Conducting multidisciplinary research also allows for multiple triangulation of the data through the use of a variety of geographic sources, multiple coders, and a multidisciplinary team of researchers interpreting the results.[169]

Multidisciplinary investigation is a rapidly growing way to approach conducting research.[170] It is increasingly found in many fields including health, sustainability, biotechnology, and engineering. The disciplines represented within health research are varied, representing an embedded hierarchy not only of professions but also research methodologies, something reflected in the broader realm of multidisciplinary research.[171]

2.5 Participatory Methods

> Patient engagement is about meaningful collaboration. Patients become patient partners in the project and can be actively engaged in governance, priority setting, developing the research questions, and even performing certain parts of the research itself. This type of participation helps to ensure that the research being conducted is relevant and valuable to the patients that it affects. Patient partners can also collaborate with the research team to summarize or share the results with target audiences (especially other patients) and with policy makers or other decision makers who may apply the results in a health or community setting.
>
> Canadian Institutes of Health Research[172]

An essential element of this view of truth is that people must be engaged in research that involves them. This belief aligns with the pragmatic stance of this research. Patient-engaged research can be generally understood “as a qualitative research inquiry in which the researcher and the participants collaborate at all levels in the research process (participation) to help find a suitable solution for a social problem that significantly affects an underserved community (action)’.[160] Patient engagement approaches research through active engagement between the researchers and patients throughout, often starting during the grant writing phase and carrying on through the entire research project, including conducting, analyzing and disseminating research, as well as knowledge translation activities. Patient engagement emphasizes doing research with patients rather than doing research on patients, and encourages integrating patients as full team members. The Canadian Institutes of Health Research (CIHR) Strategy for Patient Oriented

Research (SPOR) was created to build capacity to engage patients as partners and improve patient outcomes.[160] Similar initiatives exist in the United States and the United Kingdom, demonstrating the growing awareness of the value of including patients in the research cycle.

Patient engagement in research is about supporting and strengthening the secure, trusted relationships that exist between patients and providers and can include grant writing, study design, analysis, and writing research papers. Esmail describes patient engagement in research as conducting research with patients instead of on them, or for them.[173] CIHR defines patient engagement as:

> *"Actions individuals must take to obtain the greatest benefit from the healthcare services available to them… Engagement is not synonymous with compliance. Compliance means an individual obeys a directive from a healthcare provider. Engagement signifies that a person is involved in a process which he or she harmonizes robust information and professional advice with his or her own needs, preferences and abilities in order to prevent, manage and cure disease."*[75]

Conducting research that engages patients in the research process can take many forms. For example, while the inclusion of patients was important in developing the research described in this thesis, an emphasis was also placed on including all of the stakeholders in the research process – pharmacists, physicians, patients, and advocates. There are several approaches to including broader community members into the research process that emphasize doing research with people, instead of on people.[174] Participatory Action Research (PAR) emerged from action research and originated in organizational development.[175] PAR promotes community engaged research that has the end goal of action, with a focus on experimentation that is grounded in the social dimension – both experiential and historical.[176] PAR is broad in nature and does not lend itself to an easy definition, as it approaches research through the lens of human agency and efforts to transform the world through collective efforts.[176] PAR can lead to challenges in defining what counts as participation, research, and action, but it ultimately emphasizes the value in not requiring strict definitions.[176] Through stressing change, PAR highlights experiments that are founded in people’s lived experiences. PAR does not encourage reproducibility and promotes grounding research and the gaining of knowledge in human agency. [175–177]

Community-based participatory research (CBPR) is similar to PAR in that it also focuses on collaboration between the community and researchers, and tries to include multiple perspectives in the research process. CBPR acknowledges that there are inherent tensions due to power dynamics between researchers and the community.[174,178] Blumenthal questioned if CBPR was truly possible and acknowledged the difficulties in balancing the quality and rigour of science with how much the project aligns with the principles of the research approach.[179]

This project focused on a high-level approach to engaging patients as well as other stakeholders vested in healthcare including engineers, pharmacists, physicians, information specialists, and advocates in the research process, taking aspects of both CBPR and PAR research into account, but not falling neatly within the boundaries of either. The research team involved in the research project included pharmacists, physicians, and patients, where representation of the groups being studied throughout the design and implementation were included. The research drew from Chevalier and Buckle’s PAR characteristics of qualitative design research, which engaged patients in the research process and expanded it to include the other stakeholders. This thesis grounded the methodological design for the research presented as follows: i) stakeholder-focused research on the questions we were seeking to address, ii) mixed methods data collection, and iii) multidisciplinary data analysis involving community decisions in data analysis.[176] Similarly, by embedding elements of CBPR such as collaborative partnerships and including multiple perspectives throughout the research process, we were able to develop a research project with outcomes that are inclusive and supportive. The research presented in this thesis is inclusive of various stakeholder perspectives through the process, with the goal of building an understanding that can directly lead to the refinement or creation of tools to better support patients and providers in health.

2.6 Terminology

Terminology around multidisciplinary research is often interchangeably referred to as multidisciplinary, or transdisciplinary, all to refer to the practice of having diverse teams on a research project. For the purposes of this research project, the following definitions were agreed on by members of the research team during the two day meeting.

Table 2-1 Multidisciplinary Research Definitions

Multidisciplinary	"is a process for providing a juxtaposition of disciplines that is additive, not integrative; the disciplinary perspectives are not changed, only contrasted" [180]
Interdisciplinary	"is a synthesis of two or more disciplines, establishing a new level of discourse and integration of knowledge." [181]
Transdisciplinary	"explains when holistic schemes that subordinate disciplines, looking at the dynamics of whole systems."[180]

2.7 Multidisciplinary Framework Method

The advantage of using a multidisciplinary approach to designing this research is that it provides a paradigm that accounts for clinical, patient, and public involvement. Researching health decisions and communication is inherently multidisciplinary, as decisions cannot be made with only one perspective. By designing research and using a method that supported multidisciplinary researchers, we were ultimately able to analyze the research with a similar mix of perspectives as those involved in making decisions.

Bringing multidisciplinary researchers together can be a challenge. Different research paradigms, skills, and research perspectives often come with inherent tensions that can make collaborative research complicated. [182] There are several emerging methodologies to support research that reflect the complex nature of conducting research across disciplines, including the Framework Method, the Methodology for Interdisciplinary Research (MIR) framework, and the Delphi.[182–184] The Multidisciplinary Framework Method, which emerged from the Framework Method, was chosen to guide the analysis of the data in this thesis because it uses clear steps to follow and offers a supportive framework where not all members have experience with qualitative data analysis.

Having its origins in large scale qualitative social policy research, the multidisciplinary framework method is becoming increasingly popular in health research.[182,185] Gale et al. argue that the Framework Method can be used to include diverse perspectives and drive multidisciplinary collaboration as well as lay involvement in the research.[182] By using a method that specifically includes lay people in the analysis, the Framework Method provides both an open as well as a reflexive approach to provide rigour to our analysis. The Framework Method was also designed to draw out qualitative phenomena that emerge as parts of larger scale studies.

2.7.1 Multidisciplinary Research Team

Conducting multidisciplinary research results in a diversity of ideas, methods, and perspectives brought together to inform and analyze research. The goal of research is to generate knowledge, and by bringing together a group of researchers with different methodological expertise this project is able to effectively examine the complexities of health research from a number of perspectives, and for the research group as a whole to do a self-examination of their heuristics while analyzing data. The research team involved in this project included people representing health, information, business, technology, engineering, and patient partners, which reflects the multidisciplinary nature of this area of research (for team membership please see Appendix A), with the intention of representing stakeholders who make health decisions. The members of the research team who collectively represent the different perspectives included in the scope reflect best practices in multidisciplinary teams in how they reflect the different perspectives included in our scope.

2.7.2 Multidisciplinary team two day meeting

The multidisciplinary team, including engineers, clinicians, health researchers, business and communication researchers, patients, and a patient navigator, were involved with data analysis. The team met over the course of a two-day meeting, with the majority of members in attendance to begin to analyze and thematically code the data. The purpose of the meeting was to establish consistent terminology and definitions, begin to develop a multidisciplinary analysis of the data and attempt to merge discipline-specific understanding of the topic. The steps followed were: (1) interviews were transcribed verbatim; (2) core research team members read transcripts and listened to the audio recording to familiarize themselves with the interviews; (3) core team members thematically coded the data; (4) the entire team thematically coded a subset of five interviews; (5) the team codes were used to develop a working analytic framework; (6) two team members re-coded the data; and finally (7) the data were presented to the entire team for discussion and refinement.

2.8 Qualitative Analysis

2.8.1 Ensuring methodological rigor

It is essential when conducting qualitative analysis that credibility, rigour, and trustworthiness are demonstrated as the research often relies on researcher interpretation of the findings.[186] It is important to ensure that as qualitative research is conducted, a critical approach be taken to make certain that rigour is enhanced.[187] Qualitative researchers will always have bias, however, this thesis relied on triangulation, peer debriefing, and audit trails as three different technical checks to ensure quality data. Other methods to recognize researcher bias and how it may impact results, and confirm findings include objectivity/confirmability, reflexivity, and prolonged engagement.

Findings were triangulated through confirmation with existing data, and research, as well as by using multiple perspectives and backgrounds to analyze the data and using different data collection techniques.[186] All publications also included an ‘audit trail’ that included a description of sources, techniques of data collection and analysis, and how research decisions were made.[160] The ultimate goal was to write ‘rich descriptions’ of data which could be understood both by the researchers and the readers.[162] By presenting the data as themes that were then presented as a holistic picture the goal was to reach saturation of the data, and to understand the this data, not to generalize the results to other settings.[162] Peer debriefing, also referred to as analytic triangulation, was also completed by having regular discussions with qualitative researchers external to the process, and the presentation of findings to interested groups.[186] While generalizability was not the ultimate goal, by using diverse participants in the research, external validity was increased, and there is potential that the results are consistent in other settings.[188]

2.9 Data Analysis

Data analysis in qualitative research can be complex and, to people unfamiliar with the process, difficult to contextualize as qualitative research data can come from many sources.[160] Thematic analysis is one of the most common methods used to analyze qualitative data. Using broad thematic analysis techniques allows for flexibility of frameworks and adaptability to different methods and analysis and rich description of data.[160] The inductive approach to thematic analysis is a core characteristic of qualitative research that allows for identification, definition, and clarification of categories that are directed by the data.[162] The inductive approach was chosen as it allowed the researchers to recognize emerging patterns within the data throughout the entire process of data analysis and was able to guide analysis within the Multidisciplinary Framework Method.[162] By using a method of analysis that was flexible and easy to learn we were able to involve researchers from across different disciplines as well as actively include patient partners in the analysis process.

While qualitative methodologies such as grounded theory also use tools like thematic analysis, they have different goals. The overall goal of grounded theory is to construct a theory based on the emerging codes, while the aim of this research is to use data to answer our pre-defined research questions.[160] Many of our methods of analysis originated as grounded theory methodologies such as using initial coding to identify key phrases.[189] Our research also used memos, which are structured field notes used to lay out insights and observations (Appendix D).[189] Finally, by modifying the constant comparative method to identify codes that fell outside of those initially identified instead of the more traditional cases that do not confirm a model.[190]

During the two-day meeting, the research team gathered together to create the analytical framework. The set of codes developed were then jointly organized into the themes used for Chapters 3 and 4. Prior to the two-day meeting two patient and two HCP interviews were coded individually by each team member. During the meeting, the group used the coded interviews to first come to a consensus about overall codes, and agreed on overarching themes using the Multidisciplinary Framework Method. These final codes and themes were used to code the remainder of the interviews by the core research team, and after a final round of refinement the coded data was returned to the full team. Using a method that provided a practical way of data analysis allowed for all members of the research team, which included quantitative, qualitative, clinical, and lay members, to actively engage with the data and offer their perspective without having to read through the full amount of data or participate in a more technical method of analysis. One of the challenges inherent in multidisciplinary research is bringing together different research paradigms, as well as challenge beliefs inherent to one discipline of study. The process of decision-making about coding required all participants to be both reflective and critical about how they perceived the data and ultimately move beyond their pre-existing biases.

2.10 Secondary analysis of data

Chapter 5 is based on qualitative re-analysis of the data gathered from the semi-structured interviews used for Chapters 3 and 4 with the specific intention of understanding how physicians and pharmacists feel about how they communicate.[165] Secondary analysis of data is applied when researchers want to examine interests separate from the original analysis, analyze the original data further, or complete further analysis of a subset of data.[191] Evolving after the initial analysis, this analysis utilized a Focused Ethnographic approach that used the interviews and observations to focus a re-analysis of the data on the relationships between physician and pharmacist cultures inherent to the larger Canadian health environment.[160]

Secondary thematic analysis of the data was carried out because, during the initial coding guided by the original research question, questions were generated that the data regarding relationships between pharmacists and physicians could answer. After re-examining the original data and codes, the data was then re-analyzed under the lens of the following research question: How do relationships between physicians and pharmacists influence collaboration and communication? Similarly to our original research analysis, which used methods from grounded theory, theoretical sampling was used to seek out further data to expand a developing category was used.[189,192]

2.11 Project Overview

2.11.1 Recruitment

Between October 2015 – April 2016, a diverse sample of physicians, pharmacists, and patients were recruited across Canada in Ontario (Toronto, Kitchener-Waterloo, North Ontario), Nova

Scotia (Halifax), Alberta (Calgary and Edmonton), and Quebec (Montreal and Quebec). Diversity was achieved as much as possible with different perspectives and geographical locations given the limitations of recruitment. The four provinces were chosen as each has a different EHR system and offer diverse cross-Canada insight into patient and HCP experience. Further, recruiting participants from across Canada increased the generalizability of the results. Inclusion criteria for patients were that patients were taking at least one medication, and regularly saw their doctor. Patients were also recruited through personal, academic, and professional connections.

2.11.2 Ethics Clearance

Ethics clearance for this research was granted by the University of Waterloo (ORE#: 20940), Wilfrid Laurier University (WLU: 4637), Dalhousie University (REB#: 2015-3716), and University of Alberta (Pro00061862). All participants signed informed consent prior to interviews. All participant information is kept in a secure location.

2.11.3 Key informant interviews

Between October 2015 and April 2016, interviews were conducted across Canada with Pharmacists (25), Family Physicians (9), and Patients (30). Observations were completed by the research team and participants were given the choice of where they would like the interview to take place, with locations including on campuses, at patients' homes, and places of employment.

2.11.4 Patient Interviews

An ethnographic approach to data collection was used for interviews with patients. Demographic information was gathered, and the Agency for Healthcare Research and Quality's Short Assessment of Health Literacy-English (SAHL-E) was administered. This was followed by a semi-structured interview, which was conducted by a member of the research team. Patients were given a list of Likert scale questions aimed at understanding their trust of their various healthcare providers (General Practitioners, Nurse Practitioners, Specialists, and Pharmacists). For data analysis, all audio recordings were transcribed and thematically coded.

Assessing participants' health literacy helped contextualize participants' comfort with health information without relying on self-assessment. Health literacy assessment is well established, with many potential tools measuring print, oral, and online information-seeking, capacity for understanding health information, and both communicative and functional health literacy.[193] SAHL-E was chosen as it was free, and was quick and easy to administer.

Interviews (Appendix E) were conducted according to a semi-structured interview schedule, which specified topics to be covered during each interview, with additional probing questions to elicit opinions regarding patients' experiences in shared decision-making with their HCP, as well as insight into their thoughts about the potential benefits and risks of EHRs. Initial topics addressed included clinical experiences, factors influencing the decision to take, or not take, medication or treatment, the role of themselves or other people in that decision, who the people are who help them make decisions, and a request for recent examples of situations they deemed relevant. The structure of the listed initial questions was not rigidly followed, with participants being invited to add any relevant examples, situations, thoughts, or opinions they had as the interview progressed. Throughout patient interviews, probing questions were added in order to glean insight into newly emerging themes, so they could be adequately addressed in subsequent interviews. At the end of the interviews, participants were invited to add anything they thought might be relevant, or to make a statement about what had previously been discussed.

Interviews were conducted at the participant's home, at the School of Pharmacy, or at a location of the participant's choosing, one-on-one with the interviewer(s). Interviews were recorded using a digital recorder, and the duration of each interview was usually under one hour. Interviews were transcribed verbatim from the audio recordings, and after transcription was complete, transcripts were reviewed to ensure that complete participant anonymity was maintained.

2.11.5 Pharmacist and Physician Interviews

The research team used a purposive sampling approach to identify a broad spectrum of practice sites. Recruitment outreach was conducted using posters, social media, and snowball sampling from contacts of the researcher team. Pharmacists and family physicians practicing in Ontario, Alberta, Quebec, and Nova Scotia were all recruited using the same outreach methods.

Interviews with HCPs consisted of two parts: (1) medication-focused decision-making, and (2) interviewees' opinions of EHRs. HCPs were interviewed where they practiced, either in the pharmacy or the physician's office. Interviews focused on how the pharmacist or physician presented information to patients, how collaboration was approached during care, specifically with relation to medication prescribing or problem solving, how they currently interact with

EHRs or EMRs used in their practice, and finally potential areas for developing new EHRs. The interview guide is available in Appendix C.

Interviews were conducted in community pharmacies and primary care clinics, using the included provinces to represent different levels of primary care integration and adoption of electronic health records (See Table 4-1 in Chapter 4 for more details).

2.11.6 Think-Aloud Protocol.

Think-aloud, sometimes referred to as talk-aloud is a protocol where participants think aloud as they perform a specific task.[194] As participants go about a task, they say whatever comes to mind including what they are looking at, completing, thinking, distracted by, and/or feeling.[195] By verbalizing their task, with the ultimate goal of making the thought process as explicit as possible, the researcher is able to get insight into the participant's full process, rather than only seeing the final outcome.[194] Physicians and pharmacists were asked to complete this protocol as they completed a task related to medication management, which was audio-recorded, transcribed verbatim, and analysed with the semi-structured interview data.

2.12 Scoping Review Methodology

The breadth of information available on the inclusion of reason for use with a diagnosis intersects with many disciplines and spans across a number of emerging fields of research. Conducting a scoping review over a systematic review was chosen because scoping reviews do not assess the quality of existing literature, but rather are intended to identify gaps in current literature, and inform where more research may be necessary.[196] To better understand the current scope of knowledge, a scoping review, following the methodology of Arksey and O'Malley and

Levac, Colquhoun, and O’Brien, was chosen as the way to best synthesize the available information.[196,197]

Arksey and O’Malley recommend six stages, including the option of consultation, which was later described by Levac, Colquhoun, and O’Brien as essential to validate the findings. [196,197] Stage one of a scoping review identifies the research question; stage two identifies relevant studies; stage three describes the process of study selection; stage four charts the data; stage five collates, summarizes, and reports the results.

As the scoping review was conducted, the authors began to understand that it offered significant insights into the process of searching for information in a multidisciplinary paradigm. The challenges were not only in understanding the different terminologies, frameworks, and methodologies reflected in the searching but in building a narrative around how to communicate the value of the results within a discipline-specific focus. The methods used for this review are reflective of the potential for developing future methodologies for searching in multidisciplinary research, as well as communicating the findings in a way that is relevant across different disciplines.

Chapter 3

Exploring the role of teams and technology in patients' medication decision making.

This chapter is published as follows:

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3.1 Overview

Objectives: We know little about how electronic health records (EHRs) should be designed to help patients, pharmacists, and physicians participate in interprofessional shared decision-making (IP-SDM) We used a qualitative approach to understand better how patients make decisions with their health care team and, how this information influences decision making about their medications, and finally how this process can be improved through the use of EHRs.

Design: Participants from four regions across Canada took part in a semi-structured interview and completed a brief demographic survey. The interview transcripts were thematically analyzed using the Multidisciplinary Framework Method.

Settings and Participants: 30 Participants aged 18 and older with at least one chronic illness were recruited from across Canada. We interviewed participants in their homes, at the School of Pharmacy, or another location of their choosing.

Results: We identified four main themes: (1) Complexity of patient decision-making: who, where, what, when, why; (2) Relationships with Physicians and Pharmacists: Who do I trust for what?; (3) Accessing health information for decision making: How much and from where?; (4) Patients' methods of managing information for health decision-making. Across the themes, participants appreciated expert advice from professionals and wanted to be informed about all options, despite concerns about limited knowledge. EHRs were perceived as a potential solution to many of the barriers identified.

Conclusions: Patients make decisions with their healthcare providers as well as with family and friends. The pharmacist and physicians play different roles in helping patients make decisions. We found that making EHRs accessible not only to healthcare providers but also patients can provide a cohesive and clear context for making medication-related decisions. EHRs may facilitate clear communication, foster inter-professional understanding, and improve patient access to their health information. Future research should examine how to develop EHRs that are adaptive to user needs and desires.

Key Points:

Background:

- This project was completed by a multi-disciplinary research team from across Canada that included engineers, clinicians, healthcare researchers, business and communication researchers, patients, and a patient navigator. Patient partners were involved throughout the research process.
- To best navigate health decisions, patients need to be active participants in managing and understanding their health.
- Weighing costs, benefits, preferences, and an abundance of information contribute to patients' lack of confidence about making the 'right' decision, perpetuating a cycle of limited agency, and low adherence to treatment regimes.
- There needs to more evidence around how electronic health records can facilitate shared decision-making.

Findings:

- For patients, the type and amount of information desired changes if a health situation is acute or chronic. Patients have a greater desire to access to EHRs with a long-term chronic condition.

- Patients value their relationship with their physician more than their relationship with a pharmacist. Pharmacists are viewed as a reliable source of information whatever their relationship with the patient.
- In addition to providing information for healthcare providers, EHRs should be accessible to patients and designed to help them navigate medication decision-making with their interprofessional care teams.

3.2 Background

A good relationship between patients and their healthcare providers (HCPs) is essential for patient well-being. In the modern healthcare system, multi-setting electronic health records (EHRs), which refers to a digital version of a patients paper chart, available to authorized users, across multiple sites have emerged as a powerful tool to improve communication between HCPs and patients.[54,198] Nevertheless, the challenge across North America has been to incorporate EHRs in patient-centered care at all touch points, including visits with the physician, pharmacist, and emergent care. There has been increasing evidence that EHRs can successfully improve care coordination by improving communication and collaboration among HCPs.[199,200] However, it is still unknown how this can translate into both improved communication and collaboration among HCPs and improved communication and collaboration between HCPs teams and patients and their caregivers-families. While there is a strong awareness of what patient-centered care is, there is no standard approach to patient-centered communication and how EHRs can support it.[201,202]

One patient-centered communication approach for medication decisions is shared decision-making (SDM). SDM is defined as “an interpersonal, interdependent process in which the health care provider and the patient relate to and influence each other as they collaborate in making decisions about the patient’s health care.”[203] While SDM supports patient-centered care, there is limited understanding of how to adapt EHRs to support SDM.

Pharmacist involvement in SDM falls under the auspices of interprofessional shared decision-making (IP-SDM)—an expansion of the physician-patient decision-making dyad. In IP-SDM, multiple HCPs and the patient contribute to the shared decision.[97,204,205] IP-SDM is particularly complex when it involves pharmacists, who are not typically co-located with physicians and are thus perceived to be outside the immediate circle of care.[206] Electronic health records (EHRs) have the potential to provide a platform for improved communications and understanding between HCPs and patients, emphasizing the importance of information continuity in primary care, and ultimately facilitating IP-SDM related to medications or treatments.[54,148,198] To accomplish this, EHRs must evolve from being a resource for HCPs to one that supports all members of the decision-making team.

At present, research suggests that patients typically rely on the expertise of one trusted HCP to make important decisions, especially when the situation is emergent or ambiguous (e.g., having surgery or starting a new medication).[207,208] For individuals living with chronic illness, those decisions are spread across multiple HCPs and time and are complicated by frequent diagnostic and monitoring tests, and complex treatment regimens.[114,209,210] Thus, to design EHRs that can help patients navigate the spectrum of complex care decisions, we must have a clear understanding of the types of relationships patients have with different HCPs, and the types of information both patients and HCPs need to share decisions.

3.3 Objectives

Patients who have difficulty managing their care experience more preventable illness and suffering, suboptimal outcomes and can be more reluctant to participate actively in their care decisions.[9,135] There is potential for both EHRs and IP-SDM to support patients, and medications can serve as an exemplar of that potential.[120] Therefore we sought to describe patient perspectives on how people make medication decisions, what information is needed and desired by whom, and the ways EHRs can support patients in sharing medication decisions with HCPs.

3.4 Methods

Research Design

We used a qualitative approach that included a short demographic survey, a one-hour semi-structured interview and photographic field notes recording how participants currently organize their health information.[186] This project was part of a larger mixed methods study to analyze the state of IP-SDM and EHRs among patients, primary care clinics, and pharmacies.[147] This research received ethics approvals from the University of Waterloo, the University of Alberta, Wilfrid Laurier University, Université Laval, the University of Toronto, and Dalhousie University.

Recruitment & Participants

Participants were recruited from four Canadian provinces: Alberta, Ontario, Quebec, and Nova Scotia.[1] We recruited a purposive sample of patients who were over age 18 and lived with at least one chronic illness. Participants were excluded if they were unable to speak English or French or unable to provide consent. We recruited through community-based advertising posters, online promotion in social media, and snowball sampling. Local and regional patient support groups were contacted to invite their members to participate.

Data Collection

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[1] Alberta & Nova Scotia HCPs had access to EHRs at the time of the study. In Ontario, HCPs in some health regions were beginning to gain access to the EHR.

Semi-structured 60 minute, in-person interviews were conducted and audio recorded by four trained members of the research team then transcribed verbatim. Interviews occurred where the participant felt most comfortable including their home, local university, or at another location of the participants choosing. All members conducted interviews in Ontario (KM, KG, JB, KW), with one research assistant conducting interviews in Nova Scotia (JB) and one research assistant conducting interviews in Quebec and Alberta (KW). French interviews were conducted by a bilingual member of the research team (KW) using a French version of the interview guide and were professionally translated.

The core research team (KM, KG, CB, LG) developed the interview protocol using a reflective case study by Dogba et.al. on the emerging paradigm of IP-SDM.[205] The interview protocol included open-ended questions and probes to help elaborate or clarify participants' answers as necessary.

Interviews gathered information on three areas (Appendix E): (1) how participants make decisions about medications (e.g. "What is the most important thing on your mind when you're making the choice to take, or to not take that medication"), (2) how decisions are made with different professions (IP-SDM) (e.g. "Have you ever disagreed with your doctor about a suggested treatment?), and (3) participant understanding and perceptions of EHRs (e.g. Have you heard of electronic health records?). We recognized that most participants would have little to no familiarity with IP-SDM, so the interview protocol was designed to ask about elements of IP-SDM. The interviews focused on patient perceptions of how they communicate and interact with HCPs involved in their care, from the initial interaction through to diagnosis and medication prescribing, dispensing and refilling. Participants were asked to discuss their knowledge of health records and what potential they envision for EHRs. Field notes were taken during and after the interview to record the environment, external influencers, distractions, and photographs of how the medications were stored. [211,212] Participant data were anonymized in the transcripts.

Data Analysis

Data were stored and organized using NVIVO 11 software and analyzed using emergent coding.[213] Analysis involved the entire multidisciplinary team, including engineers, clinicians, health researchers, business and communication researchers, patients, and a patient navigator. A modified version of the *Multidisciplinary Framework Method* was used [182] according to the following process: (1) interviews were transcribed verbatim; (2) the core research team read interview transcripts and listened to the recordings; (3) Two team members (KM, KW) initially thematically coded the data; (4) Together the research team (KM, KW, KG, CB, LG, JM, LG, FL, AM, JC, MD, LD) thematically coded two patient interviews which allowed us to expand the coding framework to include a multidisciplinary, patient engaged perspective; (5) These team codes were used to develop a working analytic framework; (6) two team members re-coded all data including patient interviews (KM, KW); (7) the coded data was returned to the team for discussion and refinement. Any disagreements were resolved through discussion. Collected field notes were not included in the thematic analysis, however, we did use field-note photographs to refine the themes and offer examples.

3.5 Results

We conducted semi-structured interviews with 30 participants between 30 and 85 years of age (mean, 61 years), and 73% were women (Table 3-1). Participants had received a diagnosis of at least one chronic illness, including osteoporosis, hypertension, Crohn's disease, and cancer. We identified forty participants, with seven being lost to follow-up and three withdrawals due to changes in illness status, resulting in 30 interviews. None currently or had previously worked in the healthcare system. Participants managed an average of four prescriptions (range: 2-13). Over the previous three months, participants averaged two visits to their family physician, three visits to a pharmacist, and two visits to a specialist.

Table 3-1 - Participant Demographics

Total participants in study	30
Average age	60.5
Gender	
Male	8
Female	22
Average number of self-reported chronic medical conditions	2
Highest level of education attained	
High school	6
College diploma	7
Bachelor's degree	11
Master's degree	4
PhD	2
Average number of prescriptions medicines taken regularly	4.3
Average number of supplements taken regularly	2.7
Average number of visits to family physician in past 3 months	2.1
Average number of visits to pharmacist in past 3 months	3.1
Average number of visits to specialist physician in past 3 months	2.4
Average number of different pharmacies visited in past 3 months	1.1

Using multidisciplinary coding, the codes were arranged into four main themes: (1) Complexity of patient decision-making: who, where, what, when, why; (2) Relationships with physicians and pharmacists: Who do I trust for what?; (3) Accessing health information for decision-making: How much and from where?; (4) Patients' ways of managing information for health decision-making. (**Table 3-2**). Ideas about EHRs and IP-SDM cross through all four themes.

Table 3-2 Themes related to how patients make medication related decisions.

Theme	Description	Relevance to EHRs
Complexity of patient decision making: who, where, what, when, why	The context significantly influences health decisions. Emergent situations are approached differently than chronic health conditions, and the different contexts includes past experiences, physical location, and availability of health information.	EHRs can help people make decisions by providing access to their health information, and give an understanding of why physicians give recommendations.
Relationships with Physicians and Pharmacists: Who do I trust for what?	Patients describe how interactions with HCPs influence their health decisions. Participants described the nature of the relationship with different HCPs (physicians vs. pharmacist) and how this influences health decision making. Family, friends and HCPs all influence decisions being made but in different ways.	Participants trust different people for different types of health information. Designing EHRs to account for different relationships influencing health decisions can allow for greater awareness of the different roles people play in decisions.
Accessing health information for decision making: How much and from where?	Even though there may be similarity in experience, patient diversity leads patients to feel hesitant about making decisions 'out of their experience'. Patients require information to make health decisions, most of which is not easily available to them. The amount of information desired varies on a case-by-case basis, often dependent on if patient is in a crisis situation. Most critically, patients are often getting information outside of traditional contexts (i.e from a HCP)	The amount of information a patient wants changes based on chronic and acute health situations. EHRs would benefit from being able to provide different amounts of information based on patient preference.

	which means that there is potential for misaligned information between patients and HCPs.	
Patient's ways of managing information for health decision making	Patients shared strategies on managing and sharing health information. Current EHRs did not appear to support required communication.	Participants expressed a desire for EHRs to transmit health information between their various HCPs, lessening their perceived need to be the one to transmit health information.

3.5.1 Complexity of patient decision-making: who, where, what, when, why

The context in which a person arrives at a decision is impacted by the type of health decision they are making (e.g., emergent or ongoing), past experiences whether positive or negative, external (e.g., HCP, friend) and internal (e.g., family values, past experiences) influencers, and information patients can access (e.g., patient portals, HCP, personal documentation, online).

> *"During an appointment [with my family physician] it's really hard [to decide about a medication]. I need time to think about it so I talk to my pharmacist, I go on the internet, I talk to friends, and I really check it out before I make a decision. I trust my doctor, but I still want to know more about the drug" Female, 77, 1016*

Previous experience with complications from treatments or errors in medications, even if a single instance, shapes how participants approach decision-making. These lived experiences did not have to pertain to the same medication, treatment, or decision process to influence the context in which participants make future decisions.

> *"For my complaint I had to order my own chart, and I was shocked to death. I found oh, three or four other errors. I lost trust in the system. I have to go be going by something life threatening or I won't go to a hospital, period." Male, 54, 1021*

Participants noted that they negotiate interactions with their various HCPs differently and were influenced by HCPs, family, and peers in different ways depending on the acuity of the health issue. In crisis situations, participants expressed a desire for an expert (i.e., an oncologist for a new cancer diagnosis) to define treatment decisions and to not overwhelm them with too much information. In these cases, participants describe a mentality of immediate survival, rather than wanting to gather more information and discuss options.

> *"It was mostly [the doctors] giving me information because when you are first diagnosed [with cancer], you are just blown away and you just want to start and do something and they are mainly giving me information and telling me how it's going to go." Female, 57, 1004*

Despite an initial preference for an HCP to make a decision in an acute situation, as time passed and the health situation changed to chronic, participants shift their preference to start gathering information from other sources.

> *"[Understanding medications post heart attack is] a learning process. I think any patient has to have a certain trust in the professionals. As the month's pass, you say, well wait a second now, is this necessary? Is there a supplement, a natural blood thinner that you could take rather than say, the rat poison they give you?" Male, 70, 1013*

For chronic conditions, participants rarely describe having made a decision about their health in one location or at one time. While participants had little experience with EHRs, they envisioned EHRs would help them make decisions by providing access to their health information, an understanding of why their physicians make recommendations, and improved information flow between HCPs.

> *"I'd like to see the data. For example, at least once a year, my annual, I'll go off and do blood work. All of the data that comes from that I'd love to see because I think it would help inform how I behave or how I think about myself." Male, 63, 1030*

3.5.2 Relationships with Physicians and Pharmacists: Who do I trust for what?

We observed that participant perceptions about how they interact with their HCPs significantly influenced their engagement in the decision-making processes. This includes how they describe how they negotiate the responsibility for making medication related decisions with their HCP, and the type of relationships the patients' have with the physician and/or pharmacist.

Participants aligned feeling comfortable with their family physician with the quality of care they received.

> *"[With my family physician] generally it is the comfort from the initial meeting. If you are able to talk to each other and then they express a good competency of everything going on, then I make that good connection."*
> *Male, 54, 1021*

When participants discussed what they like about their physician, and what made them trust the physician, they most often brought up how a physician learned about them, their family, and their values. Participants who perceived a physician's lack of caring also had lower levels of trust with that physician.

> *"[My family physician] never asks about me. Never. You know, what was your job? How are you coping with the death of your husband? He had my husband as a patient too. What about your children? Nothing. He never asks me anything. As someone looking after my medication I trust him, but not as someone looking out for me" Female, 77, 1016*

Participants perceived that pharmacists influence decision-making in a way that was different from family physicians. For example, several participants reported having more trust in their pharmacist's knowledge of drug information than in their physician's knowledge. None of the participants felt it was necessary to have a relationship with a pharmacist to be able to access the pharmacists' knowledge.

> *"Pharmacists I tend to trust more than the doctor, as far as pills go. Now as far as giving me something for the heart attack, they're pretty well locked into [the prescription] ... Compared to my family physician, I would far more trust a pharmacist being aware of what drugs interact with what drugs." Male, 70, 1013*

Most participants were not aware of any relationship between their pharmacist and their family physician. From the participant's perspective, the only connection between the physician and the pharmacist is the patient and the prescription.

> *"As individuals, I don't think the pharmacist and doctor interact. What I have noticed with my doctor is, years ago, you would go into the office, they'd write out the prescription, they'd hand it to you. You had the responsibility of taking it to the pharmacist to fill it. That's the only connection I truthfully see between the pharmacist and the doctor." Female, 63, 1005.*

3.5.3 Accessing health information for decision-making: How much and from where?

Participants consistently reported that gathering information from others who had been through a similar experience helped to alleviate stress. Participants who were part of a cancer support group spoke at length about how they actively sought information about treatment and other options from their cancer support group, as did another who participated in a support group for people living with fibromyalgia.

> *"I have some friends who are very interested in health. Some who are very interested in alternative medicine. I talk to them about my problem and come up with a decision that is based speaking to them, my physician, and online information. For better or worse." Female, 69, 1006*

By comparison, another participant only wanted to know minimal information. Later, he discussed how he only spoke to his physician to get information.

> *"I like the basic information and any potential side effects or harm that might cause or drug interactions. Other than that it gets almost confusing and complicated" Male, 54, 1021*

Participants expressed concern about how health information in an EHR, was interpreted by other patients. Although most participants expressed confidence in their own ability to understand health information, they were also concerned that *other* patients would be overwhelmed or not understand how to interpret health information.

> *"I think if we're going to give access to patients, we have to educate them. They have to know what they're looking for. Normal is simple, what do we*

> *do with abnormal? There has to be a lot of education around it." Female, 42, 1017*

While many of the participants stated they had heard of EHRs, the difference between EHRs and EMRs was not well understood.

> *"All [my oncologist] had to do was put in an access number, go online and she had my whole history of tests and results and everything and whatever. I think I would like to have that access. If doctors know about it, why on earth shouldn't we, as the patients, get to know about it?"*
> *Female, Female, 74, 1003*

All of the participants interviewed identified a desire for an easier way to access health information, for both themselves and their HCPs. When prompted, participants thought EHRs had great potential.

3.5.4 Patient's methods of managing information for health decision-making

Participants have diverse experiences of receiving information, searching for additional information, and understanding their HCPs opinions about what information was valued. Participants want information because, in most cases, they did not feel like an expert, and found it difficult to be confident in making correct decisions. As a way of coping with overwhelming information and concerns about incomplete health records, many participants developed independent ways of organizing their health information.

> *"I have my own copies of everything. When I went to my breast cancer oncologist for the first time, I made a summary of all of my treatment, so that she could see exactly what I've been through. If I'm doing it myself, I*

> *feel like I'm including all the important things that they need to know."*
> *Female, 57, 1007*

How participants organize their health information changed depending on their priorities. One participant who had an emergent situation after a heart attack, spoke about keeping careful notes on their health interactions. Yet, during the home visit, all of their health and wellness objects (such as medications) randomly scattered in a drawer (Fig. 3-1). This speaks to the gaps in current tools available to assist patients and their caregivers with collection and management of health information. We keep isolated personal records of health interactions as there is no central, accessible digital record of care, and no reliable, affordable, universal system for managing in-home dispensing.

Figure 3-1 - Medication organization

Participants wanted access to EHRs to help transmit information among HCPs and to be aware of who had access to which information. In many examples, participants felt that transmission of health information between HCPs was delayed and that they were the one responsible for communicating health information to ensure timely access. During the interviews, participants commonly describe a process of moving from the physician's office to a pharmacy to their home or another social location and discussing options with different people in these places. Participants describe an ideal world where the EHR would move information between HCPs.

> *"I would love to have access to my electronic health records because I know when I went to my osteoporosis specialist after I had cancer, I told her I had cancer. It was news to her and she wanted to find out what the results were." Female, 74, 1003*

In our observations, patient-generated records included artifacts such as printouts of Wikipedia pages and medication information sheets from the pharmacy, typically organized into binders (Fig. 3-2), or written into notebooks, and often kept in a specific drawer or organized in an online file.

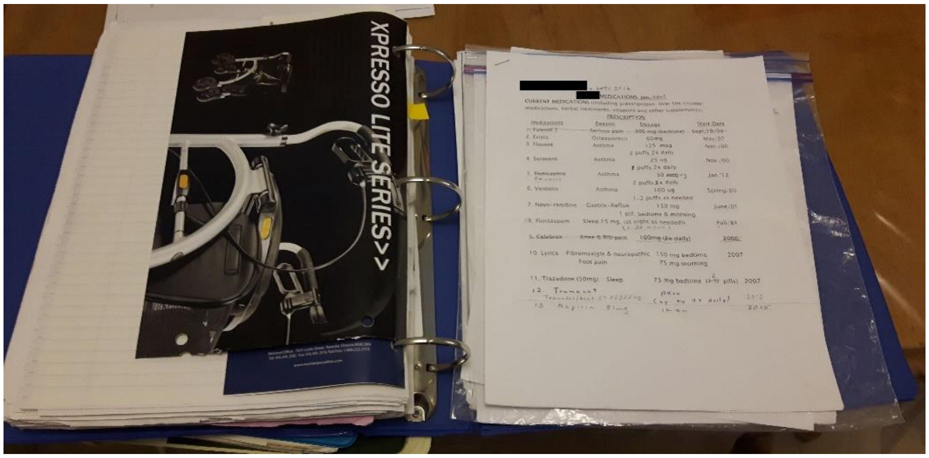
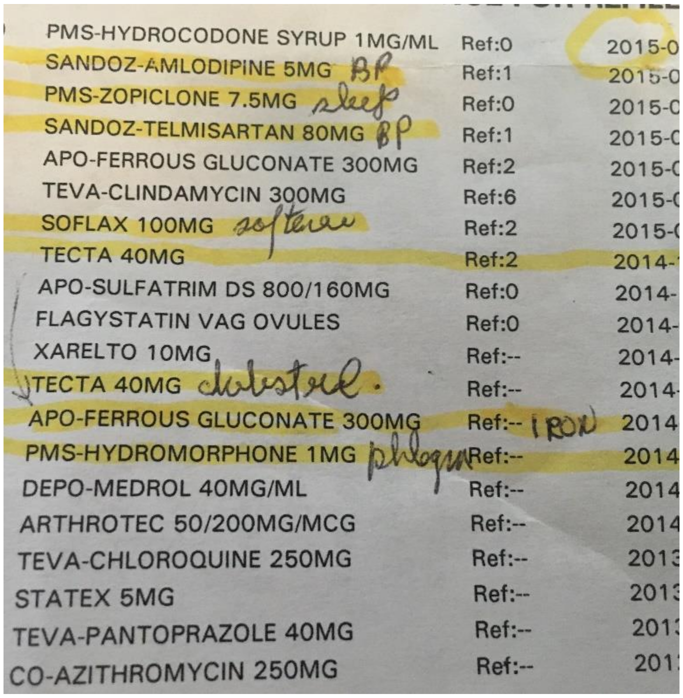


Figure 3-2 Health information binder

In many cases when we asked participants about what drugs they were taking, they showed us a printed list of medications from their pharmacist. Of note in provinces that had EHRs available to both the physician and pharmacist, participants still describe a lack of communication and understanding between their physicians and pharmacists. This list only provides basic information about a prescription – the date dispensed, how many refills, and the drug name and dose. Patient-generated notations can be problematic, as illustrated by Fig. 3-3 where a participant highlighted Tecta (a proton pump inhibitor for stomach acid) as medication for cholesterol, and hydromorphone (an opioid with some antitussive properties) as a treatment for phlegm.



PMS-HYDROCODONE SYRUP 1MG/ML		Ref:0	2015-0
SANDOZ-AMLODIPINE 5MG	BP	Ref:1	2015-0
PMS-ZOPICLONE 7.5MG	sleep	Ref:0	2015-
SANDOZ-TELMISARTAN 80MG	BP	Ref:1	2015-
APO-FERROUS GLUCONATE 300MG		Ref:2	2015-
TEVA-CLINDAMYCIN 300MG		Ref:6	2015-
SOFLAX 100MG	softener	Ref:2	2015-
TECTA 40MG		Ref:2	2014-
APO-SULFATRIM DS 800/160MG		Ref:0	2014-
FLAGYSTATIN VAG OVULES		Ref:0	2014-
XARELTO 10MG		Ref:--	2014-
TECTA 40MG	cholestrol.	Ref:--	2014
APO-FERROUS GLUCONATE 300MG	IRON	Ref:--	2014
PMS-HYDROMORPHONE 1MG	phlegm	Ref:--	2014
DEPO-MEDROL 40MG/ML		Ref:--	2014
ARTHROTEC 50/200MG/MCG		Ref:--	2014
TEVA-CHLOROQUINE 250MG		Ref:--	201
STATEX 5MG		Ref:--	201
TEVA-PANTOPRAZOLE 40MG		Ref:--	201
CO-AZITHROMYCIN 250MG		Ref:--	201

Figure 3-3 Pharmacy print out of medication list

3.6 Discussion

We examined patient perspectives on how they make medication decisions, what information is needed and desired, and the ways EHRs might support patients in shared medication decisionmakings with HCPs. During the interviews, it became clear that even when participants were in a location that had EHRs, they did not have personal experiences with using or interacting with an EHR. This paper draws on participant perspectives on medication decision-making to provide insight into what should be included in the design of future EHRs so they and useful for SDM.

We observed that medication decisions are complex and that, from the patients' perspective, the decisions often occur without a formal connection between the physician and pharmacist. There are also two aspects to decision-making: (1) type of decision being made, and (2) sources of information. The decisions being made can range from 'do I take a medication?' to 'who do I listen to?' Our results show the potential that exploring including a platform for aggregating health information from traditional and non-traditional sources and thusly fostering a patient's ability to work with different HCPs, EHRs can be used to foster IP-SDM.[214] This study identifies 1) what information patients are missing and (2) how EHRs could be designed as a mode of delivery for SDM tools and thusly improving patient information access.

Research is emerging on how to best incorporate IP-SDM into EHRs.[93,159,214,215] If information access is grounded in a single shared EHR, all who are involved in decision-making have a common platform to share information in a meaningful way. Lenert *et al.* have developed a model to incorporate SDM into EHRs.[159] The model emphasizes that EHRs need to accommodate the preferences and communication styles of patients and HCPs as they relate to IP-SDM.[93] However, this model needs to expand to include other HCPs, especially for patients who have less capacity to use the information in an EHR.

When making a decision, the amount of information that our patient participants wanted varied based on the nature of the situation -emergent or chronic. Our research expands on the idea that patients are more involved in SDM when they are offered a choice rather than a recommendation.[135,216] We also identified that patients can shift between preferring different decision styles depending on the circumstances. For example, participants who were in emergency health situations mentioned wanting to be told what to do. By comparison, once participants had lived with a chronic illness, they preferred to lead or share in decision-making rather than to receiving a recommendation. As such, the usefulness of an EHR for patients will likely also change over the course of an illness as well.

Participants show diverse ways of organizing their health information independently of formal medical records. The concept of a patient maintained '*shadow records*' highlights three aspects of how people use, organize, and create health information. First, it shows that the participants' desire to have access to their own records motivates them to create their own information management systems. Second, there is a lack of awareness of how they can share this information with their HCPs. Third patients believe that information which may be valuable in decision-making is missing from their formal health record. Patient portals and personal health records have helped patients see what information their HCPs have access to, and what is missing from their record.[217,218]

Relationships are also an important component of IP-SDM.[219] Similar to other studies, we found that patients deeply value the relationship they have with their primary care physician but did find they may not see value in a comparable relationship with their pharmacist.[220] Furthermore, it was clear that participants were aware that their pharmacist and physician did not work together as a team. Thus, future EHR design needs to consider how to convey the role each HCP has played in a patient decision to start or modify treatment. By increasing transparency and providing a platform, EHRs have the potential to improve access to information for patients and HCPs.[37,221] Understanding the complexities of the IP-SDM process shows the potential for to support patients in sharing medication related decisions.

The main limitation of this study is that the national focus required the use of multiple interviewers. Despite training to ensure consistent approaches to participant interviews, unintended variance in interview style may have influenced participant response data. Further, the interviews were conducted prior to the launch of patient access to EHRs in two of the four provinces included in this study. As such, most interviewees did not have personal experience with an EHR. Those who were aware of EHRs, or identified as having used an EHR did not have substantial experiences interacting with them and were not aware of the full potential or purpose of them. This also meant that participants were not constrained by preconceptions of what an EHR looks like, leading many to describe a vision of an EHRs that was more consistent with their needs and desires. Finally, as with any qualitative study, the results should not be considered to be generalizable to all patients in all situations. Rather, the strength of our methodological approach was that it aimed to gather the perspectives of a diverse group of patients and to analyze the data with a multidisciplinary team. As such, our research provides insight into the design of EHRs that can support patients, physicians, and pharmacists in making complex decisions about medications.

3.7 Conclusion

We found that patients make decisions both with their HCPs and outside the healthcare setting with family and friends. We also identified that pharmacists and physicians have different roles in helping patients make decisions about medications. EHRs have the potential to facilitate clear communication, foster inter-professional understanding, and improve patient access to their health information. EHR designers need to account for these different types of users.

Further qualitative research to understand the roles of other allied HCPs and caregivers. Future research examining how to develop EHRs that are adaptive to user needs and desires and that lower barriers to SDM can provide context for medication decision-making.

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Chapter 4

Physician and Pharmacist Medication Decision-Making in the Time of Electronic Health Records: Mixed-Methods Study

This chapter is published as follows:

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4.1 Overview

Background: Primary care needs to be patient-centred, integrated, and interprofessional to help patients with complex needs manage the burden of medication-related problems. Considering the growing problem of polypharmacy, there is increasing attention on how and when medication-related decisions should be coordinated across multi-disciplinary care teams. Improved knowledge on how integrated electronic health records can support interprofessional shared decision-making for medication therapy management is necessary to continue to improve patient care.

Objective: This objective of this study was to examine how physicians and pharmacists understand and communicate patient-focused medication information with each other and how this knowledge can influence the design of electronic health records.

Methods: This study is part of a broader cross-Canada study between patients and health care providers around how medication-related decisions are made and communicated. We visited community pharmacies, team-based primary care clinics, and independent-practice family physician clinics throughout Ontario, Nova Scotia, Alberta, and Quebec. Research assistants conducted semi-structured interviews with physician and pharmacists. A modified version of the *Multidisciplinary Framework Method* was used to analyze the data.

Results: Data was collected at 19 pharmacies and 9 medical clinics and we identified six main themes from 34 healthcare professionals. First, *Interprofessional Shared Decision Making* was not occurring and clinicians made decision based on their understanding of the patient. Physicians and pharmacist reported indirect *Communication*, incomplete *Information* specifically missing insight into indication and adherence, and misaligned *Processes of Care* that were further compounded by electronic health records that are not designed to facilitate collaboration. *Scope of Practice* examined professional and workplace boundaries for pharmacists and physicians that were internally and externally imposed. Physicians decided on the degree of the *Physician/Pharmacist Relationship*, often predicated by co-location.

Conclusion: When managing medications, there was limited communication and collaboration between primary care providers and pharmacists. Pharmacists were missing key information around reason for use, and physicians required accurate information around adherence. EHRs are a potential tool to help clinicians communicate information to resolve this issue. EHRs need to be designed to facilitate interprofessional medication management, so that pharmacists and physicians move beyond task-based work toward a collaborative approach.

Acknowledgements: Our thanks go to Christian Chabot for his support and input throughout the project, and Jonathan Boersema for assisting with data collection.

Key Words: Shared Decision Making; Electronic Health Records; Collaboration; Interprofessional Collaboration; Medication Management

4.2 Introduction

In clinical settings, medication-related decisions are often passed verbally among patients, doctors, nurses and pharmacists, and the message can become distorted. Too often, however, critical information is not shared, even when an electronic health record (EHR) is used, and the decision to prescribe or not prescribe, to take or not take a medication is made with missing or distorted information.[222–225] Health systems now promote an ethos of partnership, where providers and patients navigate complex relationships and interactions. The shift from a patient-physician decision-making dyad, to a network of providers, introduces more complexity into what are often byzantine processes that precede health decisions. Nevertheless, patients often rely on a trusted HCP's expertise to make important decisions where the situation is emergent or ambiguous (e.g., having surgery or starting a new medication).[207,208] Research has not yet empirically characterized how current communication between healthcare practitioners affects care, and specifically how EHRs can strengthen communication by making information easier to access.[198]

A medication decision involves at minimum a patient, a prescriber, and a pharmacist, and all parties are engaged in a process of shared decision making (SDM).[226,227] SDM is based on a model of communication where healthcare professionals (HCP) and a patient both contribute to clinical decisions in unique ways. [210,228] The HCP shares information about the benefits and risks of different treatment options; the patient describes their preferences and values as they relate to their treatment options. Inter-professional shared decision-making (IP-SDM) involves multiple HCPs is emerging as a response to care increasingly being delivered by inter-professional teams to collaboratively work with a patient to decide on the best course of action.[204] A systematic review of the adoption of shared decision making by HCPs concluded that while it is unclear if interventions that promote the adoption of SDM are effective, interventions that target patients and HCPs simultaneously are more effective than ones that only target one group.[55] The evolution of IP-SDM is challenging our beliefs about how and when HCPs actively communicate with each other and with patients, and the role of the EHRs may play in decision making.

Adverse drug events (ADE) are one outcome of miscommunication in the medication management process. The costs of ADEs to the healthcare system are staggering, yet in one U.S. study physician reviewers determined that of the 30% of inpatients who experienced at ADE, 44% were preventable. [229–231] While these medication-related problems are the symptom of a complex and disconnect healthcare system, the inclusion of pharmacists in the medication management has reduced the rates of ADEs as well as healthcare costs.[232] ADEs account for somewhere between 1.4–15.4% of hospital admissions in the USA and Canada, accounting for an estimated 177,504 emergency department visits with U.S. patients 65 years and older, and increasing the mean length of hospital stay from 8 to 20 days.[233–235] SDM is known to improve communication, lessen ADEs and overall lower healthcare costs.[236,237] Through greater communication and collaboration between HCPs and patients, IP-SDM provides a platform that has significant potential to further lessen ADEs and continue to lower healthcare costs.[144]

In most healthcare settings, pharmacists and physicians often do not communicate well because they largely work *independently in parallel* with each other, rather than collaboratively.[238] There can as well be challenges in communication due to differences of opinion of role, reluctance to challenge, different work schedules, and different information priorities.[239–241] For example, how physicians and pharmacists communicate and make decisions with each other is based on perceptions about the role each one plays in a person's care, and is tightly tied to ideas about pharmacists' scope of practice. According to Nugus et al., there is a clear acknowledgement in healthcare that physicians are the ones with "formal responsibility for patient care" and that they are omnipresent in care. [72] As a result, EHRs may reflect the physician's information or decision-making needs more than the pharmacist or the patient. The challenge to designing multidisciplinary EHRs, is that they need to account for the workflow and communication models of different professions. It is important that physicians and pharmacists have strong communication because it is essential to go beyond transactional interactions to ensure optimal therapeutic outcomes of patients.[242] This research is to better foundationally understand how pharmacists and physicians communicate, which can be used to lessen medication related errors, however healthcare costs, and design and improve EHRs that facilitate collaborate.

This objective of this exploratory study is to examine how physicians and pharmacists understand and communicate patient-focused medication information with each other, and to identify barriers to IP-SDM for medication management that should inform designing EHRs that support IP-SDM. This research will allow for the design and refinement of EHRs that can be designed to facilitate better communication, improve medication management and ultimately contribute to improved care.

4.3 Methods

4.3.1 Research Design

This research was part of a larger mixed methods study on shared decision making in the context of electronic health records that included observations, interviews, and think-alouds with patients, physicians in primary care, and pharmacists. This paper focuses on the qualitative, semi-structured interviews with physician and pharmacists. We have taken a pragmatic stance, recognizing that a constructivist view of truth can be tempered with the need to conduct research that informs health care decision making.[161] Our analysis was guided by a framework analysis method that provides both a systemic and flexible approach to multi-disciplinary data analysis.[182]

We conducted interviews in community pharmacies and primary care clinics across Canada, using provinces to represent different levels of primary care integration and adoption of electronic health records (Table 4-1). This research received ethics approvals from the University of Waterloo, the University of Alberta, Wilfrid Laurier University, Université Laval, the University of Toronto, and Dalhousie University.

Table 4-1 Description of in-place Electronic Health Records (EHRs) and Primary Care Models in Alberta, Ontario, Quebec, and Nova Scotia between December 2015 and October 2016.

	Alberta	Nova Scotia	Ontario	Quebec
Electronic Health Record (EHR)	Netcare	SHARE	ClinicalConnect (South Western ON)*	DSQ
Medication profile	Yes	Through DIS	Only hospital medications	Yes
Laboratory Values	Yes	Yes	Yes	Yes
Medical imaging	Yes	Yes	Yes	Yes
Integrated systems	PIN (Pharmaceutical Information Network)	DIS (Drug Information System)	OLIS (Ontario Laboratories Information System)	N/A
Other information	Hospital visits, surgeries, drug alerts, allergies/ intolerances, immunizations	Hospital admissions/ discharge information, history and consulting notes	Allergies, medical reports, pathology and microbiology results	Electronic prescriptions
Physician Access to EHR	Yes	Yes	Yes	Yes
Pharmacist Access to EHR	Yes	Only DIS	No	Yes

		(access to laboratory values in near future)		
Team-based Healthcare	PCN (Primary Care Network) healthcare teams	Collaborative Care Teams	Family Health Teams	Family Medicine Groups
Pharmacist Integration in Team-based Healthcare	Yes	Yes	Yes	Government promotes close ties between community pharmacies and FMGs

*EHRs are region specific in Ontario; separated into 3 regions

**Information collected in this table reflects healthcare at the time of the interviews and may have changed since.

Recruitment & Participants

The research team used a purposive sampling approach to identify a broad spectrum of practice sites. Recruitment was conducted through several venues including posters, social media, snowball sampling from previous and existing contacts of the researcher team. We included pharmacists and family physicians practicing in Ontario, Alberta, Quebec and Nova Scotia.

Data Collection

Three research assistants conducted and audio-recorded the interviews. One of the research assistants was a PhD candidate and experienced qualitative researcher (KM), and two were PharmD students (KW, JB). The three interviewers jointly conducted three interviews to train the student RAs in the semi-structured interview techniques, and they regularly met throughout the data collection period to compare interview notes and transcripts. All three interviewed participants in Ontario, with KW completing all of the interviews in Quebec and Alberta, and a JB completing all of the interviews in Nova Scotia. Field notes recorded during and after the interview documented the environment, external influencers or distractions, and participant; specific questions were added to better understand the decision-making approach.

Interviews with HCPs consisted of two parts: (1) medication-focused decision-making, and (2) interviewee's opinion of EHRs. HCPs were interviewed where they practiced, either in the pharmacy or the physician's office. Interviews focused on how the pharmacist or physician presented information to patients, how collaboration was approached during care, specifically with relation to medication prescribing or problem solving, and how they currently interact with EHR's or Electronic Medical Records (EMR) used in their practice, and finally potential areas for developing new EHRs. The interview guide is available in Appendix C.

Data Analysis

We employed a modified version of the *Multidisciplinary Framework Method* to analyze the data.[24] A multidisciplinary team, including engineers, clinicians, health researchers, business and communication researchers, patients and a patient navigator were involved with data analysis . The steps followed were: (1) interviews were transcribed verbatim; (2) core research team members read transcripts and listened to the audio recording to familiarize themselves with the interviews; (3) core team members thematically coded the data; (4) the entire team thematically coded a subset of five interviews; (5) the team codes were used to develop a working analytic framework; (6) two team members re-coded the data (KM, KW); and finally (7) the data were presented to the entire team for discussion and refinement. Data were stored, organized and reported using NVIVO 11 Software (QSR, 2016). Any names and identifiers were in made anonymous in the transcription process. Multiple triangulation of the data was achieved through the use of a variety of geographic sources, multiple coders, and a multi-disciplinary team of researchers interpreting the results.[169]

4.4 Results

In total, we interviewed 21 pharmacists and 10 family physicians (Table 4-2). On average, the HCPs had been with their current clinic eight years, and had been practicing for 15 years. Compared to physicians, a larger sample of pharmacists was recruited to account for variability in practice setting including five pharmacists who worked in chain pharmacies, 12 in independently owned pharmacies, and four in team-based medical clinics.

Table 4-2 Participant demographics collected at time of interview (n=34)

	Family Physicians (N=9)**	Pharmacists (N=25)
Province		
Nova Scotia	0	4
Quebec	2	2
Ontario	6	15
Alberta	1	4
Total Participants	10	25
Team Environment	10	4
Independent Practice	0	21
Years in Practice*	12.6	16.2
Average time in current practice (years)	9.9	7.1
Average Age (years)*	43.4	39.8
25-35 years old	2	7
36-45 years old	4	12
46-55 years old	2	4
55+ years old	1	2
Gender		
Male	4	11
Female	7	14

*Information regarding age and years in practice were not collected from 1 family physician participants

Thematic Analysis

Initial coding conducted by the core research team led to the identification of 46 codes, which were then developed into five themes describing the different elements of how pharmacists and physicians make medication decisions with patients: *workflow, communication, accuracy, decision-making*, and *computer systems*.

As part of the multidisciplinary framework, we held a two-day research meeting where the entire multidisciplinary team participated in the analysis. Research group members came to the meeting having individually coded the same five interviews. Through a process of negotiation, individual codes were rearranged into 81 subthemes and six major themes as outlined below (Table 4-3). KM & KW re-coded the remaining interviews using the new framework with no additional themes arising. The new coding framework placed a more significant focus on how pharmacist-physician relationships and scopes of practice affect medication decisions (Table 4-3). We found that decision-making was influenced by the information, processes, and communication factors related to EHRs, which in turn were influenced by the physician-pharmacist relationships and scopes of practice.

Table 4-3 Themes related to inter-professional medication decision making between physicians and pharmacists

Theme	Subthemes	Description
Inter-professional Shared Decision Making	• IP-SDM Intentions • Decision Point • Making the decision • Assumptions about patients • Patient communication • IP SDM	Pharmacists and physicians did not describe IP-SDM in their practices, and acted as unintentional gatekeepers to medication information. Professionals make decisions based on their individual understanding of the patient's situation and educate the patient based on that decision.

Communication between physicians and pharmacists	• Reasons for HCPs to communicate with patients • Reasons for HCPs to communicate with each other • Flow of information • Communication work-arounds • Method of communication • Availability • How to document in the medical or pharmacy chart • Risk communication • Patient as messenger	Pharmacists and physicians often communicate with each indirectly through patients, faxes, or receptionists. Yet, both groups are cautious about the expansion of EHRs, and how EHRs influence ability to do their work.
Information exchange between physicians and pharmacists	• Important information for patient care • Information detectives • Data collection and entry • Multiple Users • Place of access • Context of data entry • Adherence • Information scarcity limits roles • Design features • Timeliness	Pharmacists and physicians require information not accessible through current online health platforms to provide patient care. Even in situations where the information was available it was clear that relationships drove information sharing. Most critically, physicians required access to information about medication adherence while pharmacists require clear access to medications indication.
Process of Care	• System design (fill and bill) • Identifying patients in need of care • Stages of care • Technology limits practice • Decision making • Workarounds • Documentation of process • Workflow bottlenecks • Prioritization	Pharmacists and physicians find that current systems do not typically align with their decision-making processes and do not support collaboration in daily workflow.

Scope of Practice	- Responsibility to diagnose - Negotiating role boundaries - Accountability - Medication management - Mentorship & role modeling - Monitoring	The workplace and professional boundaries for pharmacists and physicians are both internally and externally imposed. This includes how each group negotiates the boundaries of their job, how each group negotiates their interactions with each other and with patients, and how relationships, or lack of relationships, impact their ability to carry out their roles and responsibilities.
Physician/pharmacist relationship	- Physical distance - Community vs. primary-care pharmacist - 5Ws of shared understanding - Filling the gap/Tailoring - Building collaborative work environments - Transactional communication	Relationships were strongly influenced by physician location, nature of the task and a power imbalance.

4.4.1 Inter-professional Decision Making

In the interviews, we asked about how different treatment options were presented, how patients' values were taken into account, and if the participant knew about IP-SDM. We observed that IP-SDM was not an active part of the typical decision-making process. Rather, we identified a spectrum of decision-making, where the most common approaches to decision making included paternalism and informed decision making, as outlined below, rather than IP-SDM.

In the paternalistic decisions that were both described and witnessed, the physician or pharmacist made a decision because they "assumed", "understood", or "knew" it was "best" and then they “informed” the patient and what the patient should do. In other words, the physician or pharmacist “shared” *their* final decision rather than sharing the decision-making process:

> *``I really do consider also the patient's preference or pre-knowledge or understanding. Have I considered all the factors; the patient factors, cost factors? That kind of thing I try to make it so it's sort of like rational prescribing, thinking is there a reason to give it to them?”*
> *Physician 1205, Family Health Team, Ontario*

During informed decision-making, pharmacists and physicians focus on educating patients well enough to allow the patient to make a decision. The goal is to offer recommendations, to help the patient understand why the HCP offered the recommendation, and to allow the patient to choose if they want to pursue the recommended course of action:

> *“I want them to make an informed decision. I want them to understand what's going on with their health. I want them to understand what the options are and why we're pursuing those options. I want them to make an informed decision about whether they want to move forward with a particular treatment course or not and understand the rationale for that.”*
> *Physician 1202, Family Health Team, Ontario*

One of the challenges of informed decision-making is the information will “scare” the patient. It is unrealistic for all patients to become as well educated as a HCP about a medical decision:

> *“I don’t want to give more information than necessary, especially if I see that a patient is more anxious during the beginning of the counselling, and even more so if the patient doesn't want to take the medication or is scared to take the medication.”*
> *Pharmacist 1121, Quebec, Independent Pharmacy*

Pharmacists who worked in teams talked of making decisions *with* physicians rather than patients:

> *It was last Wednesday, was the last day that I worked there, and it was more I help the physician choose the medication. Not so much the patient*

> *themselves. It was a very complex case and the physician had asked me to meet with the patient first to do a medication review appointment.*
> *Pharmacists 1124 Family Health Team Ontario*

4.4.2 Communication between pharmacists and physicians

Communication between pharmacists and physicians is heavily dependent on the fax machine. Unlike a phone, faxed documents provide a written record of an encounter. However, fax machines are not connected with pharmacist and physician information systems, reducing the efficiency of their use.

> *"We almost prefer a fax than phone a physician. We phone if it's an immediate thing, but faxing gives us, again, the detailed paper, dated and detailed work that we can keep track of. That's what we try to do"*
> *Pharmacist 1109, Independent Clinic, Nova Scotia*

A common complaint amongst participants was that the standard processes to request information from another HCP are flawed. Pharmacists felt that they were limited by having to wait for a reply to a fax, and physicians had to wait until they had time where they could track down a pharmacist they trusted. The notion of a centralized way to communicate information was met with positive reactions. Being able to access key information without actively asynchronously communicating with another HCP was identified as a way to streamline the sharing of basic medical information (e.g., diagnosis, prescriptions, and lab results). Communication might then be around sharing meaningful information, such as patient histories or complex care regimens. Participants were concerned that information is not properly being communicated, and may be missing or incorrectly documented. Pharmacists reported rarely being able to get past gatekeepers such as office staff.

> *"There's the ward clerk who won't let you through to the doctor. It's really difficult to get a doctor on the phone unless if they're calling you"*

> *Pharmacist 1102, Independent Pharmacy, Ontario.*

In instances where pharmacists are co-located with physicians, face-to-face interactions have the potential to foster the development of a trusted relationship. However, even when pharmacists and physicians are co-located, pharmacists still negotiate the power differential by modulating communication.

> *"I don't go to a physician and say, 'You must do this.' I say, 'This is the problem that this patient is having on these medications. Here are our options. The options are A, B, and C. I like A because this, this, and this. I like B because of this, this, and this. What do you think we should do?' I never try and tell them what to do." Pharmacist 1125, Family Health Team, Ontario*

4.4.3 Information exchange between pharmacists and physicians

Pharmacists and physicians use different pieces of information to provide patient care. Physicians record diagnostic information, including physical evaluations and tests, while pharmacists keep detailed records of medications provided. Most community pharmacists interviewed did not have access to the reason a medication was prescribed, or diagnostic test and/or laboratory results. They assessed appropriateness and dispensed medications using the limited information contained on a prescription or patient recall. Additional or clarifying information needed to be requested from the physician. Even in situations where pharmacists had access to information through an EHR, issues relating to missing information, and the consequent need to contact a physician to gain access to it, were mentioned.

> *"Maybe there's some piece of information that we're missing and that's where you ask questions. If they're asking for refills too soon then it may be, 'Why are you needing this more than what has been prescribed? Are you taking more than what was on the instructions that we have? Has someone told you to take more?"*
> *Pharmacist 1124. Family Health Team, Ontario*

Pharmacists often were missing information on the reason medications were prescribed. Not knowing why or how a prescriber decided on a medication not only limited their ability to properly educate patients about their medications, but also limited their ability to participate in decisions to start, change, or stop a medication.

> *"I would just say that getting information on the indication would be one. Trying to find out what they're taking the medication for and what they're hoping it's going to do for them would be two of the first questions."*
> *Pharmacist 1107, Nova Scotia, Independent Practice*

Physicians were also concerned that pharmacists do not have sufficient patient information to effectively prescribe, de-prescribe or assess a patient's medications. Physicians were missing information about how a medication is taken after it was prescribed. Occasionally, there were plans in place to confirm prescription pick up and adherence, but the absence of adherence data was a clear gap in information. Both groups cited the benefit of an EHR being able to improve communication and improve patient care overall.

> *"We've got a system [to help us keep track of] adherence. It's a really difficult point, and it's a really important point that I think we need to look because it's not good right now."*
> *Physician 1201, Ontario, Family Health Team*

4.4.4 Process of Care

Pharmacists and physicians have different processes for providing care, which are reflected in different information systems used in their daily workflow. Physicians use clinical data from physical assessment, lab values, and diagnostic imaging to make treatment decisions. Their office-based EMRs support documentation of their patient encounters, assessments of the information, and prescribing history. In community pharmacies, the pharmacy practice management systems (PPMSs) support dispensing, and provide patient information sheets, auxiliary warning labels, warnings about adherence, and drug interaction alerts. Even in Alberta and Quebec, where there are province-wide EHRs that include lab values and dispensing information, the dispensing information is not integrated into the physician EMR and the clinical information is not incorporated into the pharmacist's PPMS.

> *"My goal is to get my EMR and the pharmacist's EMR exactly the same and up to date"*
> *Physician 1206, Family Health Team, Alberta*

The lack of overlap between physician and pharmacist information systems reinforces the siloed workflows of the two professions, and lack of interoperability between privately-owned electronic medical records. However, even when pharmacists and physicians work on the same system, it can be difficult to mesh the two decision-making processes. The resulting hybrid can be inefficient, requiring back-and-forth between the patient and different HCPs.

> *"I made some recommendations to the physician and patient, which then the physician discussed with the patient in her appointment with the patient. We also discussed, the doctor and I, after, to confirm, yes, this is what we did, and just to follow-up on the whole discussion."*
> *Pharmacist 1124, Family Health Team, Ontario*

Many participants lacked awareness of the decision-making processes of other HCPs, which left them guessing about why certain decisions were made. Guesswork thus becomes the *de facto* process, rather than an open and collaborative process. Finally, even though Alberta pharmacists are able to prescribe and use a provincial EHR used by physicians their experiences were ultimately similar to pharmacists in other provinces who did not have access to an EHR.

4.4.5 Scope of Practice

Scope of practice refers to the internal and external boundaries placed on pharmacists and physicians. In many provinces, the scope of pharmacist practice has expanded to include prescribing, which has traditionally been the physician's role. This can result in role friction.

> *It's been good, all the changes, for sure. [..]You just learn [which physicians] who you can do it with and who you can't, and then you go with that.*
> *Pharmacist 1114, Independent Pharmacy, Alberta*

In rural areas, pharmacists have more latitude to practice their full scope of practice as there are fewer options for care and they are more likely to know other local HCPs. Scarcity of services provides situations that encourage greater collaboration and partnerships due to availability as well as familiarity with colleagues.

> *"There's no full time physician in town… A lot of the local doctors are very open to our input and actually will seek it. Nearby doctors are a group who will cover for each other, and we know them"*
> *Pharmacist 1110, Independent Pharmacy, Nova Scotia*

Ideally, a team-based practice means that the different professions are more easily able to understand each other's roles, including how one profession's skills can complement another's. Physicians generally did not consider pharmacists as partners in care, and rarely mentioned active collaboration.

> *"Yeah. Things are good with my pharmacist and I. We're still trying to work on enhancing our relationship but definitely the trust exists there and then now it's just kind of more a matter of allowing some pharmacists to feel like they can do more."*
> *Physician 1205, Family Health Team, Ontario*

Even in cases where active collaboration was spoken of in a meaningful and positive way, it was still clear that there were underlying restrictions; for example, in the above quote while the physician spoke about collaboration, the comments qualified that only *some* pharmacists should be allowed to *feel* like they could do more. Similarly, the physician referred the pharmacist team member as “my pharmacist” creating in and out groups of pharmacists, and reinforcing traditional power archetypes.

4.4.6 Relationships between pharmacists and physicians

Physician-pharmacist relationships were often influenced by physical location and institutional context. When pharmacists and physicians were co-located, particularly when there is a common institutional governance such as a family health team in Ontario, they were able to share a common system of health records. The face-to-face interactions also allowed the pharmacists and physicians to establish personal relationships with each other. Building trusted relationships allowed for informal collaboration about patient care. Pharmacists often spoke of feeling like they an outsider to care or that they were “… not wanting to bother” the physicians (Pharmacist 1107, 1108, 1109, 1121). The limited opportunity for face-to-face collaboration artificially restricted the pharmacist’s ability to support the patient.

Pharmacists also often felt that they had to navigate the authority of physicians when assessing medication, and that, due to their perceived role in health, they were not able to influence care to the best of their abilities.

> *“I notified a patient’s physician to a contraindicated drug given by a patient’s psychiatrist. The physician didn’t feel comfortable changing the drug, and the psychiatrist said, well, I'm not changing mine, I have him on what I want him to be on. The neurologist, I couldn't get in touch with him, and then the group home, they were almost a little bit, ‘we wish you hadn't*

> *put your hands in the pot, there's too many people trying to mess things up'. It was really frustrating because there's this clear thing that could cause harm to the patient, and you almost felt like you were doing more harm than good by alerting everyone to it."*
> *Pharmacist 1102, Independent Pharmacy, Ontario.*

Finally, it became clear through the interviews that pharmacists' processes for working with physicians are not designed to facilitate collaboration. Rather, they may have evolved as work-arounds that compensate for the strained relationship with the physician.

> *"Most physicians do like subtle language of requesting as to, "Can you give me the thought behind prescribing this because we're just not sure, we want to make sure the patient understands it well or providing recommendations."*
> *Pharmacist 1116, Alberta, Chain Pharmacy*

4.5 Discussion

This project examines how physicians and pharmacists communicate patient-focused medication information with each other to inform the designed for EHRs for IP-SDM. There is limited research on how EHRs currently impact IP-SDM, and the potential they have for improving collaboration. We can see that the limited communication between physicians and pharmacists, is strongly dependent on relationship. Sub-optimal management and use of medication is already well-documented, and suggests that we may not be optimally positioned to provide accessible, effective and affordable medication management as patient need rises over the coming decade.[243] Before pharmacists and physicians can share medication decisions with patients, they themselves need access to comprehensive information. Furthermore, they must be prepared to share information about decision making, and to develop strategies for inter-professional collaboration that do not rely on co-location or a common institutional electronic medical/health record. The findings of this study point to a status quo where integrated provider medication management and IP-SDM is the exception rather than the rule in community settings.

Workable solutions to how information is shared are both social and technical. Most electronic health information systems are capable of semantic interoperability, where a receiving information system is able to clearly interpret information in exactly the same way as the sending information system. Using vocabularies including RxNorm, and structured documents such as the CDA and FHIR® support interoperability.[244] As beneficial as these may be competitive market forces the costs rarely support this option, despite its popularity amongst providers. Despite pharmacists having played an integral role in delivering high quality clinical care in hospitals for decades, this study highlights the slow progress towards integration and IP-SDM acceptance in the community. Our research supports the idea that social factors such as professional acceptance, institutional structures and trusted versus not-trusted relationships are significant barriers to the adoption of EHRs into the care patients rather than the technical challenges.

Kannampalli, Schauer, Cohen and Patel note "complex systems can appear very different, depending on aspects, granularity, and circumstances that the researcher chooses to focus on." [245] By focusing on the relationship between physician and pharmacists in this study, we saw that each healthcare profession has access to critical information that the other profession does not (e.g., pharmacists do not have access to information about a medication's reason for use, physicians do not have access to adherence information). These reasons relate both to inadequate systems for health information exchange, as well missing professional standards that encourage comprehensive medication information exchange.

Our findings on communication, information and process mirrored Bardet *et al.* meta-model on physician and community pharmacist collaboration.[246] Bardet *et. al.* identified that early on in a collaboration, key elements include trustworthiness and clarity around roles. Physicians and pharmacists also need to develop an interdependence, and establish the interest, skills and positive perceptions, have clear expectations, and a relationship that is grounded in trust.[247,248] Open and bi-directional communication is also important.[246] Our findings add to the work by Bardet *et al*. by highlighting how the disconnected computer systems and decisions processes limit collaboration between pharmacists and physicians. All participants were enthusiastic about the potential for provincial EHRs to improve information sharing and communication.[12] A well-designed EHR could also facilitate many of the components of a successful collaboration, specifically it has the potential to foster IP-SDM and level the playing field for understanding around information, process, and communication.

According to a review of IP-SDM by Dogba *et al*, safe and high-quality healthcare depends on increased levels of collaboration among HCPs and better engagement with patients. [205] In our study, all participants voiced their support of IP-SDM in general. However, when it came time to give examples, only one physician was able to describe an instance of IP-SDM in practice, and no pharmacists or physicians were able to clearly articulate a shared a vision for IP-SDM. Moreover, participants had reservations about their patients' abilities to make decisions. They referenced the notion that HCP training and experience enables them to know what is "best for the patients". Patel, Bakken, and Ruland refer to this as a "cautious willingness" to participate in IP-SDM due to fears over patient competence, motivations, and dishonesty about adherence. [249]

The notion of "cautious willingness" also applies to HCP collaboration. [250] Physicians are cautious about giving up a perceived ownership of a patient's care, and pharmacists are equally cautious about making physicians feel like they are trying to take over care. The reluctance of pharmacists to embrace a full scope of practice also reflects serious concerns about missing information. In the interviews, it was clear that pharmacists perceive themselves as the last gatekeeper of a patient's wellbeing, yet are unable to perform that function.

Elwyn *et al.* noted that HCPs often miss the second half of a consultation, where IP-SDM occurs.[251] We would argue that the second half of the medication-related consultation is where IP-SDM and the pharmacist belong. Physicians have the unique expertise to focus on the diagnoses in the first half of the consultation. Pharmacists, however, have the expertise required to help the patients understand and choose a treatment option that is consistent with their needs and preferences. However, pharmacists cannot act until they have access to the right information at the right time, and have a bi-directional communication with the physician. Ultimately research should evaluate the link between all interactions in the healthcare process that impact patient and clinician decision making.

4.6 Strengths and Limitations

As part of a larger mixed methods study, the insights presented here are derived solely from interviews of pharmacists and physicians. Although these analyses reveal perceptions about and barriers to IP-SDM and collaboration, they do not reflect a complete analysis of all data collected, specifically the data collected from patients. However, in the context of building a deep understanding of physician-pharmacist communications and relationships, this analysis is a critical step in building a holistic model of IP-SDM related to medication management. In addition, while the sample includes pharmacists across all four provinces, recruitment challenges limited the participation of physicians in each of the four provinces, especially in Nova Scotia. Given the similarities in policies and practice between Canadian provinces and the inclusion of a variety of physician perspectives we believe this has had little to no impact on our results. Finally, differences in interviewers' approaches to semi-structured interviews may have led to differing emphasis on IP-SDM and collaboration. While the benefits of a multidisciplinary research team is stronger objectivity stemming from a variety of research, professional, and patient backgrounds, this study might have been strengthened if the research team had employed prolonged engagement. While important, due to interview time constraints, we did not explore physicians' perceptions of pharmacists prescribing, adapting, or cancelling medications; the influence of these perceptions is suggested for future research.

4.7 Conclusion

Our study shows that until pharmacists can see the reason a medication is prescribed and physicians can gain insight into adherence, neither group will be fully able to work together to make medication decisions collaboratively. The major barriers to collaboration include poor communication systems with minimal inter-institutional information exchange, and even when an EHR exists there are most often competing decision-making processes. We identified the potential to build EHRs that not only better facilitate access to information, but also allow for processes that better accommodate collaborative care, and enable better understanding of the pharmacist’s scope of practice. Future research should focus on alignment of EHRs with the inter-professional decision making process, that can foster both intra- and inter-institutional collaboration and information sharing to best support IP-SDM.

Chapter 5

"My Pharmacist": Creating and Maintaining Relationship between Physicians and Pharmacists in Primary Care Settings.

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5.1 Overview

Background

This paper examines how pharmacists and primary care physicians communicate with each other, specifically when there is or is not an established relationship.

Methods

Analyzing data from semi-structured interviews with nine primary care physicians and 25 pharmacists, we examined how pharmacists and physicians talk about their roles and responsibilities in primary care and how they build relationships with each other.

Results

We found that both groups of professionals communicated with each other in relation to the perceived scope of their practice and roles. Trust and collaboration was perceived to be driven by a healthcare professional's confidence in another specific healthcare professional (i.e., an individual, not a profession). Physicians and pharmacists both described communication and trust as being closely tied with having a prior relationship. Pharmacists were also responsible for initiating the relationship as they relied on it more than the physicians. The presence or absence of a personal connection dramatically impacts how comfortable healthcare professionals are with collaboration around care.

Conclusion

The findings support and extend the existing literature on pharmacist-physician collaboration, as it relates to trust, relationship, and role. The importance of strong communication is noted, as is the necessity of improving ways to build relationships to ensure strong interprofessional collaboration.

Keywords: Pharmacist; Physician; Interprofessional; Collaboration; Relationship; Community

5.2 Introduction

Communication between healthcare professionals on a healthcare team is foundational to patient care; however, often the only communication occurring is through fax, or other non-collaborative tools. Physician and pharmacists share a similar training history, as well as shared values and norms, but each profession has unique sub-cultures and characteristics.[238,252] There is strong research on the benefits of pharmacist-physician collaboration, such as enhanced quality of care, increased patient engagement, improved patient safety, as well as staff satisfaction and retention, and greater staff perceptions of empowerment and recognition all of which fall under the practice of interprofessional collaboration.[58,253–255] Strong working relationships between physicians and pharmacists are foundational to providing good patient care.[239,256,257] The implication of robust communication between physicians and pharmacists is an important foundation upon which to base interprofessional trust.

The ways in which pharmacist-physician relationships influence communication have not been widely explored. Existing research emphasizes the community pharmacist's roles of drug dispensing, medication therapy management, chronic disease management, and patient education.[258,259] The degree of collaboration between individual physicians and pharmacists varies greatly, and is dependent on a number of influential factors such as shared values, relationships, role definition, and trust.[253,260] For patients, an effective collaboration by their healthcare team can lead to improved coordination with healthcare professionals (HCPs), increased opportunity to participate in decision-making, improved satisfaction and better use of resources.[77,210,247,261] Challenges to collaboration are the lack of compensation for teamwork, limited time, and the necessity to coordinate care across many different practitioners.[252]

Traditionally, community pharmacists and physicians have worked in separate locations with little face-to-face contact. Team-based primary care, also known as the medical home or family health team, is one of the models for providing more integrated community health care, where the physician works in a co-located setting with other HCPs such as nurse practitioners, nurses, and pharmacists.[262] Notably, the pharmacist role is not typically affiliated with a separate drug dispensary. These expanded roles for pharmacists improve patient outcomes and reduce healthcare spending.[263,264] As new models emerge, more research is needed to understand the influence of co-location on collaboration.

Our paper begins to address the gap in understanding of how pharmacists and physicians describe their relationships, both in team-based and traditional settings. Analyzing qualitative semi-structured interviews with 9 physicians and 25 pharmacists who are and are not co-located, we examined (a) how and when physicians and pharmacists communicate, (b) how and if pharmacists and physicians discuss personal relationships, (c) what are the barriers to communication between them, and (d) how and if co-location changes their relationship.

5.3 Methods

5.3.1 Study Design

This research is based on thematic qualitative analysis of semi-structured interviews. The investigators were gathering the subjective experiences of pharmacists and physicians to better understand the meaning they attach to their experiences interacting with each other. This paper is part of a larger study of how physicians, pharmacists, and patients understand and communicate patient-focused medication information to each other.[90,147] We chose a qualitative Focused Ethnographic approach to capture experiences in the socio-cultural context in which participants interact with each other.[265] Focused ethnography is an evolving method used primarily in practice-based disciplines to, as Hall describes, "…capture specific cultural perspectives and to make practical use of that understanding."[266] Focused ethnography most commonly uses purposive sampling techniques and allows for a holistic exploration of a research question that may adapt as the research occurs.[265]

Ethics approval was received from the University of Waterloo, University of Alberta, Wilfrid Laurier University, Université Laval, University of Toronto, and Dalhousie University. A qualitative methodological approach of semi-structured interviews, talk-alouds, and observations was carried out with nine primary care physicians (PCP) and 25 pharmacists across Canada, allowing for open sharing of views on how medication-related decisions are made and communicated both across professions and to patients.

5.3.2 Participants & data collection

Recruitment was conducted through advertisement in public venues (e.g., libraries, community centers) and posting on social media sites (Facebook, Twitter), and through snowball sampling from previous and existing contacts of the research team, professional outreach, and suggestions from participants resulting in a convenience sample. Participants were included if they were: (1) a licensed and practicing pharmacist or physician; (2) spoke English or French; (3) lived and worked in Nova Scotia, Quebec, Ontario, or Alberta. Participants were recruited to include a range of perspectives, experiences, years of practice, and geographical location, with our sample providing a good balance of team and independence practice pharmacists and physicians (Table 5-1). Identified participants fell into two categories (1) team-based, where pharmacists and physicians were co-located and practicing together; (2) independent practice, which may include both clinics as well as corporate practices, where they were not co-located but may work closely depending on environmental factors including size of community and established working relationships. Participants were diverse and included different years in practice, age, and gender. All participants were provided with a letter of information and gave their consent to voluntarily take part in the study.

In total, three research assistants conducted and audio recorded the interviews. Initial interviews were jointly conducted to train student research assistants in semi-structured interviewing techniques, and regular meetings were scheduled to compare notes, go over interviews and discuss emerging results. Field notes were recorded during and after the interviews.

5.3.3 Data Analysis

Although the interviews primarily explored how physicians and pharmacists make medication related decisions, insights into how relationships influence the ways in which physicians and pharmacists communicate emerged. Analysis was largely inductive, and used a modified form of constant comparative analysis the data was analyzed until theoretical saturation was reached.[162,185,191] The majority of the analysis came from the interview transcripts with some triangulation coming from talk-alouds, observations, and field notes. Initially the coding was done in two parts – first with a small group analyzing the interviews using “free” unstructured coding and largely descriptive codes, and then, during a two-day meeting, the Framework Method was used to bring together the larger research team comprised of engineers (2), clinicians (3), healthcare researchers (5), business and communication researcher (1), patients (2), and a patient navigator (2) to develop the codes used for the analysis of the two prior papers.[182,189] From the initial analysis two papers emerged, one about patient medication decision-making, and another on pharmacists and physician decision-making.[147] After these two papers were completed, the authors determined the value of further analyzing the interviews to specifically. Initial re-analysis of the data was completed by KM, who listened again to the interviews, coded the data, and defined preliminary themes. Next the authors completed a secondary analysis of the collected interview data (KM, LG, KG), who participated in all phases of the original coding and analysis, and one member who was brought in as a final coder (EN). Data were stored, organized, and reported using QSR NVIVO 11 Software (QSR International Pty Ltd. Version 11, 2017).

In what follows, we examine the process of how personal relationships between pharmacists and physicians impact how they discuss collaboration and professional interaction. Comparing the accounts of physicians, and pharmacists allows us to explore the interactions, what was and was not said, and how each professional understands the role of the other. Multiple triangulation of the data was achieved through a multi-disciplinary team of researchers interpreting the results, multiple coders, and by conducting interviews across Canada in a variety of different settings.[169]

5.4 Results

In total, 34 semi-structured interviews were conducted with physicians and pharmacists across Canada using an interview guide (see Appendix C). The interviews were conducted at a place of the participants choosing, most commonly their place of work, and took between 30 minutes and one hour to complete, depending on participant availability. Table 5-1 summarizes individual and contextual characteristics of pharmacists and physicians obtained from the demographic survey. The participants represented both urban and rural environments from across Canada, specifically in the provinces of Alberta, Ontario, Quebec, and Nova Scotia.

Table 5-1 Participant demographics collected at the time of interview (n=34)[147]

	Family Physicians (N=9)	Pharmacists (N=25)
Total Participants	9	25
Team Environment	5	4
Independent Practice	4	21
Urban	9	18
Rural	0	7
Years in Practice	12.6	16.2
Average time in current practice (years)	9.9	7.1
Average Age (years)	43.4	39.8
25-35 years old	2	7
36-45 years old	4	12
46-55 years old	2	4
55+ years old	1	2
Gender		
Male	4	11
Female	5	14

The results of this secondary analysis are presented in this paper. The secondary analysis resulted in three new thematic areas, different from the original paper focused on understanding how relationships and collaborations are discussed.[147] "My pharmacist" examines when physicians discuss different ways they communicate with pharmacists they know, or provided specific examples of when they sought out a pharmacist with whom they had a relationship. "Can't get through to them" gives data on barriers discussed by pharmacists, namely the different perceptions of gatekeepers and modes of easy communication. Finally, "It took a little bit of time" discusses when relationships have been built, positively or negatively, and how this shapes collaboration and interactions.

5.4.1 "My pharmacist"

During the interviews, physicians and pharmacists were asked how and when they communicated with each other. All physician respondents spoke about pharmacists affirmatively, but there was a marked difference in how physicians spoke about their communication with pharmacists in general and those with whom they have a confident working relationship or worked with as part of a team. The participating physicians attributed positive relationships with pharmacists to being located close by, or to co-location as part of a team based clinic, and separated pharmacists they knew from pharmacists they did not know:

> *"I called the pharmacy because I wasn't sure how to prescribe some medication… In fact, a pharmacist answered and I asked if [D] was there because I know him, and I spoke to him." [Physician 1201, Team Environment, Ontario]*

When responding to an interview question about what sort of interactions the physician has with pharmacists, Physician 1207 stated, *"That's our pharmacist."* During Physician 1205's interview when discussing if they worked together with pharmacists in patient care, 1205 replied that *"... Individuals that I feel could benefit from a med reconciliation, I would refer them to B, my pharmacist."* Physicians who spoke about 'their' pharmacist in this way of 'knowing them,' thusly identified their pharmacist as smart and reliable.

For physicians who did not work in the same building, or very close to pharmacists, the level of collaboration was markedly different.

> *"My patients all have different pharmacies… I rarely speak to the same pharmacists on a monthly basis, or a regular basis. It is not really a constant team work but rather sporadic interactions... We don't have direct contact to create therapeutic plans" [Physician 1209, Team Environment, Quebec]*

Physician 1209 specifically mentioned that they do not want to 'waste' time establishing the basics of a relationship when they do not know if they will ever speak to that pharmacist again. In contrast, when physicians mentioned having a specific pharmacist they talk to, they often described having trust or confidence in the pharmacist:

> *"With the pharmacist we have in our department, for sure, we are very spoiled… I have complete confidence in her skills… So, with my pharmacist, everything works very well. And I have no problem with her making suggestions." [Physician 1210, Team Environment, Quebec]*

Comparatively, the quote below demonstrates the other way of discussing interactions with pharmacists, more common to physicians not actively working in collaborative environments.

> *"I would message the front and ask them to call the pharmacy and confirm… unless there's a bigger concern I'm happy for the secretaries to do it." [Physician 1203, Team Environment, Ontario]*

For physicians who do wish to develop a relationship with a pharmacist, the evolving corporate model of pharmacy can be a barrier to relationship building:

> *[I know pharmacists at] maybe a half dozen pharmacies. For the other 28, I don't know who I'm speaking to… [Pharmacist] is like the old-time, country, family pharmacists. He knows his patients, and he's there all the time. [Pharmacists at big chains] they just come and go, and you never know who's there next. They don't know the patients… it's challenging. [Physician 1201, Team Environment, Ontario]*

The above physician demonstrates their perception of the difference between pharmacists they know and feel comfortable with versus ones they do not know. The idea that the unknown pharmacist would also not know the shared patient is key to understanding the difficulties in building trust without proper communication. As this physician pointed out, his trust in the pharmacist relies on the patient being familiar to the pharmacist. Physician 1205 noted that they appreciated the respectfulness of the pharmacist they work with most often, and was clear that part of that respect included the physician having the final say:

> *"I found [B] to be extremely respectful, and oftentimes like I said at this stage we're still in the "These are my suggestions," and I still have the okay or not okay" [Physician 1205, Team Environment, Ontario]*

This physician's sense of it being unimportant for them to have an interaction with an unknown pharmacist to clarify information directly contradicts Physician 1201, who feels 'spoiled' to have full confidence in their pharmacist's skills.

As a counter to physicians who most often could identify a single pharmacist, the pharmacists who are not co-located and by necessity interact with a wider group of physicians as such have to navigate unfamiliar physicians as part of their profession. Instead of saying *my physician,* they used phrases such as *the doctor*, *a physician*, or *our clinic*. The difference in the language used to describe relationships between physicians and pharmacists also comes through in how both pharmacists and physicians discuss interprofessional communication.

5.4.2 "Can't get through to them"

Pharmacists identified that they can be more effective when they have a strong relationship with the physician. However, it was very challenging for pharmacists to initiate a relationship with a physician. Gatekeepers, often reception staff or nurses, were mentioned as barriers to direct communication with physicians, especially in independent pharmacy settings:

> *"[Family Doctors], you can't get through to them. There's the ward clerk who won't let you through to the doctor. It's really difficult to get the doctor on the phone unless they're calling you." [Pharmacist 1102, Independent Practice, Ontario]*

This said, even in situations where there was a dedicated phone line, there were still barriers to collaboration:

> *"Either it'll be the secretary running back and forth between me and the doctor, if they say that the doctor can't come to the phone. In that case, they'll just ask me to fax it." [Pharmacist 1105, Independent Practice, Ontario]*

The exception was in rural practice, where pharmacists were more likely to meet physicians through small social networks, because there were fewer providers in town, or because the clinic and pharmacy were closer together. During the interviews, it became clear that co-location allows for the same type of informal networking and rapport building as rural environments. Pharmacists who identified relationships with specific physicians outside of a co-located environment were more likely to mention the ability to call a physician to discuss a patient:

> *"If it's urgent, I will call them. I have most of the local doctor's cell phone numbers. If I need to get a hold of them, I will get a hold of them." [Pharmacist, 1101, Independent Practice, Ontario]*

This pharmacist goes on later to discuss how having a relationship with a physician eases the process of communication: *"I have an arrangement with the doc to just call him if there's a major issue and we fix it now."*

In contrast, every physician mentioned it was easy to contact a pharmacist if needed:

> *"If the patient's in the office, I will call the pharmacist right then and there… I will talk to the pharmacist and we'll try and resolve it." [Physician 1206, Team Environment, Alberta]*

Most physicians interviewed agreed with the pharmacists that fax as the easiest way to communicate. While the pharmacists saw fax as a way to have a record of the conversation, less intrusive, or as an easier mode of communication for the physician, physicians said that they preferred fax as a way to align patient care, rather than to seek out clarifications or collaborate.

> *"I'll usually do a fax just because I feel like it's less intrusive, and so they can potentially get back to me quicker without having to call, but if it's something that I really want to know, then I might do both." [Pharmacist 1107, Independent Practice, Nova Scotia]*

The lack of easy communication outside of co-location settings was an issue for both physicians and pharmacists. Physician 1201 ended their comment by stating that having direct conversations with pharmacists would be more productive than *"…waiting for this stuff to sort itself out."* Physicians in team-based environments described stronger relationships with community pharmacists who were not co-located, suggesting when physicians work closely with pharmacists they gain a better understanding of the role pharmacists have in health:

> *"We know most of our pharmacists that are in the neighbourhood and we have a good rapport with them, and we can phone them up, we've met them. We talk to them because they're physically within walking distance" [Physician 1208, Team Environment, Ontario]*

Having a good rapport with pharmacists based on physical walking distance also implies that the physician has a strong community focus and that the physician and pharmacist are working together to support patients, the community, and each other.

5.4.3 "It took a little bit of time"

As the team-based model grows in popularity and is increasingly seen as an ideal way to care for patients, there was a general feeling that collaborating with known colleagues was preferred, though it takes time to develop the relationship.

> *"It took a little bit of time for the doctors to feel comfortable with me, to be able to realize what my skillset was" [Pharmacist 1118, Team Environment. Ontario]*

Pharmacists noted a stronger sense of agency when working in co-located environments, feeling more positive about the overall influence they have over care. Developing relationships between practitioners was built around an awareness of role and ability.

> *"I was the only pharmacist here so I had to essentially develop my own role, which is great because I had a lot of autonomy. It was also challenging too because the role was new and [the physicians] didn't necessarily know how to utilize the pharmacist role in a family health team." [Pharmacist 1118, Team Environment, Ontario]*

But over time, the pharmacists became a central part of the team, relied upon in the daily workflow.

> *"I work with a team of family physicians. We are about 24 physicians. We have a pharmacist. If ever [the pharmacist] is not there because there is a day of the week she is not, then at that moment, if it isn't urgent, I'll wait until she is back at work the next day." [Physician 1210, Team Environment, Quebec]*

Negotiating boundaries around care and role can be difficult. When pharmacists have not worked in collaborative partnerships, even in team-based clinics, they identified difficulty articulating the boundaries of their role and emphasized they only asserted themselves with physicians they knew,

> *"[Giving recommendations] is not so much with physicians outside of the clinic where I work. It's specifically with the ones I collaborate with at the community health center clinic." [Pharmacist 1124, Team Environment, Ontario]*

When relationship building has been successful, the benefit of casual interactions becomes apparent. During Pharmacist 1118's workflow talk-aloud, the process was interrupted by a physician interrupting the think-aloud to say hello, seeing if the pharmacist was available to talk about shared patients.

> *“Physician: I just wanted to poke in and say Hi, but I will let you guys do your thing.*
> *Pharmacist 1118: Yeah, no problem*
> *Physician: [After you’re done] we can go over to the café and maybe get some tea or coffee or something.”*

These informal interactions are only possible when there is a personal relationship between practitioners. Later in the think-aloud Pharmacist 1118 discussed how personal relationships positively influence their ability to do their jobs *“Again, because I work so closely with the doctors here, I can just send them a message saying, "Hey, can you do this blood work for me?"”* Interestingly, this played out in Pharmacist 1118’s perception of the expanded scope of practice as well:

> *“I don't really need to practice under the expanded scope because I have such a good relationship and such close contact that I don't necessarily need to write a prescription or extend a prescription because I can just say, "Hey, can you just do that for me?"” .” [Pharmacist 1118, Team Environment, Ontario]*

Physicians who did not work directly with pharmacists in co-located settings discussed that while they did interact with pharmacists, in most cases those interactions were limited to clarifications. The noted examples of collaboration between physicians and pharmacists only occurred in situations when there was an established relationship where they either knew each other personally or worked together in a collaborative health environment.

5.5 Discussion

The original purpose of gathering this data used for this analysis was to better understand the decision-making process by physicians and pharmacists.[147] Our analysis identified that co-location allows relationship building through familiarity and ease of access, both of which allow the pharmacist to demonstrate their expertise. This qualitative exploration of how relationships, trust, and communication are discussed often included mentions and clarifications of role, which is reflective from past research into interprofessional collaboration and provides opportunity for future study.[252,267]

During early analysis it emerged that as decisions were being made the influence of personal relationships between physicians and pharmacists was present as a factor even when the intent of the interviews was not to investigate these relationships explicitly. The question arose about how this perception of relationship influences how and when collaboration occurs.

While this study did not measure trust, it is an established factor in building collaborative relationships.[268] Pharmacists who have built established relationships with physicians have more opportunities to demonstrate their clinical knowledge, which allows physicians to develop trust in their abilities, as well as gaining a better understanding of a pharmacist's scope of practice.[267,269] As trust builds, our research agrees with what Zillich et al. discussed as being influential to collaborative relationships: when pharmacists gain confidence to assert themselves as true collaborators in care, there is a better understanding the pharmacist's scope of practice, and physicians are more likely to initiate interactions and seek out pharmacist expertise.[269]

Closely linked to ideas around trust are perceptions of role boundaries, and ideas of who is the ultimate authority on care. Brock et.al discuss how collaboration between pharmacists and physicians is influenced by what types of exchange occurs between them.[268] The pharmacists and physicians in this study often identify their role, or their scope of practice, both real and how it is perceived, as influencers in the type of exchange that occurs between each group.[267,268] Each time role, or scope of practice was discussed there was congruence around how physicians and pharmacists perceived these, even when the perception was not tied to the actual scope of practice.

Pharmacists discussed being respectful in how they challenged physicians on questions around medication management, and physicians who discussed pharmacists positively also cited the idea of being respectful as a positive driver of good relationships. Within the specific relationships examined from the physician perspective, working in a co-located environment did not necessarily result in stronger relationships with pharmacists, however through providing an opportunity for better communication, it thusly increased collaboration.

Meaningful collaboration occurred when each practitioner actively sought the other out for more than a back-and-forth interaction.[144] Research outside of health care, in marketing and sales, supports that team cohesiveness is linked to effectiveness, even when it is not connected directly to improved productivity.[270,271] Our results mirror this, in that when pharmacists and physicians are co-located, or work closely together, the way in which they discuss collaboration shifts from describing it in more tentative terms, to a more natural interaction. There is very little research that compares how collaboration changes between practitioners who are directly in a co-located practices or have an established relationship, versus collaborators who are external to the practice.

Within the relationships discussed, it was clear that having a personal relationship with a specific pharmacist resulted in a physician having more meaningful interactions with that pharmacist due to them having a clearer understanding of the pharmacist role in patient care, and feeling that care is shared between them. Similar to Snyder et al.'s study, we found that generally pharmacists were the primary initiator or relations, and described their process to building relationships with physicians clearly.[267] The pharmacists who operated in co-located environments or within 'walking distance' of a physician were more likely to described successfully relationship building, and often describing that there were shared motivators, such as improving patient care.[269] Still, physicians were the gatekeepers of the relationship.[246]

5.6 Limitations

This study reached saturation, however, there was a relatively low response rate for physicians, with less than half the number of physicians responding than pharmacists. Our sample was a convenience sample, and the participants who were willing to share their views may have had different attitudes and experiences than pharmacists and physicians that were not interested in the research. Our data was triangulated through the interviews and talk-alouds, and through coding, saturation was reached. Future studies can include participants that identify as high collaborators, as well as those who do not collaborate on a regular basis.

5.7 Conclusions

Strong pharmacist and physician working relationships not only influence how and when collaboration happens but also influence the level to which collaboration occurs. The findings from this study demonstrate that while physicians who have an established relationship with a specific pharmacist hold positive perceptions around a pharmacist's role, this does not necessarily transfer to other pharmacists as professionals. This analysis focused on identifying the differences physicians and pharmacists discuss in communicating with known, versus unknown colleagues, and understanding barriers to successful collaboration

Understanding of different working environments where each player feels able to best use their skills and collaborate to improve patient care is important. Different environments support nuanced approaches to collaborative care. The role relationships have in influencing how and when interactions occur should be given consideration to best maximize potential for designing collaborative care teams. Carefully designing systems that support active collaboration as well as ways of communicating is important to ensure strong interprofessional partnerships.

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Chapter 6

A Scoping review of research on presence and impact of including reason for use information with prescriptions

This chapter is being submitted.

6.1 Overview

Background

Though pharmacists in North America are obligated to ensure that prescribed medications are appropriately administered to the public, information about the reason(s) for why medication is prescribed is not a required component of a legal prescription. Although the benefits to prescribers of medication—including the reason for use on prescriptions—has been well documented, it is not yet standard practice to share this information with pharmacists.

Objective

To provide healthcare, informatics, and engineering researchers with a cohesive summary and scope of literature explaining why documentation of reasons for the use of medication affects the workflow and professional responsibilities of pharmacists.

Methods

We performed an multidisciplinary scoping review, searching literature from healthcare, informatics, and engineering. The following databases were searched between December 2017 and January 2019: PubMed, Institute of Electrical and Electronics Engineers (IEEE), Association for Computing Machinery (ACM), International Pharmaceutical Abstracts (IPA), and EMBASE.

Results

3,912 potentially relevant articles were identified, with nine papers meeting the inclusion criteria. The studies used different terminology (e.g., indication, reason for use) and a wide variety of study methodologies, including prospective and retrospective observational studies, randomized

control trials, and qualitative interviews and focus groups. The results suggest that including the reason for use on a prescription can help the pharmacist identify more errors, reduce the need to contact prescribers, support patient counseling, and improve patient safety. Reasons that may prevent prescribers from adding reason for use information include concerns about workflow and patient privacy.

Conclusion

More research is needed to understand how reason for use information should be provided to pharmacists and how it will impact collaboration and communication in daily practice. It is also necessary to establish a consistent vocabulary and terminology for accurately describing this area of study.

Key Words

Patient safety; Medication safety; Health services research; Review; Reason for Use

6.2 Background and Rationale

Medications are generally prescribed for conditions and illnesses for four reasons: to cure, to prevent, to slow progression, or to manage symptoms. Medications can also be prescribed to help in diagnosis or to manage the adverse effects caused by another medication or treatment. Expert knowledge is necessary to determine the different reasons a medication may be prescribed, and there may be no direct connection between a medication's reason for use and its corresponding indication. Sometimes the reason for use is obvious, such as when an antibiotic is used to treat an ear infection. Other times the reason for use is less obvious, such as when a hypertension medication is used to treat nightmares related to post-traumatic stress disorder.[272]

To foster collaborative care, it is vital for prescribers to share a medication's reason for use with others on the healthcare team. Providing reason for use information (in addition to official drug indication information) with the goal of collaborating and information sharing will contribute to ultimately improving patient safety. Currently, pharmacists who do not have access to the reason for use for a prescription must ask the patient.[273] This is problematic as the accuracy of patient self-reported diagnosis varies widely. While the accuracy is quite good with conditions such as diabetes, it is very low for conditions such as rheumatoid arthritis, or heart failure.[274–276] People who have difficulty communicating their diagnoses tend to be older, live with more chronic illness, and have a higher risk of death.[277] This puts the onus on the patient to correctly share the physician's prescribing rationale.

In patient safety literature, there appears to be consensus that it is safer for pharmacists to have access to information about why a medication was prescribed.[278] There has also been keen interest in the design of electronic prescribing systems, which arguably make it easier for prescribers to share reason for use information with one another. For example, Schiff et al. are currently testing an indication-based prescribing system, where prescribers start with a diagnosis or problem and then select from a list of recommended treatment options.[279] However, there appears to be very little information on how reason for use information should be added to support pharmacist decision-making.

To date, no systematic or scoping reviews have addressed the value of including the diagnosis, reason for use, or indication along with a prescription, nor have they considered how this information could influence a pharmacist's decision making. The objective of this multidisciplinary scoping review is to characterize the research on how the addition of the reason for use information on a prescription impacts a pharmacists' ability to practice. Given that this topic spans multiple disciplines, the first step is to map relevant literature to identify the potential size and scope of research across a variety of disciplinary databases. When literature on a particular topic is scattered across different disciplines, there is a real risk that the research will be siloed and will not reach those who are in a position to translate the research into practice.

This review was guided by the research question for this study: "How are pharmacists professionally affected when the reason for use is included on a prescription, and what are the implications for collaboration and patient safety?" Our goals were to describe and summarize research on the design, implementation, and evaluation of reason for use information given with a prescription to provide healthcare, informatics, and engineering researchers with a cohesive summary of the scope of literature around reason for use of medication to date, as it relates to pharmacists.

6.3 Methods

We followed the scoping review framework developed by Arksey and O'Malley and was conducted the reporting using the PRISMA Extension for Scoping Reviews (PRISMA-ScR) Checklist.[196,280] We carried out the following five stages of a scoping review: (1) identify the research question, (2) identify relevant studies, (3) select articles, (4) chart the data, and (5) collate and summarize the data.[196] To build the search strategy, we used the SPIDER tool (sample, phenomenon of interest, design, evaluation, research type) to identify qualitative and mixed-method studies.[281] We also used the PICO tool (patient, intervention, comparator, outcome) to develop a search strategy for quantitative studies, such as randomized controlled trials.[282]

6.3.1 Information Sources

We searched the following databases for journal articles and conference proceedings between December 2017- March 2018 and ran an update in January 2019: PubMed, Institute of Electrical and Electronics Engineers (IEEE), Association for Computing Machinery (ACM), International Pharmaceutical Abstracts (IPA), and EMBASE. We also hand searched reference lists from relevant articles. We exported all search results to EndNote reference manager software (V8, Clarivate Analytics) and removed duplicates. The EndNote File was exported to Covidence, a screening and data extraction tool for reviews (Veritas Health Innovation Ltd.).

6.3.2 Search

Three librarians worked together to build a comprehensive search strategy for each database, with support from database specialists. We began by familiarizing ourselves with the terminology for “reason for use” by conducting a preliminary search on PubMed and by searching reference lists of known publications on the topic. Developing a search strategy for each database was complex, necessitating as comprehensive a search as possible while still limiting the noise caused by the wide-reaching “indication” search term. Databases across disciplines were searched to identify the scope of research in a multidisciplinary area of study. Detailed search strategies are presented in Appendix F. A sample search strategy for PubMed is as follows:

(("reason for use"[All Fields] OR Indication*[All Fields] OR Off-Label Use[MeSH terms] OR (diagnosis[All Fields] OR diagnosis[MeSH terms] AND (pharmacists[MeSH Terms] OR pharmacist*[All Fields])) AND (prescription[All Fields] OR drug prescriptions[MeSH Terms] OR prescriptions[MeSH Terms]) AND (documentation[MeSH Terms] OR document[All Fields] OR record[All Fields] OR communication [MeSH terms] OR communication[All Fields] OR Electronic health record[MeSH Terms] OR “electronic medical record” OR labels[All Fields] OR off-label[All Fields] OR Off-Label Use[MeSH Terms] OR electronic prescribing[MeSH Terms]) AND (collaboration OR intersectoral collaboration[MeSH Terms] OR interprofessional relations[MeSH Terms] OR patient care team[MeSH Terms] OR professional role[MeSH Terms] OR team[All Fields] OR interprofessional[All Fields] OR “interprofessional collaboration” [All Fields] OR patient[All Terms] OR patients[MeSH Terms])))

6.3.3 Selection of sources

Titles and abstracts were imputed into Covidence and two authors independently screened the titles, abstracts, and full-text articles according to the eligibility criteria. Studies were eligible for inclusion if they included pharmacists as part of the study and examined one of the following: (1) the inclusion of reason for use in a prescription; (2) the addition of reason for use to a prescription medication label; or (3) why prescribers do or do not include reason for use in prescriptions. We did not limit ourselves to a specific type of study or field of study. We did not place any limits on the date or location of publications except that research must be published in English. We excluded dissertations and commentaries.

6.3.4 Data Synthesis

One researcher used a standardized form to extract data from included full-text articles. Data was verified by a second researcher. We recorded the following data: lead author, year of publication, geographic location, participants, methods, analysis, research setting, outcomes, and location of the reason for use (e.g., electronic health record (EHR), written prescription. We began by categorizing the literature according to the methodology, key findings, and setting. As articles were reviewed, we added categories as necessary to understand the full extent of themes and research currently occurring. We identified gaps and key findings after reviewing the final list of included articles.

6.4 Results

6.4.1 Study selection

We identified a total of 4,027 titles from the search with an additional 21 studies identified from other sources (Figure 6-1), of which 136 were duplicates. After 3,912 articles were screened, a total of 9 remained that met the inclusion criteria as outlined (Table 6-1 Included Studies). Examples of reasons papers were excluded included the following: focus on labeling rather than prescriptions,[283,284] did not include a pharmacist,[86,285–288] focused on medication review without indication,[289,290] monitoring medication treatment,[291] and network data mining.[292] Five overarching themes were found and are summarized below: (1) *Importance of Including Reason for Use on Prescriptions*; (2) *Impact of Reason for Use on Decision-Making and Workflow*; (3)

Reason for Use to Support Collaboration; (4) *Barriers to Reason for Use Information*; and (5) *Terminology*.

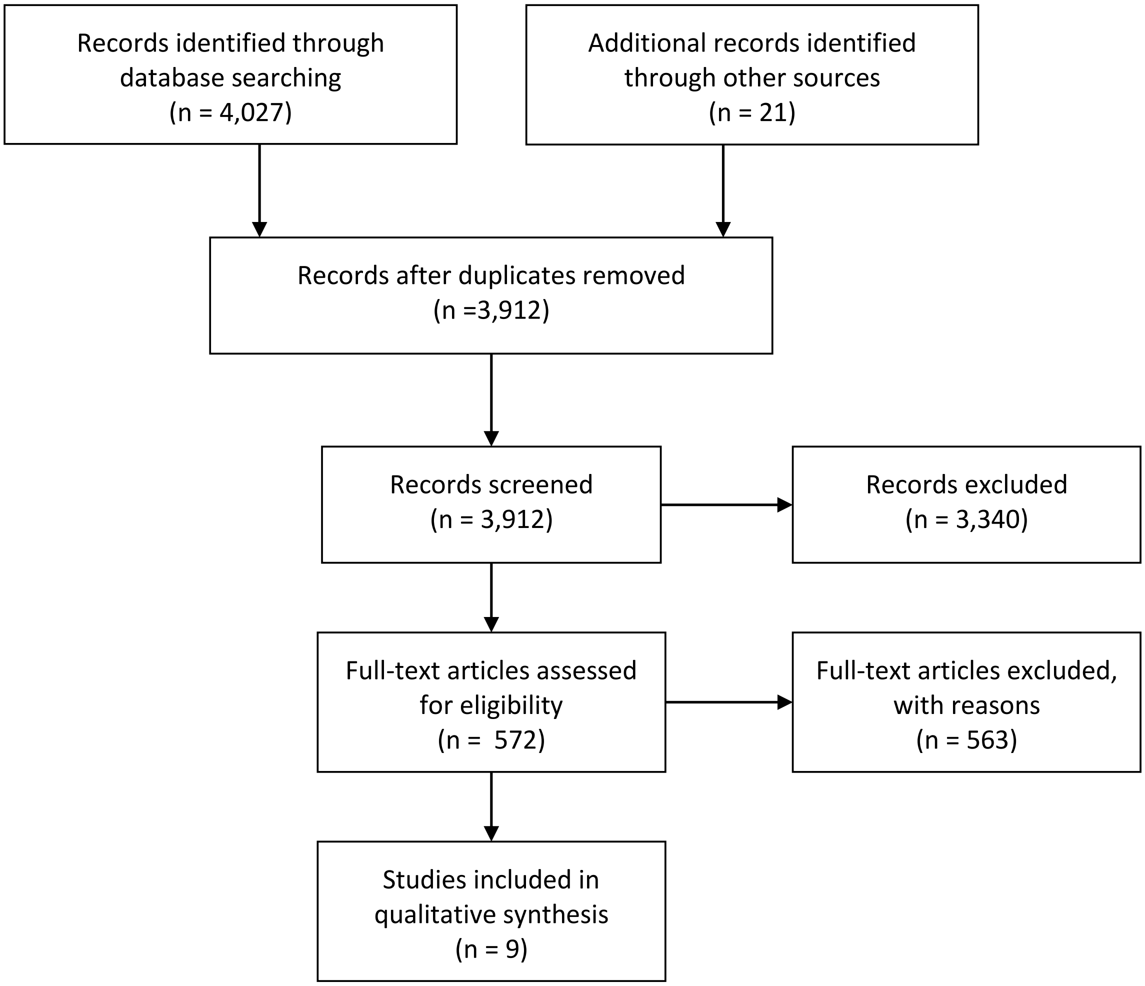

Figure 6-1 PRISMA Diagram

Descriptive Characteristics

The nine included studies were published between 1998 and 2018. In total, four studies were conducted in the United States, [273,278,293,294]two in Europe[295,296], one in the Middle East[297], and two in Australia[298,299]. Two studies focused on prescribing in hospital[295,297], six focused on primary care, [273,293,294,296,298,299] and one involved a consultation with experts from different settings.[278] As per the inclusion criteria, all studies included pharmacists, seven included physicians,[278,293–295,297–299] four included patients, [278,293–295] and one presented results from a pilot with various stakeholders.[278] Five studies used a qualitative approach,[278,293,294,296,298] and four used a quantitative approach[273,295,297,299]. Three of the included studies were published in health research journals,[295,298,299] with the remaining six published in pharmacy practice journals.[273,278,293,294,296,297] We did not identify any studies in the engineering or informatics literature.

6.4.2 Importance of Including Reason for Use on Prescriptions

All included studies identified that reason for use is needed to improve patient safety. Generally, research participants had positive reactions toward adding the reason for use to prescriptions. The most studied topics related to reason for use included the consequences of missing information, how the suboptimal flow of information between health care practitioners impacts patient care, and how better systems might be designed to support improved documentation. The papers did not always mention how a pharmacist gets access to reason for use without a prescription, with Warholak *et al,* identifying using the patient as an intermediary to get access to information.[294] Using semi-structured interviews with pharmacists, physicians, and patients, Garada *et al.* identified that the addition of reason for use information can reduce prescription and dispensary errors, and that adding the information to the label supports patient engagement and the work of other healthcare professionals (HCPs).[298] Garada *et al.* also identified that prescribers were concerned about workflow and privacy, though privacy was not a concern shared by patients.[298] Liddell et al. specifically identified that including reason for use was the most important aspect of new prescription notations.[299]

6.4.3 Impact of Reason for Use on Decision-Making and Workflow

Three studies mentioned pharmacists who felt limited in their ability to perform professional duties because of missing information such as patient medical conditions, reasons why a medication was prescribed, and treatment plans[293,294,296]; three identified the importance of reason for use in identifying prescribing errors and improving safety[295,297,298]; four recognized the potential for reason for use information to improve workflow[278,293,294,297]; and three discussed reason for use as a barrier to patient counselling. [293,294,300] Of the three studies which examined workflow: Al-Khani et al. identified the difficulty in getting physicians to comply with including reason for use[297]; Tarn et al. identified the potential benefit that improved collaboration can have on efficiency[293]; and Warholak et al. identified that inclusion of reason for use can reduce unnecessary interactions between prescribers and pharmacists.[294] Four studies discussed how adding reason for use to prescriptions would improve the pharmacist's ability in clinical decision-making. [273,293,294,298] Al-Khani *et al*.'s study used a hospital's safety reporting system to show that 35% of the medication prescribing errors that pharmacists flagged were identified using reason for use.[297]

6.4.4 Reason for Use to Support Collaboration

Two articles identified that having reason for use information improves collaboration and communication.[293,296] Six studies examined pharmacists and physicians jointly. [278,293–295,297,298] Through an extensive stakeholder assessment, Kron *et al.* discussed how pharmacists often try to infer information about why a medication was prescribed from the patients, which is supported by Warholak *et al.*'s findings that after a diagnosis is included on an electronic prescription, pharmacists have less confusion and uncertainty in their practice. [278,294] Liddell et al. demonstrated a very positive response from physicians about being more collaborative with pharmacists—both pharmacists and physicians were positive about tools that would facilitate their communication.[299]

6.4.5 Barriers to Reason for Use Information

Only one paper examined privacy concerns, concluding that while pharmacists and physicians were concerned about privacy, patients were not concerned with the privacy implications of documenting reason for use on a prescription.[298]

Of the five included studies that mentioned technology[278,294,295,297,298], four suggested there was a need to improve the prescribing software available.[7,25,26,29] Four studies examined electronic prescribing. [294,295,298,297,278] Raebel *et al.* discussed the effectiveness of a computerized pharmacy alert system paired with active collaboration between HCPs.[300] Raebel's study's goal was to improve prescribing safety and identified that a barrier to this was that clinical patient data was not easily available to many pharmacists.[300] Kron *et al.* specifically examined the difficulties in encouraging prescribers to include the reason for the prescription and identified that electronic prescribing was laying the foundation for future adoption.[278]

6.4.6 Terminology

Including a reason for use with a prescription was described in a variety of ways. The most common terminology is "indication"[278,296,298]. One study used "indication in prescription"[297] and "patient diagnosis"[294], while the remainder used "medication indication[293], "indication for treatment"[295], "reason for use"[273], "purpose of the medication"[299] and "clinical patient data."[300]

6.5 Discussion

We set out to identify and describe the current literature concerned with how reason for use information can be shared with a pharmacist through a prescription. One of the most significant discoveries of this review is how little research currently examines the importance of providing the reason for use to a pharmacist. While databases across disciplines were searched, no papers from engineering or computer science were included. The lack of papers that met our criteria for inclusion from ACM and IEEE databases is significant as the field itself is multidisciplinary—we have found that bringing the information into alignment across disciplines is a necessary step.

We identified nine studies that included the pharmacist as a potential user of reason for use information. All nine studies examined patient safety but only one study explored privacy. Several studies also examined the impact of reason for use on the pharmacists’ workflow, including improving the pharmacists’ ability to identify errors, providing better patient counselling, and reducing the need to contact a prescriber to clarify a prescription. The most common barrier cited was physician workflow.

For HCPs who are helping patients manage medications, the medication reason for use is a foundation of effective patient care—treatment outcomes may improve if these links are made.[85,301] There is at least one indication listed on the monograph for each medication (*on-label indications*), however there are many situations where medication are used in ways that are not explicitly listed on a monograph (*off-label indications*). Estimations are that roughly 21% of medications are prescribed for off-label use.[302] Thus, in the current model where the reason for use is infrequently shared, pharmacists, physicians, and other HCPs who are tasked with assessing prescriptions written by another prescriber are limited to making educated guesses about the reason for use.

While there is a significant body of literature on how reason for use information can be tracked in EHRs or for pharmacovigilance, most studies have not considered the impact of reason for use information on pharmacists.[86,285,303] Murphy *et al.* demonstrated the importance of reason for use in their paper titled “Why is your patient sedated?” where they identified that 75% of patients who had been prescribed a sedative hypnotic in a large, tertiary referral hospital had no reason for use documented in the chart.[285] In a commentary titled "Incorporating Indications into Medication Ordering — Time to Enter the Age of Reason" Schiff *et al.* argued that indications-based prescribing could improve prescribing, medication use, and patient safety while allowing prescribers to maintain autonomy.[279] In another commentary, Li and Zhou went further, arguing that excluding reason for use in prescriptions is dangerous and that pharmacists need both medication information and patient information (diagnosis, history, laboratory results) to care for patients.[304]

Indication was the most common term used in the identified research it should be noted that the term 'indication' makes identifying relevant 'reason for use' research difficult. Indication can refer to both the official indication of a mediation in respect to its monograph, as well as the reason a medication was prescribed. Indication, reason for use, and diagnosis are often used interchangeably; the resulting lack of terminological clarity makes it challenging to easily identify publications that can more accurately and efficiently guide prescriptive practice.

Understandably, there are concerns about including the reason for use information in prescriptions. In the Netherlands, for example, as of 2012 the Dutch Medicines Act was changed and the law now requires prescribers to include the reason for use in the prescriptions for certain medications, however, two years after the law passed only 12% of affected prescriptions had a reason for use included.[288] Providing more information alone is not a panacea. Kennedy et al.

identify that in modified prescriptions pharmacists identified more errors, highlighting the importance of evaluating patient safety interventions.[305] Further, several authors argue that simply including more information cannot and should not replace communication between physicians, pharmacists, and patients.[86,286,287] Pharmacists currently depend on information from patients to fill in the gaps of knowledge around reason for use.[289]

The results of this scoping review identify that more research must be done that includes pharmacists in the process of understanding how including the reason for use on a prescription can benefit collaboration as well as facilitate information transmission between HCPs. Given the growing scope of knowledge around building beneficial EHRs that foster collaboration as well as communication, the lack of research discussing the importance of how to best provide pharmacists with information about diagnosis or reason for use represents a significant gap in our current knowledge, especially across different databases.

6.5.1 Challenges in searching multidisciplinary research

Despite a comprehensive search strategy from databases across disciplines, our scoping review only identified nine articles. This may be related to the inherent difficulty of identifying common and universal search terms across multidisciplinary literature reviews. Reason for use literature bridges health, engineering, informatics and other areas, all with different terminologies, frameworks, and methods. The papers included in this study were all from healthcare journals, primarily pharmacy journals. This may mean that engineering and informatics disciplines are not aware of these papers. While the methodology for health-related scoping reviews is well documented[9], the search methodology has not yet caught up in other disciplines. For example, while PubMed uses the medical subject heading (MeSH) search terms and Embase uses Emtree, these are not standard between databases, and the non-medical databases often do not have standardized search terms. It is also difficult to identify equivalent terms that work across all databases.

Conducting multidisciplinary research will grow more challenging unless emphasis on shared terminology can be built into the process. This issue is of particular importance to both researchers and practitioners, whose work depends on the translation of research into practice. This review emphasizes the scope of awareness around including reason for use on a prescription for pharmacists. With regards to the excluded papers, it was clear that by excluding the pharmacist in the process, the burden remains on the patient to transmit key information among practitioners, and it is difficult for the pharmacist to fulfill their role potential.[306–308]

6.6 Significance

This research advances our understanding of the existing literature on including reason for use alongside a prescription, specifically identifying the gap in the literature that includes a pharmacist perspective. Future reason for use research should be multidisciplinary, collectively including the unique perspectives of prescribers, pharmacists, and patients. Research that includes multiple members of the care team focused on improving collaboration will ultimately improve patient care and safety.

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Table 6-1 Included Studies

Authors	Year	Country	Objective	Location of Pharmacist	Study Type	Reason for Use Format	Outcome Related to Pharmacists and Reason for Use
Al-Khani[297]	2014	Saudi Arabia	To explore factors that help pharmacists identify and thus prevent harm from incorrect drug prescribing errors in an ambulatory care setting.	Hospital	Retrospective analysis of pharmacist-identified errors	Mandatory reason for use field on a hospital CPOE system	Reviewing the mandatory indication field on prescriptions helped pharmacists identify 35% of all prescribing errors that were voluntarily reported
Garada[298]	2017	Australia	To investigate the perspectives of Australian consumers, pharmacists and prescribers on documenting the indication on prescriptions and dispensed medicines labels.	Community Pharmacy	Semi-structured interviews of patients, physicians, and pharmacists	Mock-ups of dispensed medication labels including reason for use	Participants felt that adding reason for use to the label would help pharmacists identify look-alike/sound-alike errors, especially when the drug has multiple indications. Pharmacists

							preferred a specific reason for use (urinary tract infection) over a general one (infection).
Kron[278]	2018	United States	To consult high-level stakeholders on system design considerations and requirements necessary for building and implementing an indications-based CPOE system.	Expert Panel	Stakeholder panels	--	Reason for use needs to be incorporated into prescriber workflow, such as through an indication-based prescribing CPOE system.
Liddell	1998	Australia	To evaluate the rate of use and acceptance of a new prescription form designed to provide more information to pharmacists and patients	Community	Education session and trial new prescription forms	New prescription forms	Most GPs and pharmacists saw indicating the purpose of the medication on the prescription as the most substantial and important focus of the new prescription notations.

Stakenborg[296]	2016	Netherlands	To describe pharmacists' and pharmacy assistants' experiences with parents contacting the pharmacy for a febrile child, and to identify ways of improving medication management of these children.	Community Pharmacy	Focus Groups	--	Antibiotic prescriptions were more common after hours. Pharmacy staff felt the reason for use is most important when doses are too low, thereby allowing pharmacists to double check the dose, and improve medication safety. Some pharmacies already had agreements with physicians to include the reason for use and for pharmacists to automatically correct a dose if it was too low.
Tarn[293]	2012	United States	To investigate older patient, physician and pharmacist perspectives	Community	Focus Group	--	The "barriers to communication" theme identified that pharmacists felt discussions

			about the pharmacists’ role in pharmacist-patient interactions.				with patients were limited because they did not have the reason for use information.
Vercheval[295]	2016	Belgium	To improve the quality of documentation on antibiotic therapy in the computerized medical records of inpatients.	Hospital	Prospective Interrupted Time Series	Reason for use recorded in prescriptions ordered through CPOE	A multifaceted intervention increased the documentation of antibiotic reason for use from 83% of prescriptions to 90% of prescriptions (p=0.0013)
Warholak-Juarez[273]	2000	United States	To evaluate the effect of incremental increases in patient information on the quality of pharmacists’ clinical decisions related to legally mandated prospective drug utilization review responsibilities.	Community Pharmacy and Indian Health Services	Simulation	Reason for use added to prescriptions	Pharmacists identified drug therapy problems better when they had access to the patient’s reason for use and this continued to improve as pharmacists had more experience.

Warholak[294]	2014	United States	To compare the incidence and types of potential drug therapy problems identified prior to and after providing the pharmacist with patient diagnosis information.	Community Health Centre	Prospective Pre-Post Study	Free-text reason for use added to electronic prescription	The pharmacist intervention rate decreased from 3.9% before the reason for use was added, to 1% after the reason for use was added ($p<0.001$).

Chapter 7

Discussion and Conclusion

7.1 Introduction

Increasingly, the healthcare field is moving towards an interprofessional, patient-centred model. In parallel to this, the rapid advancement of technology is enabling the creation of broadly accessible tools such as EHRs to facilitate information gathering and sharing. As all participants in healthcare respond to these changes, it is becoming clearer that, as knowledge is transmitted from person to person, through any medium, it becomes more tailored and, ideally, more useful to the users of that knowledge. How people access information and what information each user needs changes depending on their role and values. It follows that any tool used to facilitate health information sharing, communication, or decision-making must be created in such a way that it accounts for the different user needs presented by each participant. This thesis explores IP-SDM among physicians, pharmacists, and patients, and begins to understand how EHRs can facilitate improved information sharing. Through this exploration, it became clear that there is a subjective element to communication among participants in health. Through identifying how relationships can influence interactions between physicians and pharmacists — specifically the impact relationships have on professional exchanges and information sharing — the need for future research to better understand this variable emerged.

This thesis presents emerging research about how people access, use, discuss, and transmit information related to health by presenting the results of an multidisciplinary project that seeks to understand how and what health information patients, pharmacists, and physicians are sharing, including the types of information typically exchanged, and to begin to understand best practices and tools that support communication and collaboration.

The first phase of the project involved contacting, observing, and interviewing patients, pharmacists, and physicians. This data collected during this phase was used to develop two research papers that examined different aspects of how these groups interacted with each other, specifically around medication decision-making, and also explored how EHRs can be used to facilitate their interactions. During the coding phase for the two initial papers that described this data, a new finding emerged—that physicians' and pharmacists' perceptions of communication and trust appeared to be closely tied with having a prior relationship with each other. Through this secondary analysis, a third paper was developed to explore the ways relationships influenced how, what, and when information was communicated, and the potential implications this has for understanding collaboration and communication among HCPs. In alignment with prior literature, the findings support the notion that communication is necessary for collaboration between pharmacists and physicians, and encourages thinking about how their communication is influenced within professional boundaries as well as through deeper in personal relationships.

Incorporating findings from the papers on physician-pharmacist decision-making and relationships, the importance emerged of understanding the scope of information around including the reason for use along with a prescription. Though this topic is currently being explored, the majority of the current body of research focuses on the patient-physician relationship and does not significantly examine how this impacts pharmacy practice nor does it include pharmacists in much of the research. Aligning with best practices of scoping reviews, this study identified both gaps and directions for future research.

7.2 Mixed methods

Mixed methods and multidisciplinary approaches to understanding how health-focused information is collected and shared provide important insight into how people are navigating the healthcare system. Currently, much of the research on this topic has been siloed in its approach and has generally focused on studying one or two perspectives within a single discipline. Developing a theoretical framework to support multidisciplinary research will allow future multidisciplinary studies to identify how this research should be conducted and also enhance methods and tools used to support the conduct of this research.[309] This broader approach would help to validate findings and methodologies, which would ultimately further help with the adoption of the information presented. The next steps for this area of research—developing a theoretical framework for multidisciplinary research in health—would also respond to an identified need to improve multidisciplinary methods and the research around searching for information.

7.3 Reason for use

Medication indication, or reason for use information, is a foundational piece of information needed to provide effective care and treatment outcomes may improve if this information about the reason for prescription, diagnosis, and medication choice is provided.[85,301] Estimations are that roughly 21% of medications are prescribed for off-label use.[302] Understanding medication indication is vital for non-prescribers involved in care: it can influence care by considering drug interactions and side effects, and by clarifying the need for a patient to take a specific drug. Though there is at least one official indication for every approved drug (*on-label indications*), there are many situations where medications are used in ways for which they were not explicitly approved (*off-label indications*). While HCPs are often able to make educated guesses about the reason a medication was prescribed based on experience, information gathering, and resources that provide information on indication (such as Lexi-Comp and Drugs.com, among others), there are clear limitations to this approach, particularly when it comes to off-label prescribing.

7.4 Challenges in multidisciplinary research

There are many challenges in conducting multidisciplinary research. For their research to be successful, the multidisciplinary research team needs to spend time exchanging discipline-specific knowledge, including explaining theories and methods that may not easily come together. Even though designing multidisciplinary research projects is common today, there is not a clear answer to the question of how to conduct multidisciplinary research well. Researchers are often trained to approach research in different ways, using different languages. Creating a framework where every participant is on the same page can be challenging.

Pharmacists, engineers, and sociologists approach and think about their work differently, and there is a need to bridge understanding. Multidisciplinary research partners may not feel comfortable either critiquing out of their areas of expertise or understanding different evaluation methods. There are also difficulties in getting the right feedback to negotiate moving a project forward. As projects reach completion, the publishing process itself becomes an inherent challenge, not only in regards to where research is published, but also in how it is written. Asking ourselves what multidisciplinary research is, and what it should be, is the first step needed before researchers can fully work together.

The purpose of multidisciplinary research is to bring together disparate narratives to answer an overarching question that is relevant across all these narratives. It is well established that, when conducting multidisciplinary research, it is necessary to develop an understanding of each discipline's culture, structure, science, terminology, and expectations around knowledge and the research process. An ongoing challenge of this thesis was building a cohesive narrative from the data collected. Whose story should be told with the data, when there is no naturally consistent narrative that happens across the different disciplines being studied?

Further, the terminology around multidisciplinary research itself is not well defined. The inconsistencies in terminology, methods, and theories is reflected in one of the most cited definitions of multidisciplinary research, by Aboelela et al.[310]:

> *"…any study or group of studies undertaken by scholars from two or more distinct scientific disciplines. The research is based upon a conceptual model that links or integrates theoretical frameworks from those*

> *disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases of the research process."*

Aboelela et al.'s definition highlights that multidisciplinary research connects theoretical frameworks from different disciplines and uses study design and methodologies that are not limited to one field, rather than actively integrating them.[310] However, it does not articulate the need to develop a new framework that is itself multidisciplinary. The next step to strengthening multidisciplinary research is to develop an overarching theoretical process framework that can guide collaboration among disciplines.

Developing this shared understanding occurs throughout the research process, from ideation through to publication. One study by Grönqvist examined challenges of establishing a multidisciplinary research project, and the hazards of not having a shared theoretical framework.[166] The study described a project in which, while several theories were proposed during the process, there ultimately was no agreed-upon overarching theoretical framework, given that the different projects occurring concurrently.[166] Grönqvist concluded that, while it can be most effective to allow each researcher to frame their research in a field-specific way, this deficit makes a true multidisciplinary contribution difficult.[166] The data presented in Chapters 3 and 4 were analyzed using the multidisciplinary framework method, which helped to guide the process of data analysis for parts of the resulting papers. The research used in this thesis was multi-disciplinary in approach, but the resulting papers published remained more discipline-specific. Engineering focused projects,[152–154] as well as business focused projects,[150] were published separately from the health-focused projects included in this thesis. While collaborative members from each discipline or perspective were included in all the work, each paper focused on a discipline-specific methodology, and to date, none have been written in a way that fully combines methodologies.

Currently, there is not an established overarching theory to guide multidisciplinary research. When we think about gaining knowledge, we generally think about how knowledge progressively develops, for example, new knowledge challenging and then overthrowing old paradigms. Thomas Khun identified that it is not cumulative progress, but rather discontinuities in a series of phases that drives science forward:[311]

> *"For reasons that are both obvious and highly functional, science textbooks (and too many of the older histories of science) refer only to that part of the work of past scientists that can easily be viewed as contributions to the statement and solution of the texts' paradigm problems."* - Thomas Khun[311]

Further, Khun identifies that, if an area remains unresolved for long enough, there will come a point where scientists begin to question the model itself, describing: "a proliferation of compelling articulations, the willingness to try anything, the expression of explicit discontent, the recourse to philosophy and to debate over fundamentals."[311] Many areas of science are increasingly driven by data, rather than by theories, as Khun argues. Often health research reflects a new data-driven approach while adding a practice-driven element. Under Khun's theory, this would align as a paradigm shift, which emphasizes the need for multidisciplinary research to establish theoretical frameworks that account for an overarching theory, while continuing research into practice-related elements.

Finding potential solutions to some of the identified barriers to improved multidisciplinary research is important for driving this important type of research further. In this thesis, I put forward that before we can fully realize the benefits of multidisciplinary research, we will need to rethink how multidisciplinary research is conceived. While there is a current focus on how to do the research and how to find the solutions, there is little clarity on how we see the overarching process of conducting and navigating multidisciplinary research. As multidisciplinary research grows in popularity, the question of what is multidisciplinary research must also be asked. In many successful multidisciplinary research projects, the collaborative process is conducted through a divide-and-conquer process.

Multidisciplinary research by nature encourages challenging established scientific ideas and collaborating to combine different discipline-specific areas of expertise to find a better solution. If multidisciplinary research is to be truly successful, the next step is to work fully together: write jointly, use standard terminologies, and use the same methods, all under a multidisciplinary theoretical framework. The strength in the findings presented is not only in how they begin to build a narrative around how people access, use, and understand health information, but also in identifying how they do not come together in a single disciplinary way.

7.5 Implications and future research

Today Canada is an emerging market for EHRs and other networked tools that facilitate communication in healthcare. This thesis, while exploratory, demonstrates that there is both a desire and a need for better communication among HCPs, and between HCPs and patients. This thesis demonstrates that there are still clear knowledge gaps around key questions about information sharing, role, and scope of practice. Research clearly demonstrates that other HCPs and patients are still not aware of a pharmacist's full scope of practice.[48,90,147,252] To fully understand how people are making decisions about health, from both the clinician and patient perspectives, it is clear that more research needs to be done into subjective factors, such as how relationships can shape and influence the information being used to make these decisions. By understanding what information is being used, and improving capabilities to share the information in easy and collaborative ways, all aspects of healthcare will benefit.

In the data included in the study, the response to EHRs and their potential for improving information access and collaboration was positive. However, it was well recognized that EHR information is not a panacea, especially when the information is not delivered in a meaningful way.[305,312] Well-designed EHRs give healthcare teams and patients a more complete picture of patient health, provide information on diagnosis, enable more reliable prescribing, improve efficiencies and productivity, facilitate coordinated care, and share health information.[313] By enhancing communication, EHRs allow clinicians to focus on patient care while improving both interactions and communication between HCPs and patients.[59] Improved communication and collaboration has been demonstrated to improve health outcomes and patient safety, as well as improving the overall patient agency. Future research that accounts for different information needs should pair providing access with clarity about environment and translation of information.

Through the research described in this thesis, it became clear that while stakeholders may value different things, there is a commonality, as when, for example, physicians need information about adherence and pharmacists need information on reason for use. The process of exchanging information about adherence and the reason for use is a potential venue for communication; however, there is an identified difference between information exchange and meaningful collaboration. Collaboration is not required to share information, but without collaboration, that information may not be fully used or understood by both parties. To improve patient care and overall engagement, there needs to be acknowledgement that effective collaboration is not just a matter of the creation of tools. It requires a better overall understanding of systematic differences of values and relationships, and a better understanding of tools that can actively improve collaboration and communication.

Continuing to collaborate with different disciplines to conduct patient-engaged research will allow the results of this study to be used in developing EHRs across Canada. Further research into the diverse perspectives of HCPs and allied health professionals, as well as those designing health systems, would help to optimize information sharing, communication, collaboration, and ultimately the decision-making process. Future research should be designed to accommodate a robust multidisciplinary approach that allows us to examine how sharing and communicating health information changes, as the influence of technology and the number of stakeholders involved in care increases. Examining how this can happen in part through developing an multidisciplinary model of collaboration and information sharing, based on an understanding of roles, priorities, and values can help to direct and frame multidisciplinary research.

7.6 Strengths and limitations

In addition to the limitations outlined in the substantive chapters, the most significant limitation, as discussed above, is the lack of overarching theoretical frameworks that can guide multidisciplinary research.

Currently, there are several issues of equality when it comes to working with patient groups that may be more vulnerable, as, for example, those with genetic health issues, such as Huntington's, that may influence willingness to participate in research studies or illnesses with social stigmas such as HIV and mental illness. As well, there are overall challenges with recruiting a diverse and representative population of research participants. In the three studies comprising chapters 3,4 and 5 the core research team members adopted reflexive skills in reaching out to various patient advocacy groups as well as traditionally underserved populations.[24] The research design's use of mixed methods research and emphasis on patient and community-engaged research was helpful. Future studies have an opportunity to be more inclusive and diverse, as well as including more vulnerable patient groups.[15,314] By incorporating a participatory approach, and including patient partners and patient representatives on the research team, in addition to reaching out to capture the voices of different members of the community, this project attempted to achieve as much participant diversity as possible. Even so, ultimately, there were barriers to reaching several stakeholder groups, which may limit the generalizability of this project.

Similarly, there are challenges in recruiting within the health profession. Future research should focus on recruiting a more diverse population of HCPs. While efforts were made to recruit physicians, ultimately scheduling conflicts limited their participation. Future research should include more HCPs, as well as allied health professions such as nurses, to begin to build a more encompassing picture of the scope of health communication in Canada.

The mixed methods and multidisciplinary approach in this thesis is an important strength of this project. The participatory methods that were employed ensured that there was an important patient focus throughout the research process, from ideation through to publication. Currently, there are not many studies that examine patient and multiple HCP perspectives about how and what information is transmitted between each party, and even fewer in a Canadian context.

7.7 Conclusions

While the findings are exploratory they do present an initial understanding for which future research can use to better understand the complexities around communication, information sharing, and how relationships can influence collaboration. By answering the objectives, this research begins to identify how patients, pharmacists, and physicians find and communicate information to make decisions both individually and together, the findings help support future research that will support new systems and tools. The lessons learned from the presented studies can help direct the development of EHRs and other networked information sources that not only support but also facilitate communication and collaboration. The findings have relevance to healthcare organizations, engineers, information specialists, patients, and researchers. To build systems that facilitate communication, there is a need for them to be designed with complex user needs in mind, and understand the different influencers that go into finding, seeking, and communicating information between stakeholders including how relationships influence collaboration. Understanding the scope of knowledge around reason for use information will help to guide further research into what information is important for active collaboration. By understanding that each participant in health care may have different information needs, future systems can be designed to not only facilitate information sharing, but better enable Ultimately, building EHRs and other tools that take into account the diverse needs of the different users can help promote safe medication use and, overall, improve participation in the healthcare process by patients and HCPs.

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Appendices

Appendix A

Team Members

Name	**Discipline**
Dr. Kelly Grindrod	Pharmacy
Dr. Catherine Burns	Engineering
Ms. Annette McKinnon	Patient advocacy
Dr. Josephine McMurry	Business
Dr. France Légaré	Medicine
Dr. Lisa Guirguis	Pharmacy
Dr. Jessie Chin	Biomedical and Health Information
Dr. Maman Joyce Dogba	Medicine
Dr. Lisa Dolovich	Pharmacy
Dr. Line Guénette	Medicine
Ms. Laurie Jenkins	Nursing
Ms. Khrystine Waked	Pharmacy
Ms. Kathryn Mercer	Information

Appendix B

Ethics Documents

Form 101 Correspondence Editor

Correspondence for Application ORE#:
20940
Playing Telephone: Medication management and integrated electronic health records

Correspondence Type:
EML

Date:
11/16/2015 (mm/dd/yyyy)

Sent By:
Joint WLU-Julie

Response: No **Date**: (mm/dd/yyyy)

Notes:
Ethics Clearance (b) (ORE # 20940)
Dear Researcher:

This is to advise that the ethics review of your application to conduct research:

Title: Playing Telephone: Medication management and integrated electronic health records
ORE #: 20940
Principal/Co-Investigator: Kelly Grindrod (kgrindrod@uwaterloo.ca)
Principal/Co-Investigator: Catherine Burns (c4burns@uwaterloo.ca)
Principal/Co-Investigator: Jilan Yang (jilan.yang@uwaterloo.ca)
Principal/Co-Investigator: Josephine McMurray (jmcmurray@wlu.ca)
Collaborator: Joyce Dogba (joyce-maman.dogba@fmed.ulaval.ca)
Collaborator: Samina Abidi (samina.abidi@dal.ca)

has been completed through a University of Waterloo Research Ethics Committee. Based on the outcome of the ethics review process, I am pleased to advise you that your project has received ethics clearance.

Note 1: This ethics clearance from a University of Waterloo Research Ethics Committee is valid for one year from the date shown on the certificate and is renewable annually. Renewal is through completion and ethics clearance of the Annual Progress Report for Continuing Research (ORE Form 105).

Note 2: This project must be conducted according to the application description and revised materials for which ethics clearance has been granted. All subsequent modifications to the project also must receive prior ethics clearance (i.e., Request for Ethics Clearance of a Modification, ORE Form 104) through the Office of Research Ethics and must not begin until notification has been received by the investigators.

Note 3: Researchers must submit a Progress Report on Continuing Human Research Projects (ORE Form 105) annually for all ongoing research projects or on the completion of the project. The Office of Research Ethics sends the ORE Form 105 for a project to the Principal Investigator or Faculty Supervisor for completion. If ethics clearance of an ongoing project is not renewed and consequently expires, the Office of Research Ethics may be obliged to notify Research Finance for their action in accordance with university and funding agency regulations.

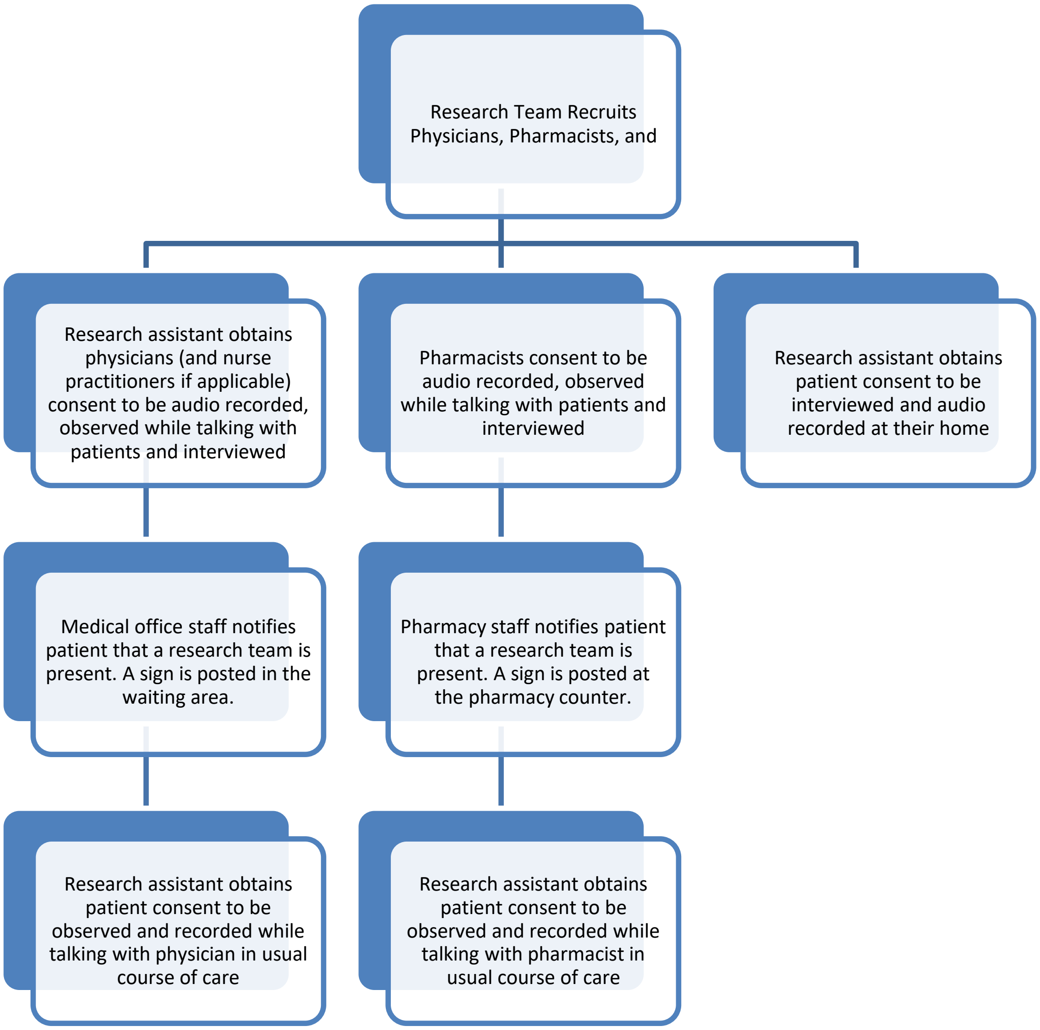
Note 4: Any unanticipated event involving a participant that adversely affected the participant(s) must be reported immediately (i.e., within 1 business day of becoming aware of the event) to the ORE using ORE Form 106. Any unanticipated or unintentional change which may impact the research protocol, information-consent document or other study materials, must be reported to the ORE within 7 days of the deviation using ORE Form 107.

Best wishes for success with this study.

Julie Joza, MPH
Senior Manager, Office of Research Ethics
University of Waterloo ext. 38535

Robert Basso, PhD
Chair, Research Ethics Board
Wilfrid Laurier University

Figure depicting recruitment and the consent process for each participant



Patient e-mail recruitment sample
Below message is sent out to invite patients to participate a research study on behalf of the researchers at University of Waterloo.
==

Hi, everyone:

My name is ***. I am a (research coordinator, Ph.D./Master student, research assistant) at School of Pharmacy, University of Waterloo. I am currently working on research project to study how integrated electronic health record can support interprofessional shared decision-making for medication therapy management.

We are looking for health professionals and patients who will help us understand how electronic medical records can be better designed for medication management. We are hoping to observe medication management in at least four Canadian provinces, including Alberta, Ontario, Quebec, and Nova Scotia. This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee and the Research Ethics Board at Wilfrid Laurier University.

We would like to invite you participate in our study. If you choose to participate, we will schedule a time at your convenience to visit your home and observe how you manage medications, including the process used for reviewing medication lists, the results of a medication review, how medications are recommended and how patients make decisions around taking medications. Through semi-structured interviews, we will also inquire about how each participant identifies potential and existing medication review problems and how each participant work to solve the problems themselves. The observation will take up to 2 hours and the structured interview up to 30 minutes.

If you are interested in participating, or have any questions, please contact:

Jilan Yang, PhD
Research Coordinator
School of Pharmacy
University of Waterloo
Email: jilan.yang@uwaterloo.ca
Phone: 519-888-4567 ext. 21377

Or

Kelly Grindrod, BScPharm, PharmD, MSc
Assistant Professor
School of Pharmacy

Tel: (519) 888-4567 ext. 21358
Email: kgrindrod@uwaterloo.ca.

Thanks very much.
HCP e-mail recruitment sample
Below message is sent out to invite healthcare professionals to participate a research study on behalf of the researchers at University of Waterloo.

==

Hi, everyone:

My name is ***. I am a (research coordinator, PH.D./Master student, research assistant) at School of Pharmacy, University of Waterloo. I am currently working on research project to study how integrated electronic health record can support interprofessional shared decision-making for medication therapy management.

We are looking for health professionals and patients who will help us understand how electronic medical records can be better designed for medication management. We are hoping to observe medication management in at least four Canadian provinces, including Alberta, Ontario, Quebec, and Nova Scotia. This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee and the Research Ethics Board at Wilfrid Laurier University.

We would like to invite you participate in our study. If you choose to participate, we will schedule a time at your convenience to visit your workplace and observe how you manage medications, including the process used for reviewing medication lists, the results of a medication review, how medications are recommended and how patients make decisions around taking medications. Through the semi structured interviews, we will also inquire about how each participant identifies potential and existing medication review problems and how each participant work to solve the problem. The observation will take up to 2 hours and the structured interview up to 30 minutes.

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Kelly Grindrod, BScPharm, PharmD, MSc
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School of Pharmacy
Tel: (519) 888-4567 ext. 21358
Email: kgrindrod@uwaterloo.ca.

Thanks very much.

Information Letter and Consent- Patients
PATIENT HOME VISITS
INFORMATION LETTER & CONSENT

November 2015

STUDY TITLE:

Playing Telephone: Medication management and integrated electronic health records

NAME OF PRINCIPAL INVESTIGATORS

Kelly Grindrod, BScPharm, MSc, PharmD
Assistant Professor, University of Waterloo School of Pharmacy
200 University Avenue West
Waterloo, ON N2L 3G1
Phone: 519.888.4567 x21358
Email: kgrindrod@uwaterloo.ca

Catherine Burns, PhD
Professor
Systems Design Engineering
University of Waterloo
Tel: (519) 888-4567 ext. 33903
Email: c4burns@uwaterloo.ca

NAME OF SPONSORS:

CANADIAN INSTITUTES OF HEALTH RESEARCH, TELUS HEALTH

INTRODUCTION:

You are being asked to take part in a research study. Please read this explanation about the study and its risks and benefits before you decide if you would like to participate. You should take as much time as you need to make your decision. You should ask the study staff to explain anything that you do not understand and make sure that all of your questions have been answered before signing this consent form. Before you make your decision, feel free to talk about this study with anyone you wish. Participation in this study is voluntary.

BACKGROUND/PURPOSE:

The objective of this project is to look at how patients, family physicians and pharmacists share information so they can make decisions about treatment. The goal of this project is to improve how we work with medications so we can better prevent errors and side effects. The ultimate beneficiaries are patients, family doctors and community pharmacists.

STUDY DESIGN:

We are visiting patients, physicians and pharmacists in Alberta, Ontario, Quebec, and Nova Scotia. During each visit, we are observing how doctors and pharmacists work, how they use their computer systems and how they talk with patients, and how patients make medication decisions. You are being asked to participate in a patient home visit.
At the patient home visits, the research team will collect data in six ways:

(1) Complete a short demographic survey including information on age, gender, years of practice, etc;
(2) Complete a short health literacy survey;
(3) Observe how you organize and manage your medications in your home;
(4) Have you talk-out-loud while using any electronic health records (audio recorded);
(5) Have you explain a typical encounter with a family physician, nurse practitioner or pharmacist (audio recorded); and
(6) Interview you about your experiences in managing medications and using electronic health records (audio recorded).

The home visit will take up to 1-2 hours.
Please note this study project will not be collecting data on actual medication lists but rather on the type of information exchanged between patients, family physicians, nurse practitioners and pharmacists, including tools and workflows involved in each step of medication management. After each visit, all audio recordings will be transcribed and any identifying information will be removed. The audio recording will then be deleted. The de-identified transcripts will be used to identify quotations that may be used in research publications and presentations. Quotations will be identified only by gender, age and province.

VOLUNTARY PARTICIPATION:

Participation in this study is voluntary. You may decline to participate any study components of demographic survey, clinical observation and interview. You may also decline to answer any of the questions in demographic survey and structured interview.

WITHDRAWAL FROM STUDY:

You may withdraw from this study at any time without any negative consequences by advising the researcher that you no longer wish to participate.

PAYMENT:

There is no remuneration for this study.

RISKS:

We do not anticipate any risks to you due to participating in this study. This study consists of unobtrusive observations and interviews. We are maintaining participant confidentiality; no risks to the participants are anticipated.

BENEFITS:

There are unlikely to be any direct benefits to the participants of this study. The intention of this project is to use the information gathered to help Telus Health redesign their electronic medical and pharmacy records. The ultimate beneficiaries will be patients and clinicians who will use the new systems that are designed for medication management.

CONFIDENTIALITY:

All information study participants provide will be considered confidential. Each study participant will be assigned a study ID that will be used for all data collection and data forms. You will not be identified in any report or publication. Only the research team will have access to individual participant data. Audio recordings will be deleted as soon as they are transcribed. Survey questionnaires and transcripts collected during this study will be retained for seven years in a secure location at our research offices at the University of Waterloo's School of Pharmacy in Kitchener, Ontario.

CONFLICT OF INTEREST

None

ETHICS REVIEW

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee and the Research Ethics Board at Wilfrid Laurier University. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca or Dr. R. Basso, the Chair of the REB at WLU at 519-884-0710 ext. 4994 or rbasso@wlu.ca.
QUESTIONS ABOUT THE STUDY

If you have any questions about participation, or would like additional information to assist you in reaching a decision about participation, please contact:

Kelly Grindrod BScPharm, PharmD, MSc
Assistant Professor
School of Pharmacy
Tel: (519) 888-4567 ext. 21358
Email: kgrindrod@uwaterloo.ca.

Jilan Yang, Ph.D.
Research Coordinator
School of Pharmacy
Tel: (519) 888-4567 ext. 21377
Email: Jilan.yang@uwaterloo.ca

CONSENT FORM – AGREEMENT TO PARTICIPATE

By signing this consent form, you are not waiving your legal rights or releasing the investigator(s) or involved institution from their legal and professional responsibilities.

I have read the information presented in the information letter about a study being conducted by Kelly Grindrod and Catherine Burns at the University of Waterloo. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted.

I am aware that my interview will be audio recorded to ensure an accurate recording of my responses. I am also aware that excerpts from the interview may be included in the thesis, publications and/or presentations to come from this research, with the understanding that the quotations will be anonymous.

I was informed that I may withdraw my consent at any time without penalty by advising the researcher.

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee and the Research Ethics Board at Wilfrid Laurier University. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca or Dr. R. Basso, the Chair of the REB at WLU at 519-884-0710 ext. 4994 or rbasso@wlu.ca.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

☐YES ☐NO

I agree to have my interview audio recorded.

☐YES ☐NO

I agree to the use of anonymous quotations in any thesis or publication that comes of this research.

☐YES ☐NO

Participant Name: ______________________________ (Please print)

Participant Signature: ______________________________

Witness Name: __________________________________ (Please print)

Witness Signature: ________________________________

Date: ______________________________

Information Letter and Consent- Healthcare professionals

HEALTHCARE PROFESSIONAL
INFORMATION LETTER & CONSENT

January 2016

STUDY TITLE:

Playing Telephone: Medication management and integrated electronic health records

NAME OF PRINCIPAL INVESTIGATORS

Kelly Grindrod, BScPharm, MSc, PharmD
Assistant Professor, University of Waterloo School of Pharmacy 200 University Avenue West
Waterloo, ON N2L 3G1 Phone: 519.888.4567 x21358
Email: kgrindrod@uwaterloo.ca

Catherine Burns, PhD Professor
Systems Design Engineering University of Waterloo
Tel: (519) 888-4567 ext. 33903
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NAME OF SPONSORS:

CANADIAN INSTITUTES OF HEALTH RESEARCH, TELUS HEALTH

INTRODUCTION:

You are being asked to take part in a research study. Please read this explanation about the study and its risks and benefits before you decide if you would like to participate. You should take as much time as you need to make your decision. You should ask the study staff to explain anything that you do not understand and make sure that all of your questions have been answered before signing this consent form. Before you make your decision, feel free to talk about this study with anyone you wish. Participation in this study is voluntary.

BACKGROUND/PURPOSE:

The objective of this project is to study how electronic health information is shared across patients, family physicians, nurse practitioners and pharmacies. This includes the types of information typically exchanged, tools that support interprofessional shared medication decision- making and best practices. The goal of this project is to improve the management of medications

to save lives and reduce the overwhelming financial burden of medication errors and side effects. The ultimate beneficiaries are patients, family physicians, nurse practitioners and pharmacists.

STUDY DESIGN:

To better understand how we should be building electronic health records, we are visiting patients and healthcare professionals in Alberta, Ontario, Quebec, and Nova Scotia. We chose these specific provinces because each has a different way of delivering healthcare in the community.

Through our team of co-investigators and collaborators, we are identifying multiple sites in each province, including each of the following: a community pharmacy, a team-based primary care clinic, an independent-practice family physician clinic and patient homes.

We are visiting each site to collect data on the following:
(1) The types of information typically exchanged between patients, physicians, nurse practitioners and pharmacists about medication management, drug interactions, and side effects assessment;
(2) The types of tools being used by pharmacists, physicians and nurse practitioners during decision-making and how are they different;
(3) How workflow differs for patients, physicians, nurse practitioners and pharmacists;
(4) How patients, physicians, nurse practitioners and pharmacists assess for medication adherence, interactions and side effects;
(5) How pharmacists, physicians and nurse practitioners make medication recommendations; and
(6) How patients make medication decisions based on their clinical visit experience.
To answer these questions, the research team would like to collect data at your site in five ways:
(1) Complete a short demographic survey including information on age, gender, years of practice, etc;
(2) Observe your typical daily workflow over 30-60min;
(3) Have you talk-out-loud while using electronic health records to explain your workflow (audio recorded);
(4) Observe you while you speak with a patient about medication therapy (audio recorded and the patient will also need to provide consent); and
(5) Interview you about your experiences in managing medications and using electronic health records (audio recorded).

The clinical observations will take place at pharmacies and medical clinics. The observations and interviews will take up to 1-2 hours per health professional and can be coordinated so that we interview multiple healthcare professionals over 1 day at a single site.

Please note this study project will not be collecting data on actual medication lists but rather on the type of information exchanged between patients, family physicians, nurse practitioners and pharmacists, including tools and workflows involved in each step of medication management. After each visit, all audio recordings will be transcribed and any identifying information will be removed. The audio recording will then be deleted. The de-identified transcripts will be used to identify quotations that may be used in research publications and presentations. Quotations will be identified only by gender, age and province.

VOLUNTARY PARTICIPATION:

Participation in this study is voluntary. You may decline to participate any study components of demographic survey, clinical observation and structured study interview. You may also decline to answer any of the questions in demographic survey and structured interview.

WITHDRAWAL FROM STUDY:

You may withdraw from this study at any time without any negative consequences by advising the researcher that you no longer wish to participate.

PAYMENT:

There is no remuneration for this study.

RISKS:

We do not anticipate any risks to you due to participating in this study. This study consists of unobtrusive observations and interviews. We are maintaining participant confidentiality; no risks to the participants are anticipated.

BENEFITS:

There are unlikely to be any direct benefits to the participants of this study. The intention of this project is to use the information gathered to help TELUS Health and other EMR providers redesign their electronic medical and pharmacy records. The ultimate beneficiaries will be patients and clinicians who will use the new systems that are designed for medication management.

CONFIDENTIALITY:

All information study participants provide will be considered confidential. Each study participant will be assigned a study ID that will be used for all data collection and data forms. You will not be identified in any report or publication. Only the research team will have access to individual participant data. Audio recordings will be deleted as soon as they are transcribed. Survey questionnaires and transcripts collected during this study will be retained for seven years in a secure location at our research offices at the University of Waterloo's School of Pharmacy in Kitchener, Ontario.

CONFLICT OF INTEREST

None

ETHICS REVIEW

This study has been reviewed through the joint Waterloo-WLU ethics review agreement as outlined at https://uwaterloo.ca/research/office-research-ethics/research-human-participants/application-process/waterloo-and-wilfrid-laurier-university-co-ordinated-joint.

This study has received ethics clearance from a University of Waterloo Research Ethics Committee at University of Waterloo and the research ethics committee at Wilfrid Laurier University. However, the final decision to participate is yours. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin, the Director, University of Waterloo Office of Research Ethics, at 1-519-888-4567, Ext. 36005, or Dr. Robert Basso, the Director, Wilfrid Laurier University Research Ethics Board, at 519-884-0710 x4994.

QUESTIONS ABOUT THE STUDY

If you have any questions about participation, or would like additional information to assist you in reaching a decision about participation, please contact:

Kelly Grindrod BScPharm, PharmD, MSc Assistant Professor
School of Pharmacy
Tel: (519) 888-4567 ext. 21358
Email: kgrindrod@uwaterloo.ca.

Jilan Yang, Ph.D. Research Coordinator School of Pharmacy
Tel: (519) 888-4567 ext. 21377
Email: Jilan.yang@uwaterloo.ca

Feedback Letter
Project: Playing Telephone: Medication management and integrated electronic health records
Principal Investigators: Kelly Grindrod, PharmD; Catherine Burns PhD
FEEDBACK LETTER
November 2015

Dear Participant,

Thank you for your participation in our study. As a reminder, the purpose of this study is to analyze the current state of shared electronic health information across patients, primary care clinics and pharmacies, including types of information typically exchanged, best practices and tools that support interprofessional shared medication decision-making.

The information collected from the study will help us to better understand how and when patients should be engaged in medication-related decisions, especially when they take multiple medications. This study will also help us to understand how medication-related decisions should be coordinated across family physicians, nurse practitioners, pharmacists, medical specialists and non-regulated care providers.

Please note that any information pertaining to you as an individual participant will be kept confidential. No personal information will be identified in the research findings. Once all of the data are collected and analyzed for this project, we plan on sharing this information with the research community and Telus Health through seminars, conference presentations and journal articles. If you are interested in receiving more information regarding the results of this research, or would like a summary of the results, please provide your e-mail address to the researchers. When the study is completed, anticipated by September 2016, we will send you the information.

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee and the Research Ethics Board at Wilfrid Laurier University. If you have any comments or concerns in this study, please contact Dr. Maureen Nummelin at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca or Dr. R. Basso, the Chair of the REB at WLU at 519-884-0710 ext. 4994 or rbasso@wlu.ca.

Yours sincerely,

Kelly Grindrod, BScPharm, PharmD, MSc Assistant Professor, School of Pharmacy University of Waterloo 519-888-4567 x21358	Catherine Burns PhD Professor, Systems Design Engineering Faculty of Engineering University of Waterloo 519-888-4567 x33903

Appendix C
Healthcare Professional Interview Guide

Demographic Questions

Participant ID:

Date:

1. Gender: ________________________________
2. Age: ___________________________________
3. Occupation: _____________________________
4. Years in practice: ______________________
5. Highest degree obtained: __________________ Year graduated: ___________
6. What is your place of employment?
    ☐ Hospital ☐ Family Health Team ☐ Long Term Care Home
    ☐ Pharmacy ☐ Other (specify) __________________________
7. Years in current role/position: __________________
8. Years in current job/employer:_________________

Interview Questions for Physicians

Think Aloud

**Suggestion: Record a task that involves evaluating a medication such as a completing a fax refill request from a pharmacy or writing of a new prescription

1. Imagine you have a student standing next to you. Can you talk through this as if you were teaching the student what you are doing?
2. That's how we want you do the think-aloud completing the task.
3. Afterward the talk aloud, ask: How did you know this was indicated? Effective? Safe? That the patient is going to take it?

Patient Encounter

**Suggestion: Record a visit with a patient involving medications (e.g., refills, new medication etc).*

1. Afterward all the encounters are complete (not after each one), ask: How did you know this drug was indicated? Effective? Safe? That the patient is going to take it?

<u>Decision Making:</u>

We're going to start by talking about how you work with patients and pharmacists

1. Tell me what it's like in your clinic.

2. Think back to the last time you prescribed a medication, can you tell me about that? (*Probing questions: Describe to me how you present a patient with different treatment options? Tell me how you take into account the values of the patients? How do you decide what information to tell them? How do you evaluate their health literacy?)*

3. When looking at a medication prescribed by someone else, tell me how you find out the indication for the patient's medication?

4. Can you describe for me how you follow medication adherence in your patients? How do you find out a patient decided to stop taking medication? Or that they changed how they take a medication? When would you call a pharmacist?

5. We're going to ask you questions about pharmacists. When I say pharmacist, who comes to mind for you? What pharmacists do you work with?

6. Think back to the last time you identified a problem with a medication, can you tell me about that? If you had a question about the prescription, what would you do first? When would you call a pharmacist? *(Probing options: What do you generally need to access? Over the last week, when did you need to get in touch with a pharmacist? What have you found to be the best, or easiest way? How do you know when a pharmacist got the information you wanted to share? Do you think there's a way to make it easier? How often do you talk to a pharmacist on the phone? Through fax? When do you call them? When do you fax them?)*

7. When was the last time you disagreed with a pharmacist about a patient's treatment? How was it resolved?

<u>Use of computer systems</u>

Now we're going to switch over to a discussion of your computer systems.

1. What computer system do you use? (Probing options: How long have you had it in place? Why did you choose this system? Who purchased it? Have you worked between different systems? What system do you prefer and why?)

2. Think back to the last patient you saw. Talk me through how you used your [ ] system. (Probing options: What information did you look at first? Where did you spend most of your time? Would you say this is the standard use of the system)
3. Describe how <u>easy or difficult</u> it is to use your [ ] system to review a patient's medications? What about the medical history?
4. Describe how <u>useful or not useful</u> your [ ] system is for reviewing a patient's medications. What about medical history?
5. What do you like most about your [ ] system? What do you like least?
6. Describe to me how you access <u>other</u> patient records like lab values, x-rays or hospital discharge summaries? What do you look for the most?
7. Tell me how you use electronic health records that are not included in your EMR? (AB: Netcare; SW Ontario: ClinicalConnect; NS: SHARE; QC: DSQ) Why do you generally need to access them?
8. Describe an ideal computer system for your clinic. Do you foresee any barriers to using even an ideal system – even in an ideal world? How would you fix those barriers?
9. Now we've talked about your practice and your computer systems. What is your take home message for us?

Interview Questions for Pharmacists

Decision Making:
Interviewer: Okay, we're going to start by talking about how you work with patients and physicians.

1. Tell me what it's like in your pharmacy.

2. Think back to the last time a patient asked you to help them make a choice about a medication, can you tell me about that? (*Probing questions: Describe to me how you present a patient with different treatment options? Tell me how you take into account the values of the patients? How do you decide what information to tell them? How do you evaluate their health literacy?)*

3. Tell me how you find out the indication for a patient's medication?

4. How do you follow medication adherence in your patients? How do you find out a patient decided to stop taking medication? Or that they changed how they take a medication?

5. We're going to ask you questions about physicians. When I say physician, who comes to mind for you? What physicians do you work with?

6. Think back to the last time you identified a side effect or drug interaction, can you tell me about that? If you had a question about the prescription, what would you do first? Why? Describe to me what you do when you need to get in touch with a physician? Describe to me how you present a physician with different treatment options? (*Probing options: What have you found to be the best, or easiest way? How often do you talk to a physician on the phone? Through fax? When do you call them? When do you fax them? How do you know when a physician got the information you wanted to share? Do you think there's a way to make it easier?*

Use of computer systems

Now we're going to switch over to a discussion of your computer systems.

1. What computer system do you use? *(Probing options: How long have you had it in place? Why did you choose this system? Who purchased it? Have you worked between different systems? What system do you prefer and why?)*

2. Think back to the last patient you saw. Talk me through how you used your [ ] system. *(Probing options: What information did you look at first? Where did you spend most of your time? Would you say this is the standard use of the system)*

3. Describe how easy or difficult it is to use your [ ] system to review a patient's medications? What about the medical history?

4. Describe how useful or not useful your [ ] system is for reviewing a patient's medications. What about medical history?

5. What do you like most about your [ ] system? What do you like least?

6. Describe to me how you access other patient records like lab values, x-rays or hospital discharge summaries? What do you look for the most?

7. Tell me how you use electronic health records that are not included in your EMR? (AB: Netcare; SW Ontario: ClinicalConnect; NS: SHARE; QC: DSQ) Why do you generally need to access them?

8. Describe an ideal computer system for your clinic. Do you foresee any barriers to using even an ideal system – even in an ideal world? How would you fix those barriers?

9. Now we've talked about your practice and your computer systems. What is your take home message for us?

Trust Questions for Healthcare Professionals

Think back over the last week of work and the people who were involved in your patients' medication management including family physicians, nurse practitioners and/or community pharmacists. Thinking of all those people, rate your opinion of the following questions.

On a scale of 1 to 10, rate how much you agree with each question (1=highly disagree; 10=highly agree).

		MDs	**NPs**	**RPhs**
1	My patients are generally treated well by the other primary care providers.			
2	Other primary care providers put my patient's interests above all other considerations.			
3	Other primary care providers took my patient seriously.			
4	Other primary care providers' judgement about my patient's medication therapy was trustworthy.			
5	Other primary care providers were honest in dealing with my patient.			
6	I would be willing to let my patient's medication be managed again by other healthcare providers in the future.			
7	The treatment my patient received from other primary care providers improved his/her condition.			
8	I had confidence in other primary care providers who looked after my patient in the community.			
9	In general, other primary care providers could have been more compassionate with my patients.			
10	Other primary care providers appeared willing to help my patients.			
11	Other primary care providers should have shown more respect to my patients.			
12	Other primary care providers were too busy to spend meaningful time looking after my patient.			
13	If mistakes were made with my patients' medications, other primary care providers would have admitted to them.			
14	Other primary care providers kept me informed about my patient's medications, including relevant tests and circumstances that could have affected my patient's medication therapy.			
15	Other primary care providers were concerned for my patient's comfort.			
16	Other primary care providers were insensitive to my patient's needs.			
17	Other primary care providers discussed with my patient all available treatment options.			
18	Other primary care providers were reassuring.			

Appendix D
Healthcare professional Memos

<u>MEMO #1</u>: Decision Making.

Definition	**Gatekeeping and Understanding:** Pharmacists and physicians did not describe SDM in their practice and acted as gatekeepers to medication information. Professionals make decision based on their understanding of the patient situation and educate the patient on that decision.
Codes	**SDM intentions; decision point; making the decision; assumptions about patients; patient communication; IP SDM**
Summary of data	• Barriers to IP-SDM Participants view making decisions through whatever framework they exist most comfortably in. In settings where they is no co-location of participants, usually decisions happen in silos, in what is perceived as necessity: care has to happen as quickly as possible. Established roles and process' result in <u>gatekeepers, human or technological</u>: ***"You can't get through to them. There's the ward clerk who won't let you through to the doctor" (Pharmacist 1102, Ontario, Independent Practice).*** There is an established emphasis on authority and historical roles meaning decisions will happen without having all of the necessary information. Does this mean that in theory participants support collaborative decision making, but not in practice? When participants were asked specifically about how they make health decisions, usually they described contacting other players <u>only as they saw necessary</u>. The overall assumption that <u>prescribers and dispensers have completely separate roles</u> was a clear one. Pharmacists felt that their job was to 'warn' and 'advise' but not to challenge. Similarly, when physicians were working with other prescriptions there was a clear hesitancy to get involved in other practitioners decisions ***"I can't think of one right now. I guess I've had some disagreements, but if they are the ultimate prescriber, I might not "win," in brackets, that discussion. I may just be able to get my concerns put across, and I might want to document my concerns if I have strong disagreements or strong feelings" (Pharmacist 1107 Independent Practice, Nova Scotia).*** • Decision making reality Participants view of decision making was thought of as <u>inherently desirable to the care process</u>, however the concept was not brought up without interviewer prompting. In addition, the goal was in all but two cases to get <u>patients to understand</u> why a HCP was suggesting a treatment, or offering a diagnosis, <u>not to actively participate in any decision making process</u>. ***"It's not what product you pick, it's how you sell it. If they want a decongestant, ultimately they're all [pain medication] and [decongestant medication]. It's doesn't really matter. How are you going to sell that" (Pharmacist 1101, Ontario, Chain Pharmacy***). The education offered to a patient similarly reflected this – the goal was to <u>get the patient</u>

	on board, not to discuss the process. ***"I don't want to give more information than necessary, especially if I see that a patient is more anxious during the beginning of the counseling, and even more so if the patient doesn't want to take the medication or is scared to take the medication." (Pharmacist 1121, Quebec, Independent Pharmacy).*** Tailoring care to what a patient is perceived to need contrasts with the philosophical ideals of patient-centred care, something that every participants focused on as a value. So, although patient centred care is acknowledged as a core value, the process of actually actively engaging in it is far more challenging.
Deviant cases	Pharmacists and Physicians working in Family Health Teams in Ontario spoke differently about both how they engage with patients, and colleagues in decision-focused setting. *"In terms of deciding which medication to use with a patient, we go through the options we have available, usually with the physician based on what the patient is presenting with" (Pharmacist 1125, Ontario, Family Health Team).* ***"I want them to make an informed decision. I want them to understand what's going on with their health. I want them to understand what the options are and why we're pursuing those options. I want them to make an informed decision about whether they want to move forward with a particular treatment course or not and understand the rationale for that." (Physician 1202, Ontario, Family Health Team)***.
Points for further consideration	• What tools and technology can support IP-SDM • What cultural shift needs to happen to support IP-SDM • How does IP-SDM become an active part of care

MEMO #2: Communication.

Definition	**Timing and access:** Pharmacists and physicians often communicate with each indirectly through patients, faxes, or receptionists. Yet, both groups are cautious about the expansion of infrastructure that could help, or hinder.
Codes	**Reasons for HCPs to communicate with patients; Reasons for HCPs to communicate with each other; flow of information; communication work-arounds; methods of communication; availability; how to document in the medical or pharmacy chart; risk communication; patient as messenger**
Summary of data	• Myth of Collaborative Care. Participants viewed care as generally siloed, physicians prescribed a medication or treatment, and pharmacists dispensed and discussed a medication. While closely linked to communication Pharmacists tended to focus on what they could do without access to a physicians go ahead, while generally keeping the physician in the loop ***“I adjust all the doses, and I do everything, he doesn't have to know, but it's important that he does actually know what his INR is, just for the file in case the patient shows up in a week from now with some weird thing” (Pharmacist 1101, Ontario, Chain Pharmacy)***. Additionally, Pharmacists emphasized the goal of being unobtrusive when it comes to care, not wanting to bother a physician with questions, even if it delayed the response time to care. ***“I'll usually do a fax just because I feel like it's less intrusive, and so they can potentially get back to me quicker without having to call, but if it's something that I really want to know, then I might do both.” (Pharmacist 1107, Nova Scotia, Independent Pharmacy).*** ***“Usually when you have issues, first way we are going to try to reach them is the fax. We try to put that as short as possible, the less they read, the better it is, the more the chances that we have an answer.” (Pharmacist 1120, Independent, Ontario)***. The ideology is that providing the best care to patients is directly linked with the pharmacists constraints of how, and when they can have access to a physician, within the practical barriers of lacking active collaboration. ***“My interactions with pharmacists are more with local pharmacists, by phone. We don’t have direct contact to create therapeutic plans.” (Physician 1209, Quebec, Family Health Team).*** While philosophically pharmacists were considering interactions with doctors, and encouraging a back and forth between patients, physicians and pharmacists the reality of patient-centred collaboration remained generally unattainable. ***“I'll give them what information I can and then it's up to them to discuss further with the doctor based on what I told them.” (Pharmacist 1117, Ontario, Chain)***. • Direct access in communication This could mean that participants support collaboration in theory, but in reality, is not built into the normal process of care. The reluctance of pharmacists to interact with physicians beyond fax was met with a desire for easier communication, and more potential for collaboration. ***“There're a few doctors you can call and talk to, and that's awesome, but it's next to never.***

	Most of them want you to fax." (Pharmacist 1114, Alberta, Independent Pharmacy)". While almost all of the pharmacists outside of clinics and family health teams cited barriers such as faxes, or gatekeepers such as receptionists, physicians never mentioned barriers to accessing pharmacists. The barriers with physicians were with regards to if the pharmacists were known, or unknown to them. Physicians spoke about collaborating even when electronic health records, or faxes were used. "***Unless there's a bigger concern, I'm happy for the secretaries to do it. Sometimes they'll message them and they'll call me in the room when the pharmacist is on the line and I'll go and talk to them. They can send a message when they have free time so we both can just do our work as long as it doesn't result in unnecessary messages." (Physician 1203, Ontario, Clinic)***. • Infrastructure to support communication Participants viewed barriers to communication as generally an annoyance. Lacking the ability for quick turnarounds in getting information was a constant complaint among participants. The idea of having a centralized way of communicating information, which was not dependent on fax was met as philosophically unproblematic. This said, the process of actively setting up, maintaining, and building the infrastructure was met with hesitancy. ***"Yes, if we had an electronic health record, it would be very helpful. We have a system in the hospital but we still don't have access to the provincial one where we could see the patient's complete profile." (Physician 1210, Quebec, Family Health Team).*** Could this mean that the reluctance of participants to actively engage in collaborative communication stems not only from a lack of awareness of scope of practice, but more simply, a lack of ability to have the same information? *"My goal is to get my EMR and the pharmacist's EMR exactly the same and up to date"* (Physician 1206, Alberta, *Clinic).*
Deviant cases	Regardless of what type of clinical setting, when physicians and pharmacists had a personal relationship with each other, communication was easier. Having personal cell phones of other practitioners was cited in three cases as a way to direct communication. Additionally, when participants were in a rural setting, there was always a more significant mention of knowing other practitioners personally, which may explain why there was improved communication in that setting.
Points for further consideration	• What are participants motivations from improving communication • How to build EHR's to better facilitate care • How communication can improve across all care settings, not just where co-location is easily attained.

MEMO #3: Information.

Definition	**Indication and Adherence:** Pharmacists and physicians require information to provide patient care that is accessible through current EHRs. Most critically, physicians required access to information about medication adherence while pharmacists require clear access to medications indication.
Codes	**Important information for patient care; information detectives; data collection and entry; multiple users; place of access; context of data entry; adherence; information scarcity limits roles; design features; timeliness**
Summary of data	• What information is necessary for care Participants view access to health information as fundamentally desirable, and were all very aware of what information they were missing, that was central to limiting their ability to do their job: Pharmacists were keenly aware that they had to participate in significant information gathering, usually done from talking to a patient rather than ‘bothering’ the prescriber. “***I would just say that getting information on the indication would be one. Trying to find out what they're taking the medication for and what they're hoping it's going to do for them would be two of the first questions that I would want to ask.” (Pharmacist, 1107, Nova Scotia, Independent Practice)***. In addition, Physicians were aware of the gap that came after they prescribed a medication. There were occasionally plans in place to confirm prescription pick up, and adherence but the lack of a formalized information point was a clear gap in care. ***“We've got a system about adherence. It's a really difficult point, and it's a really important point that I think we need to look because it's not good right now.” (Physician 1201, Ontario, Family Health Team).*** • What information is being communicated between healthcare professionals Participants communicated the majority of their communication revolved around information that was known to be missing, or assumed to be incorrect. ***“If the doctors don't make these errors or prescribe the individual prescription of the patients.. Yeah, we spend a lot of time faxing, clarifying what we think are errors.” (Pharmacist 1112, Ontario, Independent Pharmacy).*** Discussing what and why participants are communicating proved to leave the study with more questions. A clear takeaway was the necessity for the ability to be aware of indication and adherence was a core takeaway. Participants also suggested that often communication between healthcare professionals themselves was limited, and often was based on whatever information they could gather from ‘Googling’, discussions with the patient or caregiver, or ‘best guess’ assumptions. **“*Taking everything with a grain of salt, I guess, because the diagnosis the patient has given me may not exactly match the diagnosis that the physician gave.” (Pharmacist 1107, Nova Scotia, Independent Practice)*.** There is an ideology of providing patient centred care, however all too often the patient themselves was central to providing health care practitioners the information needed to provide care. This is philosophically problematic, because it emphasizes an undercurrent of mistrust, both between practitioners and patients. This may be due to lack of knowledge, or wilfully withholding information; which highlights lacking a centralized source of information has a direct negative impact on a patient’s health. *“Mostly, it will have a direct effect and impact on patient's healthcare because like we said, right now, unfortunately we're guessing, and we're assuming that patients are taking the medicines*

	we're giving them, that the medicines are the way we think they are" (Physician 1201, Ontario, Family Health Team). Interestingly, along with a lack of cohesion in finding and sharing information, there was additionally a hesitation to actively include patients in health information sharing. Participants discussed having to use patients to get information, but when it came to making them equal partners feelings of patients being unwilling or unable to understand health information: ***"We haven't explained it to the patient yet. I will explain tomorrow because I'm actually going to be delivering the medication myself to the patient, so I'll get the answer first from the doctor and then I'll let the patient know because they'll be so confused." Pharmacist 1112, Ontario, Independent Pharmacy)***. • Where information is coming from. All too commonly, the solution to finding missing information is not solved through discussion between practitioners. Most often health care practitioners mentioned asking patients for clarity, or even going to in search of information on their own: ***"I may have to Google it. The patient will often tell me. It might be in a note from the specialist, but if for some reason is not in the specialist note or the patient doesn't know, I may have to Google it." (Physician 1208, Quebec, Family Health Team***). There was a clear moral obligation for practitioners to work with the best information they would find; there was also an inherent disconnect about the best place to find, and the best way to share information necessary for patient care. *"We have a pretty incomplete medical history. We don't have labs. We don't have diagnoses, usually, unless we ask. Even then, you don't know if it's accurate." (Pharmacist 1117, Ontario, Chain Pharmacy)*
Deviant cases	One physician spoke about how they worked with the pharmacists who were part of their family health team, and actively collaborated for care. This may emphasize that it is a choice to actively communicate and collaborate in care.
Points for further consideration	• How knowing adherence and indication can help with improving care • How can information be best transmitted without leaning on the patient to be a sold carrier between practitioners.

MEMO #4: Process and Collaboration.

Definition	**Systems and Understanding:** Pharmacists and physicians find that current systems do not typically align with their decision-making processes and do not support collaboration in daily workflow.
Codes	**System Design (fill and bill); identifying patients in need of care; stages of care; technology limits practice; decision making; workarounds; documentation of process; workflow bottlenecks; prioritization**
Summary of data	**Outsider to care** Physicians and pharmacists both develop personal processes that work best for them internally in their practice, and externally through collaboration. Participants suggested that there is an imbalance in information available to them, and that to a large extent care stops when the patient leaves them. Perhaps the reluctance to challenge any medication

	decisions in an active way comes from this lack of awareness of unknown processes of prescribing and diagnosing. ***“I would try to think of it from a physician's perspective, and think of why they might be prescribing this particular medication. Taking everything with a grain of salt, I guess, because the diagnosis the patient has given me may not exactly match the diagnosis that the physician thought it was for.” (Pharmacist 1107, Nova Scotia, Independent Pharmacy)***. This can translate down to unspoken ethical concerns of doing what is right, protecting the patient, as well as protecting your practice with a undercurrent of not wanting to step on other practitioners expertise. Perhaps the reluctance to challenge any medication decisions in an active way comes from this lack of awareness of unknown processes of prescribing and diagnosing. This can translate down to unspoken ethical concerns of doing what is right, protecting the patient, as well as protecting your practice with a undercurrent of not wanting to step on other practitioners expertise. ***“He basically said, well, that's not my problem, because I'm not the one prescribing the seizure medication.” (Pharmacist 1102, Ontario, Independent practice).*** **Information gatekeeping** There was a keenness to convey support for patient centred care, and collaborative agenda. When other practitioners were included, they were brought up as advisors, to give insight into one particular aspect, or to clarify the necessity of a treatment. ***“Most physicians do like subtle language of requesting as to, "Can you give me the thought behind prescribing this because we're just not sure, we want to make sure the patient understands it well or providing recommendations." (Pharmacist 1116, Alberta, Chain Pharmacy)*.** So, although the ideology of collaborating care and working with other practitioners the reality of working within implicit barriers to access results in information necessary for IP-SDM remaining in silos. Conversely to discussions around decision making with other practitioners, where care is siloed, it was second nature for participants to talk about including patients in the decision process. This emphasized a contrast with the consistent underlying assumptions of how they perceive other people understand, need, and use health information. ***“I don’t want to give more information than necessary, especially if I see that a patient is more anxious during the beginning of the counseling, and even more so if the patient doesn't want to take the medication or is scared to take the medication.” (Pharmacist 1121, Quebec, Independent Pharmacy,).*** Many participants spoke about conversation, and collaboration both with colleagues and patients so it may be that far from the desired outcome of IP-SDM, there is a basic lack of awareness and confidence in other players abilities to be knowledgeable enough to *participate in care* in a truly collaborative way: *“I'm not asking. It's implied. However, you should still write it because then it's habit.” (Pharmacist 1115, Alberta, Chain Pharmacy).*
Deviant cases	One pharmacist working in a Family Health Team in Ontario spoke about IP-SDM in a patient care situation. Two physicians spoke about the benefits of working in Family Health Teams in Ontario; one of the two spoke of active collaboration.

Points for further consideration	• How can an EHR be built to facilitate collaborative processes of care, including medication management and diagnosis • Building a better understanding be built about perceived roles in care, and how that influences habitual processes

MEMO #5: Role/ Scope of Practice/ Relationship & Identity.

Definition	**Internally and externally imposed boundaries:** The perceived workplace and professional boundaries for pharmacists and physicians stem from how each group negotiates the boundaries of their job, how each group negotiates their interactions with each other and with patients, and how relationships, or lack of relationships impact their ability to carry out their roles and responsibilities.
Codes	**Responsibility to diagnose; negotiating role boundaries; accountability; medication management; mentorship & role modeling; monitoring; physical distance; community vs primary-care pharmacist; 5Ws of shared understanding; filling the gap/tailoring; building collaborative work environments; transactional communication**
Summary of data	• Role Boundaries. Participants viewed care as generally siloed, physicians prescribed a medication or treatment, and pharmacists dispensed and discussed a medication. Philosophically linked to communication, the differences arises in the perceptions of how roles are self-limited, and externally limited as they relate to care. Pharmacists tended to focus on what they could do without access to a physicians go ahead, while generally keeping the physician in the loop ***"I adjust all the doses, and I do everything, he doesn't have to know." (Pharmacist 1101, Ontario, Chain Pharmacy)***. Additionally, pharmacists emphasized the goal of being unobtrusive when it comes to care, and when it came time to actively collaborate to make a change there was a feeling that the physician authority had to be convinced: ***"I contacted the doctor right away to say, I don't think this is going to be an appropriate combination, can we change things? Unfortunately, the physicians weren't overly receptive to it… They were almost a little bit, we wish you hadn't put your hands in the pot. It was really frustrating because there's this clear thing that could cause harm to the patient, and you almost felt like you were doing more harm than good by alerting everyone to it." (Pharmacist 1102, Ontario, Independent Pharmacy).*** **Scope of Practice** Given that interviews spanned from independent clinics, pharmacies, family health teams, and chain stores it was clear that the political context of what was allowed to be done was clearly present in participants views, in a way that it was clear many did not question in their daily practice. Physicians led the care, and often took ownership of guiding the next directions that patients should take: *"I request that the patient sees the pharmacists. And the pharmacist sees the patients, checks adherence and comes to discuss it with me." (Physician 1210, ? ?)*. Pharmacist interviews brought up the whole picture of a patient's health, not just specific to a diagnosis or treatment plan, but would bring up relationships outside the traditional ideas of authority *"It's kind of interesting in community, because people will ask you a lot of questions that are not*

	medication-related. Sometimes they just want someone to talk to for a little bit.” (Pharmacist 1102, Ontario, Independent Pharmacy) This could mean that due to training, pharmacists understand the boundaries of their role, and believe themselves to be more limited in care, or training. ***“I Try to keep in mind is they may also have different sources of information than I do for why they may have chosen a particular treatment option versus what I would have chosen, just because of different sources a physician might have, or where they get their evidence versus where I might get mine.” (Pharmacist 1107, Nova Scotia, Independent Pharmacy***). It could be that the reluctance of the pharmacists to fully commit to changing scopes of practice could be because of their commitment to the whole picture of a patient, while understanding that they are missing information that gives them the ability to be internal to decisions to care. ***“I'll give them what information I can and then it's up to them to discuss further with the doctor based on what I told them. Usually when I don't have the indication, we can .. Most drugs you can pretty much figure it out.” (Pharmacist 1117, Ontario, Chain Pharmacy)***. **Practice of Care** Pharmacists perceive themselves as the last gatekeeper to a patients health. The ideology that providing care to patients that understands the full picture of what is best for a patient was mixed in with the boundaries of the scope of practice that a pharmacist had – both in working with a physician, but also what they perceived their role to be, and what they felt they could, and should do. ***“I really did think about the situation quite thoroughly, to see, should I have just let the drug interaction happen? Should I have just filled it and said to the doctors, hey, this could happen, should we just monitor? And I don't think I would've done that. I don't think that would've been in the patient's best interests.” (Pharmacist 1102, Ontario, Independent practice)”.*** Tailoring care outside the traditional boundaries is something that comes easier to physicians***: “I think doctors are less worried than pharmacists to prescribe something even if the indication and the clinical use differs. Pharmacists will be more by the book.” (Physician 1209, Family Health Team, Quebec)***. Participants suggested that there was significant gaps in knowledge around adherence for physicians, and around indications for pharmacists. Physicians generally did not consider pharmacists as a partner in care, and rarely brought up active collaboration. Even when pharmacists are members of Family Health Teams, the language used to describe their role implies a significant amount scope of practice implications: ***“Definitely the trust exists there and then now it's just kind of more a matter of allowing some pharmacists to feel like they can do more” Physician 1205, Family Health Team, Ontario).*** The Physician ‘allowing’ the pharmacist to ‘feel’ that they can do more is not language used to describe collaboration, but instead again implies the physician holds ultimate authority over care.
Deviant cases	The pharmacists that were part of family health teams, or family health clinics, regardless of the provinces were more confident in their having all of the information to make more active clinical decisions. “**Here, I have all the same information that they do. You can be a lot more confident in what you're recommending because you have all the information that you need to do a good job.” (Pharmacist 1124, Ontario, Family Health Team)**

Points for further consideration	• What motivations are there for people pushing boundaries of their scope of practice, or for understanding other roles scopes of practice • How does having access to core data (adherence, indication) change how practitioners interact with each other, and patients. • How can there be better understanding of scopes of practice, especially given a rapidly changing and shifting culture.

Appendix E
Patient Interview Guide

Demographic Questions
Participant ID:
Date:
1. Gender: ________________________________
2. Age: ___________________________________
3. Occupation: _____________________________
4. Highest degree obtained: __________________
5. Please outline any health conditions you have been diagnosed with:
☐ Prefer not to disclose ☐ High Blood Pressure ☐ Type 1 Diabetes ☐ Type 2 Diabetes ☐ Arthritis ☐ Osteoporosis ☐ Hypertension ☐ Cardiovascular disease
☐ Cancer (please specify) _________________________
☐ Other (please specify) _________________________

6. How many prescription medications have you been taking in the past three months?: ____________

7. How many supplements or alternative medications have you been taking in the past three months?: ____________

8. How many times did you visit a physician or nurse practitioner in the past three months: ______ Reason:____

9. How many times did you visit a specialist in the past three months: _______Reason:____

10.How many times did you visit the pharmacy in the past three months: _______ Reason:____

11. How many pharmacies did you obtain medications from in the past three months: ___________

Interview Questions for Patients

1. Think the last time you went to your doctor. Can you describe it to me? When we’re seeing doctors we often have a decision to make, when you think back on your appointment, can you describe a decision you had to make? A decision can be starting or stopping a drug, going to physio, or a specialist. When you were discussing making that decision, who led the conversation?
2. When you first have a health concern, how do you decide what to do?
3. When I say ‘primary care physician’, who do you think of?
4. What do you talk about at the beginning of your appointment? How would you describe a normal interaction with your GP? Your Pharmacist? Your specialist?
5. Would you say generally speaking, your physician gives information to you, or that you give information to them? Think about after a decision is made, do you talk to anyone else, like a pharmacist? Have you heard of Shared Decision making?
6. Can you talk about how your doctor informs you about an illness?
7. Do they tell you about treatment options? How does the discussion on which would best fit for you go?
8. If you are curious, do you ask for more information about your diagnosis from your doctor? Your specialist? Your pharmacist? Friends?
9. Do you bring someone with you to health appointments?
10. Have you ever thought about how much information you want from your health team?
11. Think of the last time your were prescribed a medication. What is the most important thing on your mind when you’re making the choice to take, or to not take that medication
12. Have you ever disagreed with your doctor about a suggested treatment? How was it resolved?
13. How do you think your health care team works together when making a decision about a medication or treatment? Do you think your doctor and pharmacist work together?
14. How do you know when you are working with a really good pharmacist or physician or nurse practitioner?
15. Is there anything else you want to say about how you make decisions?

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16. Have you heard of electronic health records?
17. How do you think electronic health records can help you?
18. When do you think electronic health records could get in the way? How?
19. Have you ever thought about what health data your doctor has on you? Would you like to access it? Do you think having access to it would change how you think about your health?
20. In an ideal world, how much of your health data would you like to see? Where would you like to see it? What do you think you could do with it?
21. Have you ever worried that your health information wasn’t being properly communicated to you, or between your various health care providers?

22. Have you ever had access to your own records? Have you ever tried to access your own records? Would you want access?
23. Have you ever accessed any of your own lab reports? Did you find it helpful to see them? Did you talk to anyone about them?
24. What do you do that makes to make your time with a doctor/pharmacist/nurse practitioner easier?
25. How have you seen your care change in the last five years?
26. What further changes do you hope to see?

Trust Questions for Patients

On a scale of 1 to 10, rate how much you agree with each question (1=highly disagree; 10=highly agree)

		Clinic (Doctor)	**Clinic (NP)**	**Specialist**	**Pharmacist**
1.	During my latest visit, I was treated like an individual, not a case number				
2.	During my last visit, I feel my interests are put above all other considerations				
3.	During my last appointment I feel I was taken seriously				
4.	Generally speaking I trust their judgement about my medical care.				
5.	Generally speaking, I feel they are honest with me				
6.	I want to continue going to my current				
7.	I feel treatment I am prescribed generally improves my condition				
8.	I felt I could go to them to discuss any concerns I have about treatment (side-effects)				
9.	I have confidence in my current				
10.	I trust my current				
11.	I feel that my current practitioner is compassionate				
12.	I feel a willingness to help me from my current				
13.	I feel my current practitioner respects me				
14.	During my last visit, they spent meaningful time looking after me				
15.	If a mistake is made in my treatment, I trust it would have been admitted to by my current				
16.	Generally speaking, I am kept informed of my tests and treatments				
17.	Generally speaking, they are concerned for my comfort				
18.	Generally speaking they are sensitive to my needs				
19.	They generally discuss all available treatment options and worked to find the one best suited to me				
20.	Generally speaking, I feel I can go to them with questions about changing or stopping treatment				
21.	Generally speaking, I feel reassured by my current				

Appendix F

Search Strategies

PubMed:
(("reason for use"[All Fields] OR Indication*[All Fields] OR Off-Label Use[MeSH terms] OR (diagnosis[All Fields] OR diagnosis[MeSH terms] AND (pharmacists[MeSH Terms] OR pharmacist*[All Fields])) AND (prescription[All Fields] OR drug prescriptions[MeSH Terms] OR prescriptions[MeSH Terms]) AND (documentation[MeSH Terms] OR document[All Fields] OR record[All Fields] OR communication [MeSH terms] OR communication[All Fields] OR Electronic health record[MeSH Terms] OR “electronic medical record” OR labels[All Fields] OR off-label[All Fields] OR Off-Label Use[MeSH Terms] OR electronic prescribing[MeSH Terms]) AND (collaboration OR intersectoral collaboration[MeSH Terms] OR interprofessional relations[MeSH Terms] OR patient care team[MeSH Terms] OR professional role[MeSH Terms] OR team[All Fields] OR interprofessional[All Fields] OR “interprofessional collaboration” [All Fields] OR patient[All Terms] OR patients[MeSH Terms]))) 1610

ACM
(("reason for use" OR Indication) AND (document OR documentation OR record OR label) AND (prescription OR drug OR medic))* 195

IEEE:
(("reason for use" OR Indication OR (diagnosis AND pharmacist)) AND (prescription OR pharmaceutical OR drug OR medic*) AND (documentation OR document OR record OR communication OR labels OR off-label OR electronic prescribing)) (218)

IPA

1	("reason for use" or Indication or indications).mp.
2	(diagnosis and (pharmacists or pharmacist)).mp.
3	(prescription or drug prescriptions or pharmaceutical preparation).mp.
4	(documentation or document or record or communication or Electronic health record or electronic medical record or labels or off-label or electronic prescribing).mp.
5	(collaboration or interprofessional relations or professional role or team or interprofessional or interprofessional collaboration or patient).mp.
6	1 or 2
7	3 and 4 and 5 and 6
#	89 total results

Embase

1	exp treatment indication/ or exp drug indication/
2	"reason for use".mp.
3	exp diagnosis/ae [Adverse Drug Reaction]
4	exp non prescription drug/ or exp prescription/ or exp prescription drug/
5	exp empowerment/ or exp follow up/ or exp document delivery/
6	information processing/ae [Adverse Drug Reaction]
7	exp hospital information system/ or exp medical record/ or exp information system/ or exp electronic medical record/ or exp "organization and management"/ or exp computer system/ or exp computer/
8	exp prescription/ or exp "off label drug use"/ or exp "drug use"/ or exp drug indication/ or exp drug labeling/
9	exp patient care/ or collaboration.mp. or exp cooperation/ or exp intersectoral collaboration/
10	exp health care personnel/ or exp professional practice/ or interprofessional.mp.
11	**1 or 2**
12	5 or 6 or 7
13	3 or 4 or 8
14	9 or 10
15	11 and 12 and 13 and 14

1513