ATHABASCA UNIVERSITY

PROFESSIONAL DEVELOPMENT EDUCATION USE BY PHARMACISTS:

EXPLORING ORGANIZATIONAL CONTEXT IN KNOWLEDGE TRANSLATION

TO PRACTICE

BY

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Approval of Thesis

The undersigned certify that they have read the thesis entitled

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Submitted by

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Dedication

To Kevin for helping me to follow my dreams.

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Abstract

Pharmacists are required to engage in professional development activities to maintain their professional licenses. The greater purpose of professional development or continuing education (CE) is to maintain and enhance competency to improve patient care. The context in which knowledge gained through CE is most effectively utilized by pharmacists for patient care has not been extensively studied. This exploratory quantitative study examines Alberta pharmacists' perceptions of their workplace context and the organizational factors they perceive influence utilization of knowledge gained through participation in CE in this setting. It explores the contextual workplace factors that hamper, enhance, or influence pharmacists' perceived utilization in clinical practice of knowledge gained.

This study determines the extent to which Alberta pharmacists perceive that their research-based learning, acquired through CE, is actually translated into clinical practice, known as knowledge translation (KT), and what aspects of their organizational workplace facilitate or hamper this process. Change theory, supported by a KT framework, forms the theoretical basis in which this study is embedded. The study gathered data from an online questionnaire of Alberta hospital and community pharmacists drawn from the Alberta College of Pharmacists, Alberta Health Services, and the Alberta Pharmacists' Association. The study used the Alberta Context Tool to gather pharmacist's perceptions.

A factor analysis of the survey tool resulted in a 14 factor solution explaining 65.67% of the total variability. These results support the validity of the tool in the pharmacist population. There was a statistically significant difference between hospital and community pharmacists on all dimensions of the ACT except for space and time,

indicating that their perceptions differ regarding organizational influences on knowledge translation in clinical care. Multiple regression examining the ACT dimensions and demographic covariates appeared to have some predictability on the informal and formal interactions dimensions of the ACT and type of pharmacy practice. Qualitative data indicated that pharmacists perceived that time and staffing were the most important factors influencing their use of CE in patient care but other factors not addressed in the survey were also perceived to be important.

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List of Abbreviations

ACP: Alberta College of Pharmacists

ACT: Alberta Context Tool

AHS: Alberta Health Services

CE: Continuing Education

CIHI: Canadian Institute for Health Information

CPD: Continuing Professional Development

DE: Distance Education

KT: Knowledge Translation

PDE: Professional Development Education

RxA: Alberta Pharmacists' Association

CHAPTER I - INTRODUCTION

Research-based professional development education (PDE) or continuing

education (CE) for health professionals is designed to facilitate the improvement of

evidence-informed clinical practice to enhance patient care and to help ensure

professional competency. While participation in CE is important to maintain licensure

(ACP, 2011), of equal or greater importance is whether or not the new knowledge gained

is being translated to clinical practice and utilized by pharmacists for patient benefit.

Pharmacists in Canada often utilize Distance Education (DE) methodologies for CE

(Austin, Marini, Macleod Glover, & Croteau, 2005) in addition to the more traditional

face to face delivery. Perceived satisfaction and learning associated with both types of CE

has previously been studied (Buxton & De Muth, 2013; Bynum, Irwin & Cohen, 2010).

However, the contributing organizational characteristics of workplace application of

knowledge gained via CE on knowledge translation (KT) to clinical practice have not

been thoroughly researched with pharmacists. It is of note that many definitions of

knowledge translation exist. For the purposes of this study, a definition of KT adapted by

Niznik (2007) from a Canadian Institutes of Health Research (CIHR) definition, "the

effective and timely incorporation of evidence-based information into the practices of

health professionals in such a way as to effect optimal health care outcomes and

maximize the potential of the health system" (Niznick, 2007, slide 5) was utilized.

Knowledge translation was an important concept of this study, however the main focus

was on contextual workplace elements that may influence KT. Specifically, the purpose

of this study was to examine pharmacists' perceptions of contextual elements in their

workplace that influenced their use of research knowledge gained via CE in their clinical

practice. This was achieved via a cross-sectional survey using the Alberta Context Tool

(ACT). The ACT is designed to measure modifiable aspects of organizational context in healthcare settings and is administered to individuals to elicit their perceptions of context (Estabrooks, Squires, Cummings, Birdsell, & Norton, 2009). It is a validated quantitative questionnaire. Two additional qualitative questions were added by the researcher to the instrument to more deeply probe relevant issues or contexts**.** As Cummings, Mallidou and Scott-Findlay noted in 2004, organizational context and its influence on KT is yet to be fully elucidated. Graham and colleagues (2005) in their seminal paper contend that adaptation to local context is necessary for knowledge to be transferred. Wallin (2009) has supported this, stating that difficulties in translating research evidence may be explained by contextual influences in which they operate rather than any particular quality of the research results themselves. Greenhalgh et al. (2004) also emphasized the importance of context in studies in order to fully understand the change process.

One of the main methods for pharmacists to gain knowledge about current healthcare research is professional development education (PDE). Professional development education is an integral part of healthcare professional practice. In the pharmacy culture in Canada, learning that occurs after obtaining your pharmacy degree is most often referred to as continuing education (CE) whereas in the education literature, the term professional development education is more prevalent. For the purposes of this study, the term consistent with the pharmacy literature, continuing education (CE), was used.

CE is more than just taking courses; it involves personal growth and knowledge gained and utilized over a professional career. The healthcare environment is knowledge driven and knowledge dependent, thus emphasizing the importance of current, relevant,

and emergent knowledge in this setting (Shannon & French, 2005). Clinicians are increasingly being asked to justify their decisions and actions with research evidence (Rouse, 2004). This essential research evidence is often most easily and most commonly obtained through CE. One of the main ways pharmacists gain knowledge about research is via CE. Haines and Jones (1994) state that, "Professional associations have an important role to play in ensuring that research based information is included in educational activities..." (p. 1488). In addition to provincial professional associations, national efforts are made to ensure pharmacists receive quality educational materials. The Canadian Council on Continuing Education in Pharmacy (CCCEP), a national CE accreditation body, reviewed and accredited 171 CE programs for pharmacists in 2014 (CCCEP, 2014). CCCEP is one of several accrediting bodies for pharmacists' CE in Canada; however, there are also non-accredited CE programs for pharmacists that offer educational opportunities. Even though many CE choices are available to pharmacists, little is known about how pharmacists incorporate research evidence or clinical knowledge into their practice. When considering these factors, one must also take into account how change is involved in the KT process.

Many professions, including pharmacy, require evidence of participation in CE for annual licensure to practice. The impetus for this requirement is to ensure continued competency and the provision of services in the most current and evidence-informed fashion (O'Brien et al., 2001). The pharmacy profession has long been recognized for its involvement in lifelong learning (Janke, 2010). While continued learning is imperative, it is also important to ensure that the learning is actually utilized to improve patient care. That is, patients should receive the benefit of care based on the best available information

and research evidence relevant to their conditions. Healthcare professionals often fail to provide the level of care that they desire and research has consistently shown that there is a failure or delay in translating research into practice (Grimshaw, Eccles, Lavis, Hill & Squires, 2012; Eccles, Armstrong, Baker, Cleary, Davies, Glasziou et al., 2009). Improved patient care occurs when research evidence is applied to clinical practice. Ward, House and Hamer (2009), note that failing to translate knowledge in healthcare practice contributes to inequities in health and squanders time and money used in research.

All professions are knowledge based (Waterfield, 2010). Waterfield argues this distinguishing feature of professions implies that knowledge is not only continuously generated by research, but that it is somehow mobilized and applied. The exchange, synthesis, and application of knowledge, elements of knowledge translation (CIHR, 2009), is becoming increasingly important and found to be frequently problematic (Baumbusch et al., 2008). For example, Hughes and Schindel (2010) found that "a consistent problem for many pharmacists was the ability to apply structured continuing-education learning to their real-world practice" (p. 178). Many health professions have noted the challenge of making informed decisions in their clinical practice using appropriate research evidence (Craik & Rappolt, 2003). Although there may be numerous reasons for this disconnect, it is likely that many of the factors are embedded in the culture and context in which daily practice takes place.

There is a well-documented gap between evidence-informed practice and current clinical practice; this gap leads to increased healthcare costs and increased patient morbidity and mortality (Davis, 2006; Lang, Wyer & Haynes, 2007; Graham et al.,

2005). Needham (2010) posits that "knowledge translation efforts can help fill this gap by focusing on methods to ensure that therapies proven effective within human clinical research studies are actually used, safely and effectively, in routine clinical practice" (p. 924). He points out that "understanding the most effective knowledge translation methods for changing routine practice and embracing clinical research findings is still evolving" (p. 924).

Baumbusch and associates (2008) indicate that knowledge translation occurs within complex social systems and that these complexities must be taken into account when examining KT. Relationships within a social system are often complex and non-linear, with multiple dimensions, and KT may also display similar characteristics. Effective KT must recognize the complexity of the context in which it occurs (Baumbusch et al., 2008; Davies, 2002; Graham et al., 2006). That is, it needs to include various facets such as leadership and culture, as well as physical constraints and opportunities that make up the concept of context. Decisions and capacity to translate knowledge into workplace practice are doubtless dependent upon many factors. These may include individual motivation and the nature of the new knowledge; however, the importance of the context cannot be underestimated. According to Davies (2002), "Organizational factors and elements in the practice setting can make or break the implementation of research evidence into practice..." (p. 560).

Organizational barriers and facilitators to KT have been studied and are recognized in the literature (Mitten, Adair, McKenzie, Patten & Waye-Perry, 2007). These authors summarized the organizational facilitators as follows: provision of support and training, sufficient resources, (technology and money), authority to implement

changes, readiness for change, and collaborative research partnerships. They also

summarized the barriers as follows: unsupportive culture, competing interests, frequent

staff turnover, and researcher incentive system. This study went further to delve more

deeply into a defined population in specific workplace settings- community and hospital

pharmacists – and their perceptions of workplace context within their respective

organizations. Pentland et al. (2011) contend that identifying barriers and facilitators

already present in knowledge users' context increases the chance that further KT

activities will then support the application of research evidence in practice.

There are often delays in the implementation of research findings (Tansella &

Thornicroft, 2009; Green & Siefert, 2005), resulting in sub-optimal care for patients

(Damschroder et al., 2009; Haines & Jones, 1994). In addition to this, research results are

often not consistently applied in clinical practice (Gibbons, Antman, & Smith, 2010;

Lenfant, 2003) also resulting in poorer clinical outcomes for patients. Squires, Hutchison,

Boström, O'Rourke, Cobban, and Estabrooks (2011) noted that there is a need for the

development of standard measures of research use and robust well-designed studies

examining nurses' use of research and its impact on patient outcomes. With the paucity of

literature on this topic in pharmacists, the same inferences could likely be made. The

potential lack of evidence-informed treatment by pharmacists is little understood but is

likely due to a number of factors similar to other healthcare professionals such as time,

available resources, space, staffing, and workplace culture, among others (Pronk, Blom,

Jonkers, Rogers, Bakker, et al., 2002) . All of these elements add to the complexity of

translating knowledge into clinical practice, as noted by Kitson, Harvey and McCormack

(1998), who state that 'implementing research into practice is complex and messy' (p. 149).

While research into the organizational context surrounding the translation of research knowledge is extensive for some healthcare professionals such as physicians and nurses, substantively less research literature exists for pharmacists. Additionally, what we know from the literature may not apply to the delivery of pharmacy services specifically as they are often delivered in a different context than physicians or nurses or other allied health care professionals. That is, pharmacists may have a different relationship to the organization that employs them and to their patients than other healthcare professionals and there may be differences from other professionals in the healthcare organizational hierarchy. As well, pharmacists may differ in their roles or have greater variation in roles within the organization in which they are employed than other healthcare professionals. These roles often vary within hospital and community practice settings. Furthermore, it may be that the culture of the organization may affect pharmacists differently than other healthcare professionals, although there is little research in the literature regarding pharmacy culture to confirm this (Rosenthal, Austin & Tsuyuki, 2010). Their organizational culture may range from a hospital setting with varied professionals to a community setting that often has few, or no, other health professionals that they frequently interact with. Finally, each professional organization has different requirements for professional practice and continuing professional development - pharmacists differ from other healthcare professionals in the specific regulations governing their practice and the competencies required for clinical practice.

Notwithstanding the individual determinants of KT, the main topic of this investigation was the extent to which organizational contextual factors are perceived to influence pharmacist's translation of the knowledge garnered through CE to clinical practice. The results of this study will benefit first, organizations that employ pharmacists by identifying contextual factors that may lead to enhanced patient care by pharmacists; second, the pharmacists themselves through reflection resulting from engagement in or increased awareness of issues in gained through completion of the survey; and finally, patients in Alberta through the improvement in pharmacy practice resulting from the discovery and potential amelioration of barriers to effective KT. When employers and practicing pharmacists utilize these results, patients could be more likely be the recipients of higher quality, evidence-informed practice by pharmacists as their workplace and their activities within it can be tailored toward maximum KT. Pharmacists could also be more likely to benefit by becoming aware of contextual factors influencing KT and applying this information in their workplace. Thus, the findings from the study will lead to strategies for and further exploration of knowledge use by both individual pharmacists and workplace groups.

As this study was broad and exploratory in nature, it was a preliminary investigation of Alberta pharmacists' perceptions of their experience of organizational context influences and the use of research information garnered through continuing education that leads to the translation of that knowledge into clinical practice. This study examined organizational workplace context in both community and hospital pharmacists in Alberta using the Alberta Context Tool supplemented by qualitative questions to

measure pharmacists' perceptions of workplace context in areas such as leadership, culture, and information sharing resources in the workplace.

The use of CE knowledge may be influenced by the workplace environment so this study focused specifically on Alberta hospital and community pharmacists' workplace and the organizational contextual elements that may be perceived to influence research-based knowledge use in clinical practice. That is, the factors that were thought to be perceived as influencing the application of learning in clinical practice. The next section will outline the significance and provide the statement of purpose for this study.

Significance of Study and Statement of Purpose

The exploration of pharmacists' perceptions of the extent to which they utilized research knowledge gained through CE in their clinical practice and what organizational factors influence this knowledge use will help inform what elements within organizations can assist pharmacists in translating their learning into clinical practice and inform on potential barriers or enhancers to KT. The study of knowledge translation, particularly the results of the translation of academic research to practice, has been a subject of inquiry in healthcare for a number of years. The actions associated with the terms "evidence-based medicine," "evidence-based practice," and more recently "evidence-informed practice" have become standards of high quality in clinical practice (Collins, 2009: Sackett & Rosenberg, 1996). Each involves the process of using research evidence to inform patient care. Good clinical practice is grounded in relevant and current research knowledge. Graham et al. (2006) noted that, despite the considerable resources put into health sciences research; there still is a deficit in the translation of research knowledge into clinical practice. Previously, Graham et al. (2005), (as cited in Graham et al., 2006, p. 20)

indicated that more than 60 theories or frameworks have been identified that address knowledge-to-action, and identified common phases in these theories and frameworks, namely: a) problem identification; b) identification, review, and selection of knowledge or research relevant to the problem; c) adaptation of the identified knowledge or research to the local context; d) assessment of barriers to using knowledge; e) selection, tailoring, and implementation of interventions to promote use of knowledge; f) monitoring of knowledge use; g) evaluation of the outcomes of using the knowledge; and h) sustainment of ongoing knowledge use. The purpose of this study is to further explore the barriers to effectively using knowledge in the pharmacist population. Community pharmacy facilitators to implementing specific programs, such as policy, payment, and communication have been investigated (Roberts, Benrimoj, Chen, Williams & Aslani, 2006) but there remains an overall lack of understanding of how pharmacists' workplace context can create or minimize barriers to knowledge use. This research addressed elements of local context as noted by Graham et al. (2005), (as cited in Graham et al., 2006, p. 20) above, as well as determined if any of these contextual elements are barriers to using knowledge in clinical practice. This study determined whether there are distinct organizational attributes for hospital and community pharmacists that limit or enable knowledge translation. The results of this research inform how organizational elements are perceived to influence pharmacists' knowledge use in clinical practice and add to the general KT literature in a meaningful way by informing on a minimally researched topic area.

The following section outlines the research questions for this study.

Research Questions

This exploratory research study examines pharmacists' perceptions of the organizational context of their workplace and its influence on their use of research-based knowledge gained through CE on clinical practice. These perceptions are the thoughts, opinions, and feelings of pharmacists as they pertain to their workplace. According to Mauch and Park (2003), an exploratory study investigates new or relatively unknown territory to better understand it. Exploratory studies look for how and why things occur and serve to find out how things can be changed or improved (Crombie & Davies, 1996). The more a study probes why events happen as they do, the more likely effective action can be taken to make improvements. Exploratory research does not always provide definitive answers to research questions but rather it gives insights into how a topic can be further investigated (Shi, 2008). Exploratory research was chosen for this study as there has been a paucity of literature related to the examination of workplace contexts' influence on KT. In order to achieve this purpose, the following research questions were examined:

1. To what extent did organizational contextual factors influence the perceived use and translation of knowledge garnered through continuing education by pharmacists in Alberta?

   a. What components of organizational context were perceived to have the greatest influence on pharmacists' perceived use of research knowledge garnered through continuing education to improve or at least influence clinical practice?

b. Were there similarities or differences between the two main contexts in which pharmacists in Alberta work, hospital, and community, in perceptions of organizational contextual factors influencing pharmacists' perceived research knowledge translation to clinical practice?

Answering these research questions will fill the current research gap in this area and add to the KT literature. The next section is the chapter summary.

Summary

The preceding chapter outlined the background and rationale for this research. It also narrowed the focus and delineated the aims and the nature of this study. The chapter briefly endeavoured to draw together the significance of the context and the research, linking the concept of knowledge translation to CE. It also outlined the research questions, which were distilled from the problem statement and guided this research study.

Following the research questions, the second chapter, the literature review, examines key areas of this study. The literature review domains are knowledge translation, knowledge translation models, the theoretical framework, and continuing education. The theoretical framework provides an overview of theories of change in which this study is embedded. It also includes a discussion of knowledge translation frameworks that apply to this study. The third chapter outlines the study methodology, ethical considerations, and the steps to complete the research in a rigorous fashion. The fourth chapter covers the quantitative and qualitative data analysis and results. The fifth chapter discusses the research results and interpretations. The final chapter provides conclusions for this study, implication for clinical practice, and suggestions for further

research. The appendices contain the qualitative questions, the consent form for research participation, the advertisement for participation in the research study, Athabasca University ethics approval, multiple linear regression analysis results, and permission for use of the Alberta Context Tool.

The literature review that follows examines KT and relevant theories of change related to KT. It delineates where the gap in knowledge in this area exists and provides an overview of the key literature in the areas of KT and CE. A glossary of terms used in this paper is provided below for the reader.

Glossary of Terms

This glossary of terms will enable the reader to consult this list to explain the terms and acronyms used throughout this research study.

Best practice: a method, process, or activity that is believed to be more effective at delivering a particular outcome than any other technique, method or process when applied to a particular condition or circumstance. (DVA, 2013)

Continuing education (CE) [for pharmacists]: Organized and structured learning experiences and activities in which pharmacists engage after they have completed their entry-level academic education and training. These experiences are designed to support the continuing development of pharmacists to maintain and enhance their competence. It should also promote problem solving and critical thinking applicable to the practice of pharmacy. (CCP, 2010).

Continuing Professional Development (CPD): the lifelong process of active participation in learning activities that assists individuals in developing and maintaining continuing competence, enhancing their professional practice, and supporting achievement of their career goals (ACPE, nd)

Continuing medical education (CME): consists of educational activities which serve to maintain, develop, or increase the knowledge, skills, and professional performance and relationships that a physician uses to provide services for patients, the public or the profession (AMA, 2010). *Evidence-based medicine:* the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical

expertise with the best available external clinical evidence from systematic research (Sackett, Rosenberg, Gray & Richardson, 1996).

Evidence-based practice: refers to a total process beginning with knowing what clinical questions to ask, how to find the best practice, and how to critically appraise the evidence for validity and applicability to the particular care situation (DePalma, 2000). This term is often used interchangeably with the term 'evidence-informed practice'.

Knowledge exchange (KE): the collaborative problem-solving process that happens through linkage and reciprocal discussion between researchers and decision makers. (CFHI, 2015)

Knowledge translation (KT): The effective and timely incorporation of evidence-based information into the practices of health professionals in such a way as to effect optimal health care outcomes and maximize the potential of the health system (Niznick, 2007, slide 5).

Professional Development (PD): (also known as 'continuing professional development') "the lifelong process of active participation in learning activities that assists individuals in developing and maintaining continuing competence, enhancing their professional practice, and supporting achievement of their career goals" (ACPE, nd, para1).

CHAPTER II - LITERATURE REVIEW

Overview

The previous chapter provided some preliminary information about why this study is important and the research questions that guided this study. This literature review section outlines where the gaps and supports were for this study and concludes with an overview of a conceptual plan that visually demonstrates how the study fits within the existing and emergent educational research literature and practice.

This literature review begins with an outline of search methods and continues with a broad look at relevant literature related to knowledge translation and the challenges of moving research evidence into clinical practice. Next, several KT models and their application are discussed, followed by a review of KT in CE of healthcare professionals, specifically, pharmacists. As CE, subsequent KT and organizational context is the focus of this study, the literature review that follows shows the elements that require examination in the study context. The final portion of the literature review looks at the theoretical underpinning, change theory, which supports the research questions. Each of these topics is important to this study as change theory supports the study, but the PARIHS framework (1998) and other KT literature provides the framework for it. The next section begins with an outline of the literature search methods.

Literature Search Methods

A review of the literature and related research was conducted to locate articles and books related to knowledge translation, professional development [continuing] education, and pharmacists. Databases such as EBSCOhost, ProQuest, MEDLINE, MEDSCAPE, CINAHL, OVID, and PubMed were included. Other search engines were utilized and

included the Cochrane Collaboration, Sage Publishing, Wiley Online Library, Biomed

Central, and Google Scholar. Relevant articles published in English between 1950 and

2014 were selected. An additional review of bibliographic entries of the selected articles

was conducted. Searches of specific journals including Implementation Science,

International Journal of Pharmacy Practice, American Journal of Pharmaceutical

Education, and the Annals of Pharmacotherapy also occurred. The Athabasca University

and Grant MacEwan University library book collections were also utilized in addition to

the author's personal book collection. Search terms included knowledge translation,

knowledge transfer, knowledge exchange, knowledge management, professional

development, professional development education, continuing medical education, and

continuing education, pharmacist + continuing education, pharmacist + professional

development education, pharmacist + knowledge translation, knowledge translation +

organization, knowledge translation + workplace, knowledge translation + workplace

influence, knowledge translation + workplace environment, and the Alberta Context

Tool.

This search resulted in a variety of literature in the conceptual area of knowledge,

mainly from healthcare, with some from the business sector. The majority of the

knowledge-related literature from healthcare was from the nursing and medical fields.

Much of it was related to clinical practice guidelines and/or the use of research evidence

in clinical practice. The search related to the workplace resulted mainly in literature from

business and healthcare. The healthcare-related literature was from a variety of

professions, including pharmacy, however the vast majority was related to nursing and

medicine. The next section outlines the research paradigm upon which this study was grounded.

Paradigm

Paradigm in a research context is defined by Webster's online dictionary (2015) as a "philosophical and theoretical framework of a scientific school or discipline within which theories, laws, and generalizations and the experiments performed in support of them are formulated" (definition 3). Others, such as Bogden and Bilken (1998) define paradigm as "a loose collection of logically related assumptions, concepts, or propositions that orient thinking and research" (p. 22). Shi (2008), states that a paradigm reflects a general perspective, model, or scheme that organizes our views. Rocco, Bliss, Gallagher and Perez-Prado (2003) note " a paradigm is best defined as a worldview" (p. 20) and go on to explain that researchers bring their own set of philosophical beliefs about knowledge, reality, and values that are used to frame their ideas about research methods. Creswell (2009) believes worldviews are 'shaped by the discipline area of the student" (p. 6) and these beliefs will lead to a specific approach to their research. My bachelor's degree was in a pure science discipline and the majority of my career has been based on this pure science [positivist] perspective. In graduate studies in the faculty of distance education, other paradigms were explored. My background has had a significant influence on my approach to this research. In the case of this study, the research paradigm organizing my viewpoint was postpositivist in nature. A postpositivist paradigm challenges the more traditional notion of absolute truth of knowledge as one "cannot be "positive" about our claims of knowledge when studying the behavior and actions of humans" (Creswell, 2009, p. 7). Philosophically, postpositivists are more

deterministic; that is, they wish to identify and assess the causes that influence outcomes

(Creswell, 2009). They also try to reduce concepts into small, discreet sets of ideas to

test, such as this study that tested elements of context and their perceived influence on the

translation of knowledge into clinical practice. As outlined by Creswell (2009),

> "The knowledge that develops through a postpositivist lens is based on careful
>
> observation and measurement of the objective reality that exists "out there' in the
>
> world. Thus, developing numeric measures of observations and studying the
>
> behavior of individuals becomes paramount for a postpositivist." (p.7).

The methodology of this study fits Creswell's (2009) description as it sought to identify

the elements of commonly identified factors related to the use of research knowledge by

using a validated measure to numerically quantify concepts. The pospositivist paradigm

also notes the value of allowing a degree of participant voice, thus the questionnaire

included a limited number of qualitative questions.

Cook and Campbell (1979) posit that they share other postpositivists' beliefs that

observations are theory laden however they reject the idea that these observations are

laden with a single theory or paradigm. Like Cook and Campbell's supposition, this study

was also based on the assumption that the research can be influenced by a number of

theories apart from, or as well as, the one that is being tested. This notion is reflected in

the literature review and design of this study as it utilized a theory-based KT model, the

PARIHS Framework, change theory, and the Diffusion of Innovations theory, to provide

the foundational elements of the study. Indeed, as Estabrooks et al. (2006) noted, KT

does not really have a satisfactory overarching theory and Grol and Wensing (2005b)

contend that multiple theories are necessary to frame an examination of KT. This aligns

with Cook and Campbell's (1979) assertion that more than one theory may influence postpositivist research.

As the reader will see throughout this document, factors influencing KT are complex, numerous, and involve a variety of models and theories. These varied concepts outlined in the literature review link back to the postpositivist view held by the researcher. The next section reviews the KT literature that is fundamental to this study.

Knowledge Translation

The essence of this study revolves around the central concept of knowledge translation. It is essential to examine the extant literature in order to understand how this study was positioned within this framework, thus the literature review begins with KT literature. Knowledge translation has been a subject of investigation for more than 50 years (Huberman, 1990; Jacobson, 2007). The general subject of knowledge translation (KT) poses some semantic concerns, as it is also referred to as knowledge exchange, knowledge transfer, research utilization, research implementation, and knowledge utilization (CIHR, 2009). In addition, knowledge itself is a somewhat hard construct to describe that continues to be debated (O'Grady, 2012). O'Grady contends that 'information is the movement of messages, whereas knowledge is created collaboratively by this process, context dependent and constructed by the users' (p. 951). McInerney (2002) proposes that knowledge is dynamic and steeped in context, intertwined with human activity and experience. Bearing that in mind, one can think about knowledge translation (KT) as involving the creating, transferring and transforming knowledge from one organizational unit or professional group to another via a complex interactive process that depends on human beings and their context (Landry, Amara, Pablos-Mendes,

Shademani, & Gold, 2006). KT varies in how it is defined (Graham, et al., 2006; Rietmanova, 2009); however, there are two prominent definitions in the literature.

Knowledge translation is framed by the US National Center for the Dissemination of Disability Research (NCDDR) as "the collaborative and systematic review, assessment, identification, aggregation and practical application of high-quality disability and rehabilitation research by key stakeholders (i.e., consumers, researchers, practitioners, policy makers) for the purpose of improving the lives of individuals with disabilities" (NCDDR, 2005, para 2).

A second definition of knowledge translation is provided by the Canadian Institutes of Health Research (CIHR) as follows: "A dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system" (CIHR, 2009, para1).

The CIHR definition is most prevalent in Canadian healthcare literature and it is a relatively comprehensive definition. It includes the complex nature of knowledge translation; however, it is framed from the perspective of the researcher rather than the research user. Graham, et al. (2007), caution that while the CIHR definition encourages researchers to translate their study results, they also must be cognizant of their audience and thoughtful about the message they wish to send. Furthermore, Graham et al. assert that thought needs to be given as to exactly what knowledge should be translated and how it is used. Additionally, according to Ioannidis (2005), research findings must be based on best evidence; promoting the use of research prematurely may cause more harm than benefit.

Additional definitions also appear in the literature. Lane and Flagg (2010), state that KT represents "a process for improving communication between producers and consumers of knowledge to increase the application of research-based knowledge in practical forms" (p.1). This definition, while useful, does not include the complexities of the KT. Straus, Tetroe, and Graham (2009) succinctly state that KT moves "beyond simple dissemination into actual use of the knowledge" (p. 165). Davies, Nutley, and Walter (2008) provide another relevant perspective on KT. These authors contend that knowledge translation implies gathering and integrating evidence from research, condensing it into convergent knowledge, and then packaging it for transfer elsewhere. That is, they assert that KT occurs when many sources of information are consulted in order to gather facts, compile them, and then present them in a way that they can be used. They further contend that results are often not presented in an easily usable format and many complexities and challenges are involved in delivering complex research information. They note that recipients of the knowledge are not always "grateful recipients" (p. 189) and propose that "whether and how new information gets assimilated is contingent on local priorities, cultures and systems of meaning. What makes sense in one setting can make different sense in another" (p. 190). This research attempted to examine some of these local and individual conditions for Alberta hospital and community pharmacists. Davies, Nutley, and Walter (2008) also elaborate on the complexities of research use by stating that,

> Research and other forms of knowledge are often used in more subtle, indirect
> and conceptual ways: bringing about changes in knowledge and understanding, or
> shifts in perceptions, attitudes and beliefs, perhaps altering the ways in which

policy-makers and practitioners think about what they do, how they do it, and why (p. 189).

While their description of the complexities of research is relevant and applicable, Niznick (2007) provided the most relevant definition of KT for the purposes of this study. Niznick stated that knowledge translation is "the effective and timely incorporation of evidence-based information into the practices of health professionals in such a way as to effect optimal health care outcomes and maximize the potential of the health system" (Niznick, 2007, slide 5) and this formed the operational definition for this study.

Norman and Heurta (2006) used the combined term knowledge transfer and exchange (KTE). They stated that the KTE process implies that "when high quality evidence is placed into a context discernible to others and supports are in place to facilitate the sharing and translation of knowledge developed . . . changes will lead to improvements in the delivery of health care and its outcomes on the population" (p. 2). As these examples show, the views of what KT entails are quite varied; however, there is general agreement that the topic is complex and involves multiple variables. While it is important to consider how these variables might affect pharmacists' perceptions of KT, there are other issues central to how and the extent to which KT occurs.

One of the key issues in knowledge translation is the gap between the discovery of information via research and its routine use in practice, or what is sometimes referred to as the gap "from bench to bedside" (Wolf, 1974). The World Health Organization (WHO) has stated that "stronger emphasis should be placed on translating knowledge into action to improve public health by bridging the gap of what is known and what is actually done" (WHO, 2004, p. 3). A significant gap exists between research

recommendations, the resultant clinical practice guidelines, and actual clinical practice (Cochrane et al., 2007; Grimshaw, Eccles, & Tetroe, 2004). A large body of literature has acknowledged this gap and attempted to aid in the understanding of how to narrow and close this gap using KT strategies (Cochrane et al., 2007). Grimshaw, Santesso, Cumpston, Mayhew, and McGowan (2006) caution that even clinicians with relatively narrow areas of practice can no longer keep up-to-date if they attempt to read primary research. Cochrane et al. (2007) contend the gap in knowledge can undermine the benefits realized from advances in medicine and the professionals delivering care.

Implementation is another important consideration in the KT process. Implementation is concerned with the uptake of knowledge and the diffusion of innovations, focusing on how generated knowledge is communicated to broader groups (Lomas, 2000). McDermid, Solomon, Law, Russell, and Stratford (2006) state, "It is clear that evaluation of knowledge transfer should measure changes in knowledge, intent, and behaviour, but also determine how new knowledge is incorporated into clinical decision-making" (p. 3). This incorporation is the essence of knowledge translation. Holzner and Fisher (1979) point out that the utilization of knowledge has political connotations and that the social and political aspects of knowledge utilization must be taken into account. They explain that knowledge systems vary greatly and depend partly on the "social conditions for and the structural distribution of trust in the knowledge system and in knowledge itself" (p. 233). They contend that trust is a prime mechanism to reduce complexity and uncertainty, saying:

> One general mechanism in the production of trust involves the construction of
> authorized and certified social identities, as, for example, in the profession. This

point is only one example of the grounding of the knowledge system in basic

social processes. Processes of knowledge utilization are affected by, and, in turn

affect these dynamics of trust and identity. For example, failure to bridge

knowledge gradients, frames of reference and divergent knowledge structures,

and divergent interests and identities may result in the rejection of knowledge and

in crises of trust. (Holzner & Fisher, 1979, p. 224)

Some of these above noted elements are further discussed when the KT models are

examined in the following section.

The apparent existence of knowledge in one setting does not mean that it can be

easily transferred elsewhere. Knott and Wildavsky (1980) note that there is fallibility in

the transfer process, and that those responsible for transferring knowledge may "arrange

the material in such a way so as to confound its value to those receiving it" (p. 552), and

advise that conditions must be created so that the knowledge can be translated

successfully. They further question why available knowledge may not be utilized,

postulating that too much knowledge may be available, that people may not know how to

find the knowledge, or that the knowledge may be too complex to be interpreted and

transferred elsewhere.

As highlighted above, knowledge and how it is translated is complex. Many

frameworks and models have been developed to address these complexities, including

such things as individual and organizational challenges. According to Bem and de Jong

(2006), a model is a kind of mini-theory; that is, it provides a visualizable representation

of the theory. It can also be an abstract picture of a field of inquiry in which no theory

exists. Graham, Tetroe and the KT Theories Research Group (2007) contend that

'conceptual models of implementation are essentially models or theories of change' (pp. 937). Thus, the following section outlines a variety of knowledge translation models, many of which are based on theories of change.

Knowledge Translation Models

Approaches to KT are still being investigated. The mechanisms whereby KT occurs are not clear, especially when the nature of the knowledge to be translated and the context of the users varies (Reimer-Kirkham et al., 2009). As a result, a wide variety of models and frameworks have been developed (Harrington et al., 2008; Ho et al., 2004).

The Canadian Institutes of Health Research (CIHR, 2005) proposed a KT model, based on a research cycle that could be used as a conceptual guide for the overall KT process for researchers.

Figure 1 - *CIHR Research cycle Superimposed by the Six Opportunities to*

Facilitate KT
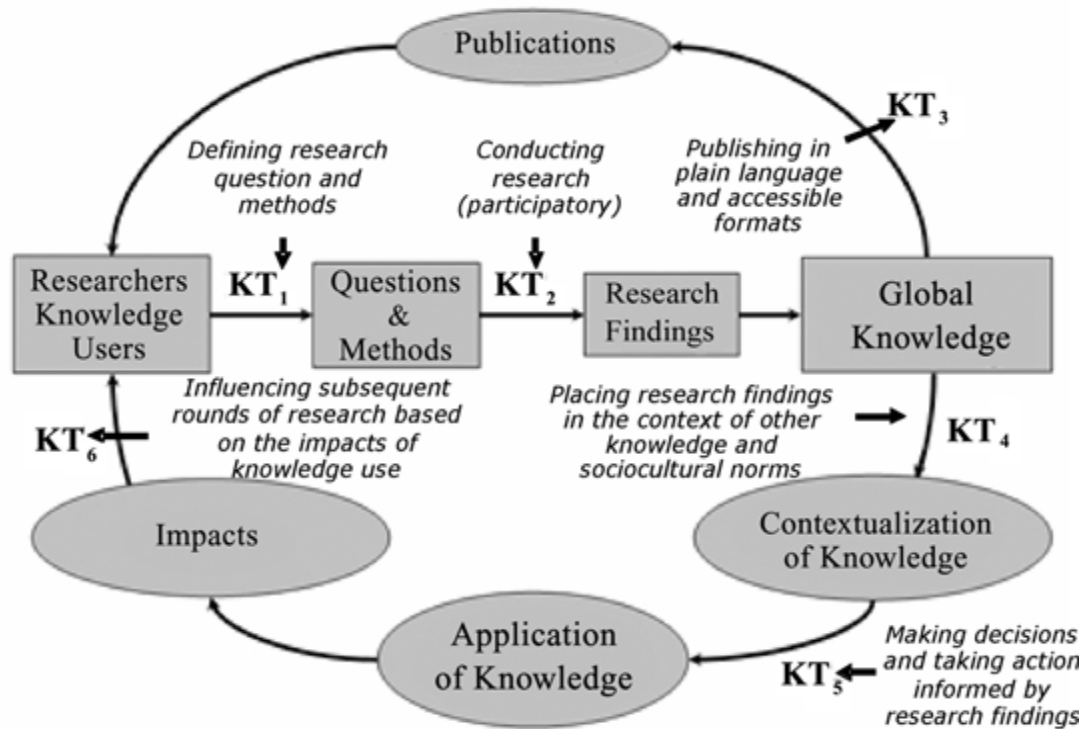
Canadian Institutes of Health Research Knowledge Translation [KT] within the Research Cycle Chart. Ottawa: Canadian Institutes of Health Research as cited in Susawad (2007) http://www.ncddr.org/kt/products/ktintro/ktintro.pdf

As outlined in Figure 1, CIHR identified six opportunities within the research

cycle at which interactions, communications, and partnerships that would help facilitate

KT could occur:

1. KT1 defining research questions and methodologies

2. KT2 conducting research

3. KT3 publishing research findings in plain language and accessible formats

4. KT4 putting research findings in the context of other knowledge and

   sociocultural norms

5. KT5 making decisions and taking action informed by research findings

6. KT6 influencing subsequent rounds of research

Although all of these knowledge translation opportunities are embedded in the

CIHR knowledge cycle, there is a deficit in the context surrounding the aforementioned

KT opportunities as they do not fully describe many facets of KT that require

consideration. In particular, the impact of context in terms of the indirect and conceptual

aspects of KT, which is centred on KT5 of the model, was of primary interest in this

study.

Ward, House, and Hamer (2009) conducted an analysis of the literature on various

KT models and theories. They identified 28 models that included the following common

and comprehensive components as part of the process of translating knowledge into

action: (1) problem identification and communication; (2) knowledge/research

development and selection; (3) analysis of content; (4) knowledge transfer activities or

interventions; and (5) knowledge/research utilization. They noted that the utilization of

the knowledge is often overlooked in discussions about the process of transferring

knowledge into action as it is seen as the goal of the process. This study focused on

knowledge utilization by Alberta pharmacists and specifically on perceived

organizational contextual factors related to the knowledge translation process, thus

responding to this critical finding of Ward et al. study.

Graham et al. (2006), in their landmark paper proposed a knowledge-to-action

(KTA) process conceptual framework to help facilitate research knowledge use by

stakeholders. It consists of two main components, knowledge creation and action (Figure

2).

Figure 2 – *Knowledge-to-Action Cycle*
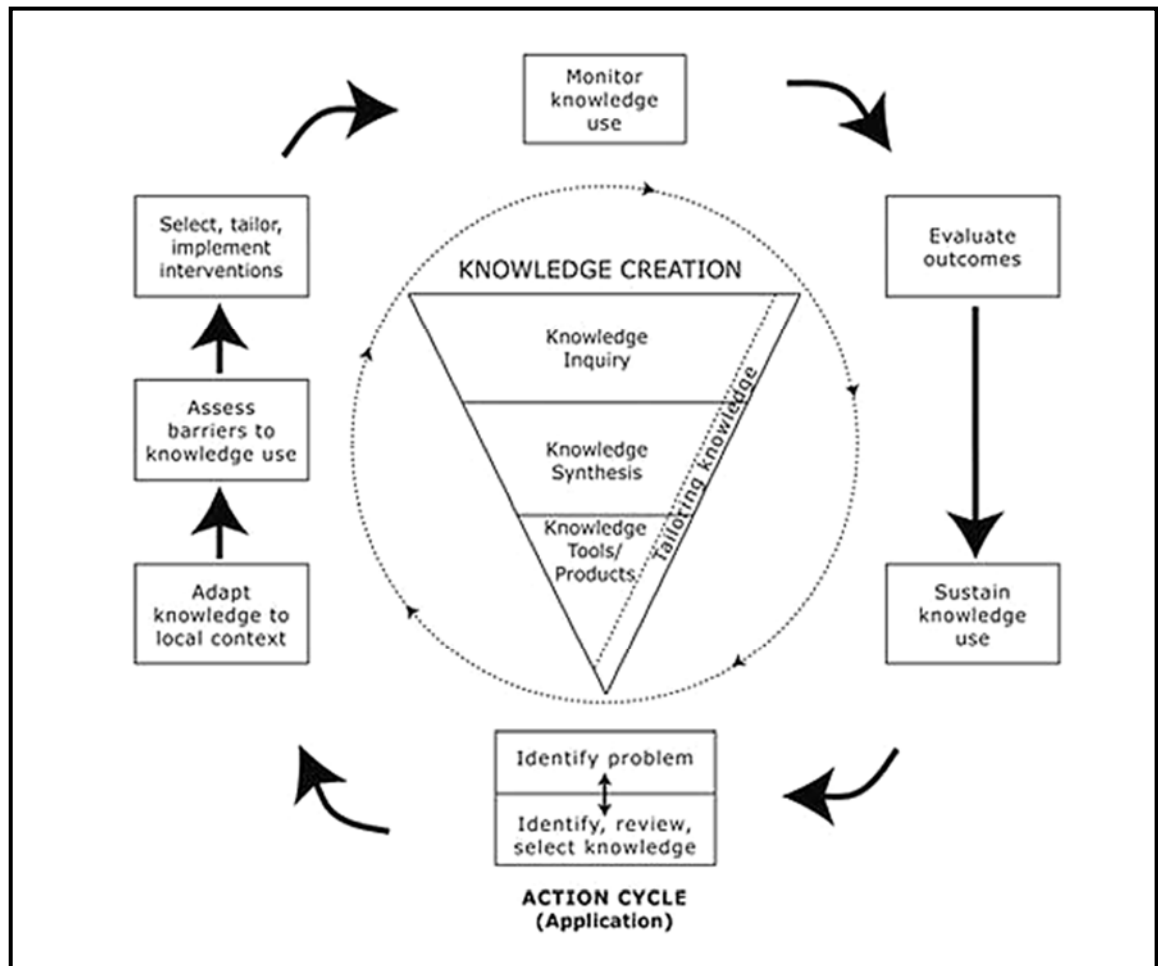
Used with permission from Canadian Institutes of Health Research (personal communication, L. Drake, April 12, 2016). Retrieved from http://www.cihr-irsc.gc.ca/e/29418.html

Knowledge creation consists of three phases: (1) knowledge inquiry, (2) knowledge synthesis, and (3) knowledge tools/products and as knowledge moves through each phase in order, the knowledge becomes both more refined and ultimately more useful. As shown in Figure 2, the action component is a cycle that represents the activities needed for knowledge application. Individual elements of the action cycle include problem identification and discerning what knowledge is required to solve the

problem. The knowledge is then adapted to fit the local context. The next step is to assess the barriers and facilitators to the knowledge being used. Once this is complete, interventions can be selected and tailored for use specifically for the problem identified. Following that, the use of the knowledge is monitored and evaluated. This will help determine the effectiveness of the knowledge used to solve the problem and allows for any required modifications. The final step is sustainability planning; this enables the use of the knowledge to continue, even in a potentially changing environment. While this model is comprehensive in looking at knowledge creation right through to knowledge implementation, it does not focus extensively on the important contextual elements of research knowledge translation. It examines barriers and facilitators but not to the depth necessary to support the main inquiry of this study. Further examination of KT models was necessary.

The Stetler Model of Research Utilization (2001) (Figure 3) differs from many of the above-noted models mentioned by Ward, House and Hamer (2009) as it is based on an individual's knowledge utilization to facilitate evidence-based practice. The model used a practitioner-oriented approach to KT, which at its core involves a critical-thinking process. The Stetler Model is a procedural and conceptual guide to be used by individual practitioners in a five-phase process for the application of research into practice.

Figure 3 - *The Stetler Model of Research Utilization*
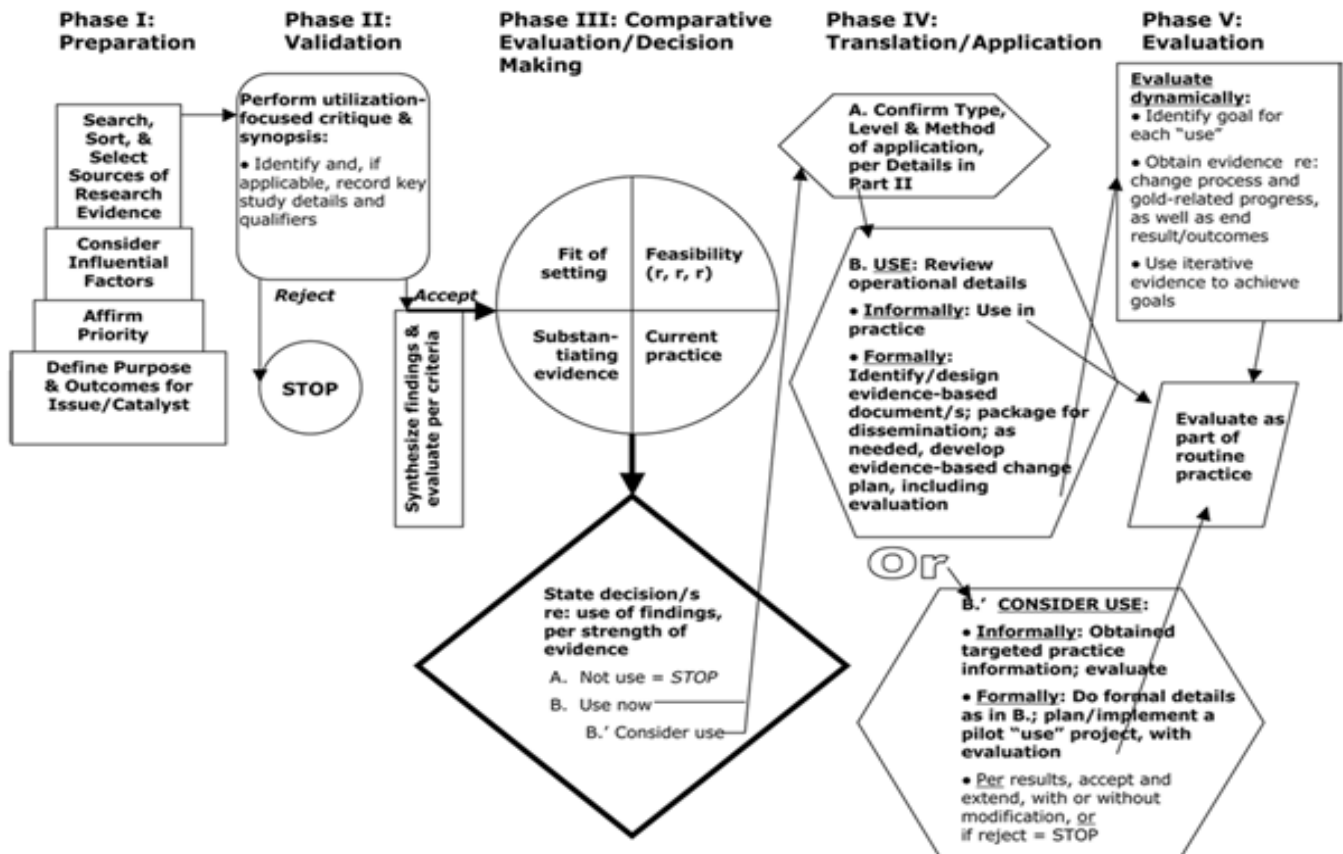
Stetler, C. (2001). Updating the Stetler Model of Research Utilization to facilitate

evidence-based practice. *Nursing Outlook, 49*(6), 272-279.

Phase I focuses on how the practitioner deals with the research evidence. Phase II

focuses on whether or not the practitioner accepts the evidence as valid. If so, the

practitioner moves on to Phase III which focuses on determining whether to use, consider

using, or not use the evidence and the processes in that decision. Phase IV focuses on

implementation; the practitioner weighs the level, method, and type of use and makes a

final decision about the use of the research evidence. In Phase V, the focus is on

evaluation of the use of the evidence.

Though acknowledging the importance of individual motivation and agency, it is interesting to note that the Model was revised in 2001 to acknowledge the equally important impact of context in which the knowledge translation must be realized. While designed initially in 1994, the 2001 revision of the Stetler Model of Research Utilization incorporates the following additional assumptions:

1. the formal organization may or may not be involved in an individual's utilization of research

2. utilization may be instrumental, conceptual, and/or symbolic

3. other types of information or research are likely to be combined with research findings to facilitate decision-making or problem-solving

4. internal and external factors can influence an individual's use of the evidence

5. research and evaluation provide practitioners with probabilistic information, not absolutes

6. lack of knowledge and skills pertaining to research utilization can inhibit appropriate and effective use (Sudsawad, 2007).

Components and assumptions of the Stetler model may be useful in determining some organizational influences on KT however it mainly addresses factors that may influence information utilization by individual practitioners, rather than focusing primarily on organizational-level concerns (Estabrooks, Scott-Findlay & Winther, 2004). A better fit for this study was a model that chiefly focuses on organizational elements.

The Promoting Action on Research Implementation in Health Services (PARIHS) framework, (Kitson, Harvey, & McCormack, 1998; Rycroft-Malone, 2004; Rycroft-Malone et al., 2002) (Figure 4) is a conceptual model that examines the interacting

elements of evidence-based practice: evidence, context, and facilitation, (Stetler,

Damschroder, Helfrich, & Hagedorn, 2011) and describes the implementation of research

in practice (Susawad, 2007). According to the model, successful implementation of

research into practice depends on the level and nature of the evidence utilized, the context

or environment in which the research is to be used, and how the research implementation

process is to be facilitated.

Figure 4 - *The PARIHS Framework*
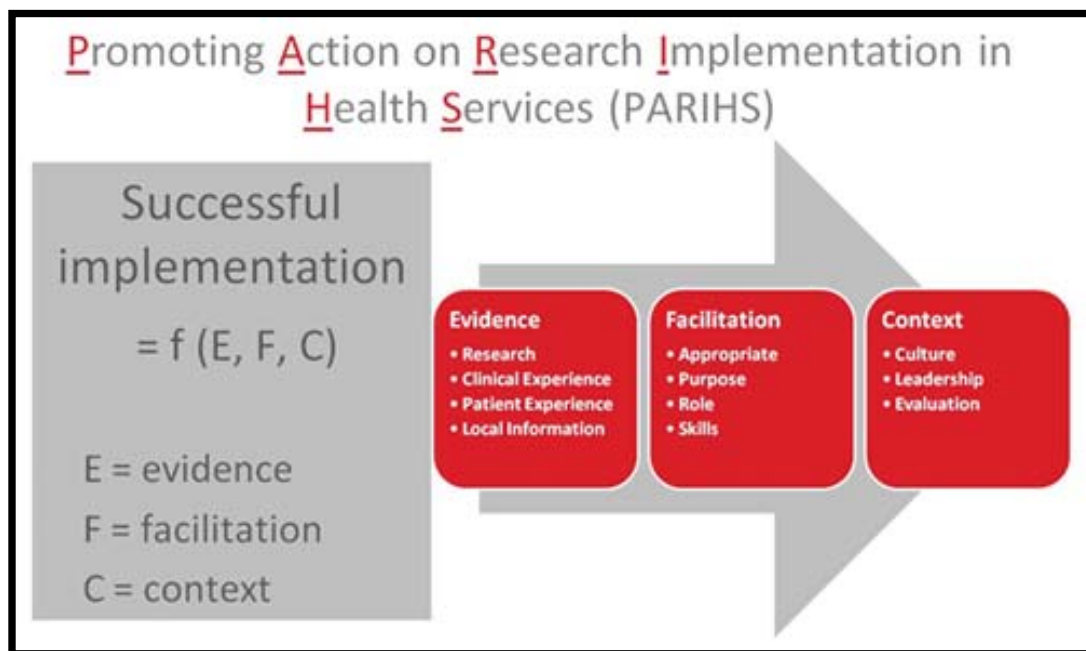
Retrieved from http://clahrc-gm.nihr.ac.uk/heartfailure/about/ and used with

permission from Gillian Harvey (personal communication, November 28, 2012).

The PARIHS framework considers evidence, context, and facilitation to be

dynamic and simultaneous in their relationship (Rycroft-Malone, 2004; Susawad, 2007).

It places these three main elements in a matrix in which they can either be expected to

influence the outcome of implementation in a positive or negative way (Kitson, Harvey,

& McCormack, 1998). Each of these elements is placed on a continuum from low to high and it is predicted that the most successful implementations occur when all the elements are on the high end of the continuum. Rycroft-Malone updated the model in 2004 and increased its complexity (Rycroft-Malone, 2004; Kitson et al., 1998). All the elements were revised based on concept analysis of each element (evidence, context, facilitation) via extracting various dimensions of the elements from the literature to form a comprehensive definition and scope (Susawad, 2007). The three main elements are further described as follows:

Evidence: this element is defined as a combination of knowledge and factors that are brought together in order to make clinical decisions. These factors include research, clinical experience, patient experience, and local data or information. Successful implementation of research is more likely to occur when these factors are on the high end of the continuum (Kitson, Harvey & McCormack, 1998; Rycroft-Malone, 2004).

Context: refers to the environment or setting in which people receive health-care services or where the change is to be implemented. It may include the physical environment, the context of getting research into practice, including factors such as operational boundaries, decision-making processes, patterns of power and authority, and resources, as well as organizational culture. Additionally, contexts in which evaluation occurs are also included (Rycroft-Malone, 2004). The PARIHS framework describes three broad themes that promote the successful implementation of evidence into practice: culture, leadership, and evaluation or measurement. Like the evidence element above, successful implementation is more likely to occur when these factors are on the high end of the continuum (Kitson, Harvey & McCormack, 1998; Rycroft-Malone, 2004).

Facilitation: This is defined as enabling implementation of research evidence into

practice to occur (Rycroft-Malone, 2004). Facilitators are central to affecting context and

working with practitioners to aid in evidence being implemented. They have a role in

supporting practitioners to change their practice; they help people to understand what

they have to change and how to change it (Kitson, Harvey & McCormack, 1998). As with

the other above noted elements, this theme has dimensions of high and low and high

facilitation relates to appropriate facilitation for the situation (Susawad, 2007).

Figure 5 - *Levels of Evidence and Context in the PARIHS Framework*

Retrieved from

http://www.bangor.ac.uk/healthcaresciences/research2/IMPLEMENT%20Impact.php.en
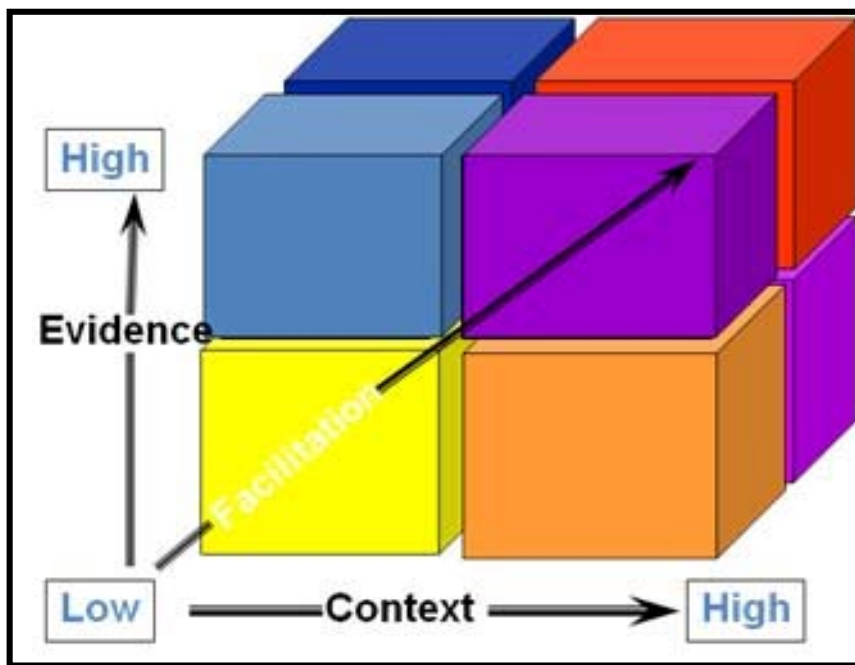
and used with permission from Jo Rycroft-Malone (personal communication, November

19, 2012).

   Rycroft-Malone (2004) suggested that the key to successful implementation of

research evidence rests on the three elements noted above: evidence, context, and

facilitation. Each has sub elements: Evidence includes research evidence, clinical experience, patient experience, and local data/information; context includes culture, leadership, and evaluation; and facilitation includes purpose, role, skills, and attributes. Each of these elements are on a continuum from low to high and the more an element is placed toward the high end of the continuum, the greater the likelihood of success in knowledge translation to clinical practice. It has been noted, however that elements of the framework still need to be better understood. This study further examined one of the main elements of this model, context. More specifically, this study used a validated measure to do so in a single professional group that has not previously been broadly studied from this perspective. The evidence component of the PARIHS framework was briefly touched upon in this study but not thoroughly examined to the extent the context concept was. Demographic information such as individual pharmacist's experience was collected and was isolated for comparisons with other contextual elements, however there were no specific questions related to the evidence component. The facilitation component was not examined as this concept involves the use of a person (often called a knowledge broker) to facilitate the use of research in practice. Research of this concept often involves intervention studies of a pre and post design to determine if change has occurred. This study was exploratory and focused solely on context. Since organizational context for knowledge translation of research was the focus of this study, the PARIHS Framework was most suited to help form the theoretical foundation for this study.

While KT models are useful conceptual tools, it is also important to examine continuing education literature, noting how the practice of CE instantiates or not the

various models of KT and its success especially as it pertained to pharmacists. The next section addresses CE in healthcare and more specifically in the profession of pharmacy.

Continuing Education (CE)

Continuing education is an integral part of pharmacy practice and thus has in most localities been institutionalized as compulsory activity in order to maintain a license to practice. Requirements exist in all Canadian provinces and territories, but vary regarding the quantity of CE required to maintain licensure. In Alberta, pharmacists are required to obtain 15 continuing education units per continuing education cycle (ACP, 2010). This is approximately equivalent to 15 hours of learning per year. Throughout Canada, the scope of practice for pharmacists has been expanding (CPhA, 2009) and creating greater and perhaps altered needs for CE (Emmerton et al., 2005). On April 1, 2007, the Alberta government passed legislation providing pharmacists with expanded scope of practice in the form of prescribing privileges and the ability to administer injections (ACP, 2011). Austin, Marini, MacLeod Glover, and Croteau (2005) found that a consistent problem for pharmacists was the ability to apply structured CE to their real-world practice; in other words, to translate the formal knowledge into effective clinical practice. The following section outlines the needs of pharmacists for CE and discusses how it is utilized in clinical practice.

There is a paucity of literature directly related to pharmacists and how they implement or translate knowledge garnered from CE into their clinical practice. A study by McConnell, Newton, and Delate (2010) examined the perceptions of American pharmacists regarding the effects of multi-faceted continuing professional development (CPD) or traditional didactic continuing education (CE) on practice change. The

researchers completed a 10-month, non-blinded, randomized controlled study of home study and distance-based learning with 44 HMO pharmacists in an intervention (CPD) group and 47 in a control (CE) group. The CPD group's education entailed systematic, ongoing, self-directed learning compared to the CE group that were only involved in a didactic educational format. Both groups completed a similar number of educational hours over the 10 months. The CPD group reported increased gains in meaningful learning and increased perceptions of changes to their practice as a result of educational activities than did those who utilized traditional CE. The intervention group reported they were able to both apply their learning to their work and reinforce their learning through practice, although they reported that time was a barrier to completing the education activities. Additionally, the intervention group reported enhanced professional knowledge, attitudes, and values as a result of the educational activities. The researchers recommended that additional studies be conducted to assess whether the perceived enhancement in practice from CPD improved patient outcomes and if different practice settings (e.g. non-HMO) showed the same results. My study helped address one of these recommendations by examining potential barriers to KT in varied practice settings.

CE for other health professional groups such as physicians, nurses, and various therapists has been more thoroughly studied than for pharmacists. With regard to physician continuing medical education (CME), Taylor (2009) proposed that CME, which more actively allows the learners to personalize their knowledge and practice, incorporating the ideas with opportunity for reflection and feedback, may be more likely to alter practice. This assumption that informs physician CE has not been extensively researched in pharmacists thus more study is needed to better understand the relationship

between learning, knowledge translation, and transfer (Thompson, Brooks, & Lizárraga, 2003).

In an exploratory ethnographic study, Rappolt and Tassone (2002) explored how rehabilitation therapists gathered, implemented, and evaluated new knowledge. The authors found that some of the strategies used for professional development education and continuing education for physicians and nurses did not address the needs of rehabilitation therapists even though the rehabilitation therapists were highly motivated to continue learning. The study focused on gaining an understanding of therapists' methods of conducting CE and translating research evidence into clinical practice. In-depth face-to-face interviews with 24 randomly selected occupational and physical therapists were conducted. The interviews, which included eight open-ended questions and probes derived from the literature, were tape recorded, transcribed, and coded, and then examined in the context of the participant's professional discipline, context of practice, and years of practice. The main themes that emerged from the findings were interpreted with respect to the literature and discussed in terms of potential strategies for future CE planning. Four main themes were identified: (1) most participants were non-systematic in their approach to evaluating and implementing new knowledge in clinical practice; (2) formal CE was highly valued; (3) informal consultation from peers was relied upon heavily as a source of new knowledge; and (4) professional isolation (e.g. solo practice environment) was perceived as a disadvantage to new knowledge gathering and barriers to implementing knowledge in isolated practice environments were accepted and not challenged.

When discussing methods for accessing new knowledge, participants initially discussed formal CE, but the majority went on to report that informal consultation with their peers was their first-line educational resource, with referral to the literature as a secondary resource. In terms of choices about where to gain and implement new knowledge, participants said that formal CE was chosen based on a critique of a presenter's research or credentials; however, this same type of critique process was not applied to information obtained from peers. Participants had difficulty articulating how they implemented new learning in their clinical practice or stated they did not know how it was implemented. They were able to identify barriers to knowledge implementation much more easily. Participants identified economic, administrative, and interprofessional barriers to integration of new knowledge into their practices. Some participants described a systematic approach to knowledge translation, while others had non-specific approaches. While not specific to pharmacists, the Rappolt and Tassone (2002) study helped to provide a comparison to the perceptions of pharmacists regarding the barriers to knowledge translation in clinical practice by outlining the perceptions of rehabilitation therapists. Also, the participants in Rappolt and Tassone's study were similar to the pharmacist population in this study in that rehabilitation professionals are thinly dispersed across diverse fields of practice. Many pharmacists in Alberta are located in rural and remote areas and are engaged in hospital or community-based practice, or both.

Several pharmacist-specific studies examined face-to-face CE or a blend of face-to-face and distance learning regarding pharmacotherapy implementation. Dualde, Faus, Santonja, and Fernandez-Llimos (2009) studied the effectiveness of a videoconference CE program on implementing pharmacy services; that is, translating what they have

learned into clinical practice. The CE sessions were run over a four-year period and the

length of participation by pharmacists and number of sessions attended varied. They

randomly selected 225 pharmacists, who had attended a synchronous videoconference

CE session on pharmacotherapy, of which 192 participated in a telephone interview.

Using the steps of Rogers' (1995) Diffusion of Innovations theory (i.e., pre-knowledge,

knowledge, persuasion, decision, implementation, and confirmation), the pharmacists

were assessed to determine their progression in the implementation of pharmacotherapy

following the CE session. In accordance with the above-noted steps, approximately 10%

of the pharmacists were in the implementation phase. About 50% of the interviewees had

attended multiple videoconference sessions. The authors found minimal implementation

of pharmacotherapy, even when participants were categorized as being in the

implementation or confirmation steps. Further, the number of courses attended was not

associated with successful implementation. Dualde et al. concluded that the gap between

positive implementation attitude using Rogers' (1995) steps, and the lack of actual

implementation of pharmacotherapy cast doubt on the role of videoconference training

courses or at least their implementation in this context as an effective means for the

provision of new pharmacy services. Fjortoft and Schwartz (2003) reported similar

conclusions. A comparison of a self-study and face-to-face CE session for pharmacists

revealed that although cognitive gains were achieved, they did not translate into positive

changes in practice behaviour.

    In contrast, the findings of Hughes and Schindel (2010) showed greater

magnitude of KT in their blended mode delivery of CE. They evaluated a professional

development course on laboratory values for Alberta pharmacists, which utilized a

blended delivery consisting of face-to-face instruction, web-based distance learning, and workplace learning. The purpose of the study was to evaluate pharmacists' experience with a CE course and to assess its impact on their knowledge, confidence, and perceived change in practice. Surveys were completed by 25 pharmacists at the beginning and conclusion of the course. Individual semi-structured telephone interviews were also conducted on a purposive sample of 16 pharmacists approximately four to five months after completion of the course. The interviews were designed to determine if or in what ways the pharmacist's practice had changed as a result of the CE course. Demographic information indicated that most participants were female, over age 40 years, and practiced community pharmacy in a rural setting. The majority of the respondents had a positive response to the blended approach to CE. Of those interviewed, most stated that their practice had expanded as a result of the course and that they felt more confident and knowledgeable. Some felt frustrated due to circumstances that limited the opportunities to use their knowledge and skills to the fullest. The researchers concluded that the blended delivery approach was effective in improving pharmacists' knowledge and confidence. The strengths of this study included the completion of both pre- and post-course surveys and the addition of qualitative interview data. Limitations included the small sample size, the use of self-reported anecdotal descriptions to describe the impact of the course, and that no attempt was made to link practice change to patient outcomes. Nevertheless, the Hughes and Schindel (2010) study presented a narrow, but insightful, look at how pharmacists who participated in a blended form of CE perceived KT related to their clinical practice. The findings cannot be generalized, and further study is necessary. In order to frame this study, it was necessary to look beyond models and related extant

literature. An examination of the theory that relates to behavioural changes associated with knowledge translation in clinical healthcare practice was also undertaken. Additionally, as this study specifically examined context, it was important to further examine what context refers to in this study. Therefore, the next section examines context.

Context

Context is defined in the online Merriam Webster dictionary (2015) as the interrelated conditions in which something exists or occurs. Context provides the frame in which KT is set within. Increasingly, researchers have begun to acknowledge the importance of contextual factors in knowledge translation (Cummings, Estabrooks, Midodzi, Wallin & Hayduk, 2007; Cummings, Hutchinson, Scott, Norton, & Estabrooks, 2010; Estabrooks, Midodzi, Cummings, & Wallin, 2007; Scott-Findlay & Golden-Biddle, 2005). Some authors have delimited their study of context to the physical environment or setting in which care is provided or practice takes place as noted by McCormack and associates (2002). Doran and Sidani (2007) succinctly state that "context is the environment or setting in which the proposed change will be implemented" (p. 4). Others expand the definition to include social and organizational structures as well as environmental structures. Kitson, Harvey and McCormack (1998) contend that context implies "…an understanding of the forces at work…" (p. 152) and that understanding the environmental culture, the relationships in leadership, and how an organization monitors its systems are essential components of context. Estabrooks, Squires, Hayduk, Morgan, and Cummings et al. (2015) examined research investigating the influence of context and its complex role in the use of knowledge in clinical care. They found that in general, context has an

important role in the use or implementation of best practice knowledge. Chilenski, Olson, Schulte, Perkins and Spoth (2015) articulate that an organization's context and the employees perceptions of it may be linked to implementation of interventions and contend that a positive context would support individuals' implementation successes. Aarons, Sommerfeld and Willging (2011) note that within clinical settings, employee perceptions and actions are influenced by elements of organizational context.

There has been research investigating the various meanings or understandings of the concept of organizational context (McCormack et al., 2002; Pepler et al., 2005). Some investigators believe that there is a deficit in attempts to capture the issue of context and its importance in research utilization (McCormack et al., 2002; Estabrooks, 2007; Boström, Slaughter, Chojecki & Estrabrooks, 2012). McCormack et al. (2002) state that little research has been done to explore the impact of context on the professional practice environment. Concurring with this, Cummings et al. (2004) note that the how and why of organizational context and KT are important unanswered questions.

Estabrooks, Squires, Cummings, Birdsell, and Norton (2009) developed an instrument to more broadly assess and measure the organizational context for healthcare settings. The Alberta Context Tool (ACT) is an eight dimensional instrument that allows for assessment of context within complex patient care settings. It is intended for administration at the level of the individual healthcare provider to determine their perception of workplace context for patient care. The Promoting Action on Research Implementation in Health Services (PARIHS) framework is used to conceptualize organizational context. The core element of the PARIHS framework, context, is generally meant to mean the work setting with specific domains including: culture, leadership and

evaluation (Kitson, Harvey & McCormack, 1998; Rycroft-Malone et al., 2002). One of

the key elements of the ACT is that it focuses on concepts of organizational context that

are potentially modifiable (Estabrooks et al., 2009). Thus, results of the administration of

the ACT could pinpoint contextual elements that could be altered to enhance KT.

The key concepts of the ACT are leadership, culture, evaluation, social capital,

formal interactions, informal interactions, resources, and organizational slack. The ACT

questionnaire was developed and piloted and as a result, was refined from 76 to 56 items.

It was initially field tested across Canada by nurses, physicians, allied professionals,

educators/clinical specialists, and managers. The ACT utilizes Likert scales to rate

participant agreement with concepts and statements about the context. This initial

validation of the ACT was conducted with pediatric nurses from across Canada (n=752)

(Estabrooks et al., 2009). Cronbach's alpha, exploratory factor analysis, analysis of

variance, and tests of association were used to assess instrument reliability and validity.

To add to their contention of instrument validity, Estabrooks, Squires, Hayduk,

Cummings and Norton (2011b) completed a validity assessment on the ACT within the

healthcare aide population working in Canadian nursing homes (n=645). The authors

utilized the *Standards for Educational and Psychological Testing* (APA, 1999) to frame

the validity assessment. In this study, they focused on validity evidence that included

advanced aspects of internal structure and relations with other variables. With regards to

internal structure, Estabrooks and colleagues found that the majority of the correlations

were greater than the predetermined cut-off of 0.3. This indicates that generally, item

scores within each concept were related to the overall score of that concept. Concept level

correlations ranged from 0.082 and 0.735 for one model and 0.398 and 0.615 for another.

This showed that the items appropriately differentiated between conceptual dimensions. They concluded that the validation process included in their study demonstrated further empirical support for construct validity of the ACT when completed by healthcare aides in nursing homes. Estabrooks et al. (2011a) completed a third validation study on pediatric nurses in Canada (n=844). They sought to determine if the ACT could be used to discriminate patient care units by the 10 ACT contextual factors. They found that ACT responses could be aggregated reliably and validly to obtain unit-level estimates of the dimensions of context in the ACT. This was consistent with their previous 2011 findings. The authors concluded that the ACT can be used to discriminate among patient care units on all contextual concepts.

Schultz and Kitson (2010) studied the ACT in an acute care hospital in Australia. They used the tool to compare context in wards that had undergone an evidence implementation process with control wards (patient care units) and to test for relationships between demographic variables of the nurses being studied (n=422) and the dimensions of context. Terminology within the ACT tool was slightly modified for the study setting. A variety of statistical analyses were utilized to compare the demographics including chi-square, t-test and Mann-Whitney U tests. Canonical correlational analysis was conducted to test for relationships between the dimensions of context and staff experience. Canonical correlations (Rc) were 0.38 and 0.34, both considered significant, however effect sizes were small (25%). Thematic analysis was completed for an open-ended question added to the tool. The study authors found that the ACT was applicable in the Australian cultural setting (different from where its initial development and testing occurred in a Canadian setting). Their results showed significant variation between some,

but not all, dimensions of context between the various patient wards. The authors then

compared their results of testing with Australian nurses to the 2008 results of Estabrooks

et al. and these findings suggested that Canadian nurses may have greater accessibility to

information but less time and space in which to use them, compared to Australian nurses.

They concluded that these findings required further study to provide more meaningful

results. Overall, this study concluded that the ACT is acceptable for use in Australia. The

authors also noted that a better understanding of contextual differences between wards at

a single hospital is needed, that experimental design should allow measurements across

wards using hierarchical models, and finally that interventions to improve context in

hospitals should start with things such as leadership skills, rather than focus on individual

level characteristics in isolation.

    Pharmacists in Alberta are currently undergoing significant practice

change. This changing scope of practice is new to Canada and many facets of this change

remained largely unstudied at the time of this study. Since 2007, Alberta pharmacists

have had the legislative authority to adapt (refill) prescriptions (RxA, 2012). The updated

Standards of Practice for Pharmacists and Pharmacy Technicians (ACP, 2011) outline

significant practice changes for pharmacists including the authority to administer

injections to Albertans over age 5 years, additional prescribing authorization, including

new prescriptions for drugs or blood products, and changes to reimbursement for

refilling, prescribing and reviewing medications (Government of Alberta, 2012). The

Alberta College of Pharmacists (ACP) sets out requirements for pharmacists who wish to

prescribe. Pharmacists in good standing on the clinical register may apply for additional

prescribing authorization after meeting these criteria:

1. Have at least one year of full-time experience in direct patient care.

2. Have strong collaborative relationships with other regulated health professionals.

3. Have and maintain the necessary knowledge, skills and attitudes and clinical judgment to enhance patient care.

4. Have the required supports in his/her practice (e.g., access to information, communication, documentation processes) to enable safe and effective management of drug therapy (ACP, 2013).

Pharmacists providing restricted activities such as prescribing must participate in ongoing continuing education and participate in the College's competency program, which includes continuing education, maintaining professional development logs, and self-assessment. As such, there is an even greater focus on continuous learning and application of knowledge for Alberta pharmacists which entails change.

Further study of the use of the ACT in Alberta home care providers and Canadian emergency room healthcare providers is currently underway (Forbes, D., Harrison, W., Woytkiw, T., Blake, C., Hawranik, P., et al., 2015a; Forbes, Strain, Blake, Peacock, Harrison, et al., 2015b; Scott, Grimshaw, Klassen, Nettel-Aguire & Johnson, 2011). Its use specific to pharmacists has yet to be explored and this study aids in bridging the paucity of research in this healthcare professional group. The next section examines the use of theory and how it helps to build the conceptual framework of this study.

Theoretical Basis of the Study

It has been proposed that clinical practice in healthcare is a form of human behaviour that can be described in terms of theory and may be generalized (Eccles,

Grimshaw, Walker, Johnson, & Pitts, 2005). Theory has been described by Bem and de Jong (2006) as "a set of statements that organizes, predicts and explains observations; it tells you how phenomena relate to each other and what you can expect under still unknown conditions" (pp. 18). Graham and colleagues (2007), state that a theory is an 'organized heuristic, coherent, and systematic articulation of a set of statements' (p. 937). It describes observations, summarizes current evidence, proposes explanations, and results in testable hypotheses. When designing research, it is important to frame the study within an overarching theory in order to guide or map out what the researcher will measure and how the data will be analyzed (Gough, Oliver, Newman & Bird, 2009). Eccles and associates (2005) note that there are various ways to choose theory when looking at clinical behaviour in healthcare. A range of theories may be relevant in how they relate to different aspects of change such as individual behaviour or organizational change. Estabrooks, Thompson, Lovely and Hofmeyer (2006) contend that "currently there is no satisfactory overarching knowledge-translation theory and, in fact, questions were asked as to whether there can or should be such an overarching theory" (p. 25). The authors go on, however, to argue that theory is necessary to guide the development of testable interventions and mapping out KT in healthcare may require several theories or models. Social, organizational and change theories all have aspects that are relevant to KT however Estabrooks et al. (2006) argue that "it is critical to find the fit between the theoretical perspective and the context in which it is to be applied" (p. 33). Reflecting on various types of theory, the research questions, and the specific emphasis on context within them guided the researcher toward change theory for this study. The following section outlines various theories of change and how they relate to this study.

Theories of Change

Effective knowledge translation in healthcare implies at least some, and possibly major, changes in practice. The preceding literature review examined critical topics to consider when designing this study and why they are important. In addition to embedding this study in the KT and CE literature, it is also important to include a theoretical framework for change. Therefore, the following section delves into change theory and directly relates to the research questions designed to elicit pharmacists' perceptions of organizational context as it relates to professional development research knowledge use and influences pertaining to its use.

Behaviour is complex (Darnton, 2008), and change theory can provide insight into reasons and understanding of why behaviour does and does not change. In addition, it helps us understand the often subtle aspects of cognition and action that influence change. Behavioural change theory tries to explain why individuals alter their behaviour patterns. Overall, change theory utilized in a healthcare setting provides a foundation for framing how individuals translate their knowledge into practice as it addresses the behavioural stages and nuances involved in altering clinical practice.

Research in knowledge translation helps provide a fresh perspective as the pharmacy profession undergoes this significant change in scope of practice. Currently, along with the change in scope of practice for Alberta pharmacists outlined in the context section of this paper, there appears to be an increasing emphasis on CE and individual pharmacists as well as the organizations within which their work is contextualized must determine when or if they will change their practice. This transitional phase was a timely point to examine specific elements of change prior to what is anticipated to be a greater

homogenization of practice in the future. According to Guion and Free (2010), behaviour change is most likely to occur when education addresses multiple individual and environmental influences or factors. This study determined what these organizational [environmental] influences were perceived to be for Alberta pharmacists. As outlined in the section that follows, Prochaska and DiClemente's (1982) Transtheoretical Model, and Lewin's Force Field theory and other change theories describe the process of change at an individual level. Roger's (1995) Diffusion of Innovations theory further scrutinizes ways in which change can be dissected but still largely on an individual level.

There are many examples of change theory; however, Cockburn (2004) contends that the most useful approach is to combine concepts from more than one theory to more comprehensively address the behaviour and understand how to influence change. This approach aligned with the postpostivist approach taken in this study. In order for pharmacists to utilize knowledge gained through CE in their practice, they often must alter how they think and/or what they do. Change theory helps to explain alterations to pharmacists' clinical practice and, therefore, provided the framework for this study. A review of these topics follows.

Improvements in patient care often depend on the implementation and application of research or KT by healthcare professionals. Davis (2005) states that it is easy to grasp the concept and indeed to measure a gap between best evidence for practice and current practice, but why that gap exists needs to be further explored. For most changes in healthcare, there are factors that enable change to occur; factors that are barriers and others that serve to reduce the speed and scope of change. Fortunately, there are also many theories from which understanding of change can be derived (Grol, Bosch,

Hulscher, Eccles, & Wensing, 2007). Change theories can help extend beyond individual determinants and help explain the organizational contextual factors influencing pharmacists' knowledge translation process in which they subsequently utilize or fail to utilize to apply their CE learning in professional practice.

The transtheoretical model developed by Prochaska and DiClemente (1982) is a staged model for change in behaviour. This model classifies people into stages that correspond with their readiness to change behaviour. These stages are precontemplation, contemplation, preparation for action, action, and maintenance. This theory predicts and facilitates movement through the various stages. The main purpose of the model is to help individuals change their health-related behavior (e.g., stop smoking). While the theory specifically focuses on the individual, it does not assess the role that structural and environmental issues may have on a person's ability to enact behavior change. Additionally, each of the stages may not be suitable for characterizing every population. For these reasons, it is not the best theory to underpin this particular study.

Another change theory includes the 10-stage model for planning change proposed by Grol and Wensing (2004; 2005a; 2005b). Grol and Wensing (2004) posit that some of the barriers and incentives for change in individual healthcare professionals include awareness, knowledge, attitude, motivation to change, and behavioural routines. These characteristics form the basis of their 10-stage model. At each stage, different problems associated with changing patient care may be identified and different change interventions may be selected. This model consists of a compilation of a variety of stages-of-change theories. In general, many of these theories are based on an initial awareness of new knowledge, thinking about the knowledge, making a decision to

change behaviour related to the knowledge, actual behaviour change, sustaining the change, and widespread use of the new knowledge. They describe the stages as orientation (promote awareness of innovation and stimulate interest and involvement), insight (create understanding and develop insight into own routines), acceptance (develop positive attitude to change and create positive intentions/decision to change), change (includes trying out change in practice and confirm value of change), and maintenance (includes integrate new practice into routines and embed new practice in organization).

In a later study, Grol, Bosch, Hulscher, Eccles, and Wensing (2007) further examined various theoretical perspectives related to patient care and the 10-stage planning model. They outlined potential barriers and possible strategies and interventions to enhance change. This newer model is useful as it is specific both to healthcare and to the individual. Overall, Grol and Wensing's (2004; 2005a; 2005b) model of change theory provides a good theoretical underpinning for individual practitioner KT as it addresses the many aspects of the elements involved in utilization of knowledge gained through CE. Their comprehensive theory amalgamation and subsequent model encapsulates an array of change theories and synthesizes them into ten stages. It also examines possible barriers to change, as well as possible strategies and interventions (Grol et al., 2007). While many elements of what Grol and Wensing propose are useful to guide this study, questions still remain about the contextual factors involved that influence change. The behaviour of pharmacists with regard to their use of research knowledge in the workplace cannot be viewed in isolation; some consideration must be given to the behaviour of others, the organizational structures, and the networks within

which they practice. Grol and Wensing's model does not fully address these other factors, thus further change theories were examined.

Kurt Lewin is well-known for his Force Field Theory, a change theory that involves the concepts of "unfreezing, transition, and refreezing" (Lewin, 1951). Becoming unfrozen is a state in which an individual becomes ready for change by countering complacency and stasis (Purser & Petranker, 2005); transition is a phase where the individual takes the journey toward making the actual change; and refreezing is a state where the change becomes the new reality and a new equilibrium is reached (Lewin, 1951). According to Lewin, change is created by intention and is linear, progressive, goal seeking, motivated by disequilibrium, and usually requires outsider intervention. Essentially, individuals must realize that what they had previously believed has changed (disconfirmation), and then cognitively restructure their beliefs, develop new standards, and finally make the change congruent with social norms (Weick & Quinn, 1999).

Lewin (1947) contends that individual behaviour is a function of the environment or "field" and the forces within that field promote change. He believed that the field was in a continuous state of adaptation, and used the term "quasi-stationary equilibrium" to reflect that while behavior has patterns, it also fluctuates due to changes in forces or individual circumstance (Burnes, 2004). According to Burnes (2004), Lewin's view was that if one could fully understand the forces, then one could understand why individuals, groups, or organizations act as they do. One would also be able to determine what forces would need to be diminished or strengthened in order to bring about change. Lewin described two kinds of forces related to change, particularly change related to learning:

one resulting from the structure of the cognitive field itself, and the other from certain valences (considered to be needs or motivations). The forces related to cognitive structure involve perceptions of the individual; the forces related to valences involve the needs, values, and hopes of the individual. Lewin (1947) contends that all intellectual processes are deeply affected by the goals of the individual and depend on emotional state (also referred to as tension) in an individual's life space. This theory is advantageous for examining the idea of individual agency, especially if one intends to examine non-voluntary workplace change (e.g. new policies that must be followed) but it does not comprehensively examine the joint organizational and individual influences on change that are integral to KT.

In addition to examining the individuals involved and the context, Roger's 1962 Diffusion of Innovations theory places a great deal of importance on the characteristics of the innovation itself and has served as a theoretical framework for a variety of KT and education-related studies (e.g., Dualde, Faus, Santonja, & Fernandez-Llimos, 2009; Estabrooks, et al., 2006; Nutley, Walter, & Davies, 2003; Wallin, 2008). Estabrooks and colleagues (2006) contend that Roger's Diffusion of Innovations theory is the closest theory that could be categorized as an overarching KT theory. Rogers (1995) defined diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. His four theories include the following:

(1) *Innovation decision process* theory, stating that diffusion is a process that occurs over time and has five stages: knowledge, persuasion, decision, implementation, and confirmation;

(2) *Individual innovativeness* theory, which maintains that innovators (people who are predisposed to being innovative) will adopt an innovation earlier than those who are laggards (people who are less predisposed to adopting innovations);

(3) *Rate of adoption* theory, which claims that innovations are diffused over time beginning slowly, followed by rapid growth; and

(4) Theory of *perceived attributes,* which states that an innovation will undergo an increased rate of diffusion if it is perceived to have relative advantage, is not overly complex, is compatible with existing values and customs, can be tried on a limited basis, and has observable results.

Based on Rogers' theories, perceptions of KT after CE align with the theory of perceived attributes, and thus supported this study. According to Rogers (1995), "diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication, in that the messages are concerned with new ideas" (p. 5). In this study, the 'messages' equate to the research knowledge in CE and the social system is the pharmacists' workplace.

Vanderslice (2000) contends that *Diffusion of Innovations* (1995) can help inform how ideas are accepted and under what conditions they are most likely to be implemented. The implementation conditions, that is, the organizational context forms the focus of this study. Grol, Wensing and Eccles (2005) state that the adoption of new ideas is influenced by the structure of the social network an individual works within. Greenhalgh, Robert, Macfarlane, Bate and Kyriakidou (2004) contend that different professional groups have different types of social networks citing physicians as having

informal, horizontal networks, and nurses as having formal, vertical ones. This study examined organizational network contextual elements of the pharmacist population in their workplace which are absent from the Greenhalgh et al. systematic review. Glanz, Rimer and Viswanath (2008) note, however, that evidence-based practice, such as the use of research in practice, depends both on organizational or system changes and on individual clinicians' behaviours.

A group of researchers in the Netherlands used the Diffusion of Innovations theory to explore to what extent patient oriented activities were implemented in Dutch community pharmacy (Pronk, Blom, Jonkers, Rogers, Bakker & de Blaey, 2002). They examined which innovation characteristics of a step-wise process of patient education were important, as well as examining under which preconditions this innovation could be implemented on a large scale. They used a cross-sectional survey of 300 randomly selected pharmacists. They then analyzed the pharmacists' perceived rate of adoption of the innovation (n=118) and used this information to ascertain what tasks were completed by the pharmacists and at what rate (innovator, early adopter or early majority). The authors then looked at innovation characteristics that align with Rogers' (1995) perceived attributes using agree/disagree/no opinion. The majority of the pharmacists were in agreement with the innovation characteristic statements related to patient education outlined in the study. Finally, the main preconditions expressed by pharmacists in order to adopt the new strategy included financial resources, workspace, time, and staffing.

This study examined some similar characteristics to the aforementioned Dutch study such as perceived contextual barriers. As with the Pronk and colleagues (2002) study, the Diffusion of Innovations theory supports this research. However, while this

theory was predominant in this study, it is also important to acknowledge that other theories may also help to explain various elements of knowledge translation. As noted previously, Estabrooks, Thompson, Lovely and Hofmeyer (2006) contend that there is no singular overarching KT theory, perhaps signalling the multifaceted nature of KT.

Grol, Wensing and Eccles (2005) state that healthcare is increasingly complex and contend that the focus should be on the system as a whole, rather than individual parts since individual agents' actions may change the context for other individual agents. It is the context and how it fits within the pharmacists' organization that is the focus of this research and it is hoped that the results will potentially inform to some extent on a system level. The World Health Organization (Peters, Tran & Adam, 2013) outlines the importance of context in implementation of change and states that '…a wide array of contextual factors typically influence implementation and these factors often change over time…' (p. 57). Mitchell, Fisher, Hastings, Silverman and Wallen (2010) advocate for a pluralistic theoretical approach to KT to best address the aspects of a phenomenon. Since theory related to knowledge translation, professional development and change have been discussed, what follows is an outline of the conceptual framework of this research.

Conceptual Framework

Miles and Huberman (1984) define a conceptual framework as 'the current version of the researcher's map of the territory being investigated' (p. 33).The conceptual framework for this study was guided by the literature, knowledge translation frameworks, change theory, reflection, personal experience, and observation. As noted by Shields (1998), in exploratory research, the purpose is linked with the conceptual framework

working hypotheses. The following is a diagram of the conceptual framework used for

this study (Figure 6):

Figure 6 – *Conceptual Framework*
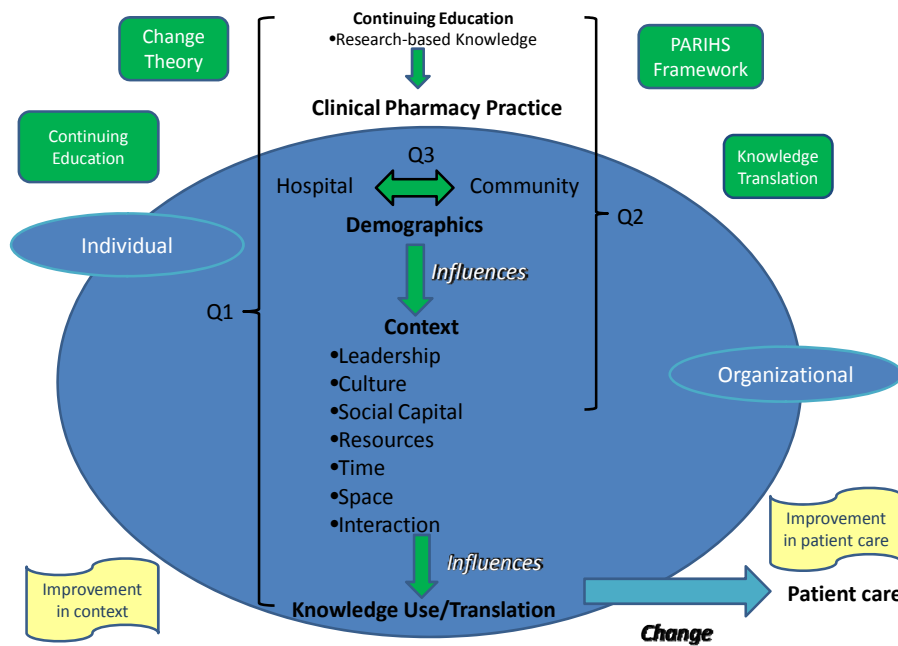
This diagram outlines the major concepts related to the research and illustrates

where each research question relates to them. The top portion of the diagram is the CE (a

mechanism whereby pharmacists garner research knowledge) and it is directly linked to

clinical pharmacy practice, the large circle. Pharmacy practice in this study was situated

in a hospital or community setting. Comparisons of these workplaces form the basis for

research question three. Question two examines what components of context have the

greatest influence on the use of research knowledge gained via CE. The six main

concepts of context are outlined and as the framework indicates, they influence

knowledge translation, which in turn affects patient care. In order for pharmacists to

affect patient care, they must change their clinical practice. Finally, the overarching research question one is shown by the encompassing link from CE to KT as it examines all of the contextual elements contained in the circle. There are two circles on the outer edge that represent the individual pharmacist and the organization within which they are employed. The top four boxes outside the large circle represent the theoretical components that support the research framework. The two smaller flags at the bottom of the outside of the large circle represent potential benefits resulting from this study. Each of these specific elements is involved in some fashion in changing patient care and was directly addressed within the research questions. The next section is a summary of the preceding chapter.

Conclusion

This literature review examined the available evidence on knowledge translation, context, and professional development education and illustrated their relationship to this study. There was relatively little literature specific to pharmacist-related research pertaining to organizational contextual elements, KT and clinical practice, thus, it was clear that a gap existed. Using the PARIHS framework (2004), along with the addition of Roger's (1995) Diffusion of Innovations, the perceptions of pharmacists as they pertain to the use of research garnered via CE in clinical practice were further elucidated in this research. With that in mind, the next section outlines the methodology utilized to answer the research questions for the study.

CHAPTER III - METHODOLOGY

The methodology chapter begins with reiterating the research questions. It goes

on to describe the study design and ethical considerations. The research questions were:

1. To what extent did organizational contextual factors influence the perceived use and

translation of knowledge garnered through continuing education by pharmacists in

Alberta?

> **a**. What components of organizational context were perceived to have the
>
> greatest influence on pharmacists' perceived use of research knowledge
>
> garnered through continuing education to improve or at least influence
>
> clinical practice?
>
> **b.** Were there similarities or differences between the two main contexts in
>
> which pharmacists in Alberta work, hospital, and community, in
>
> perceptions of organizational contextual factors influencing pharmacists'
>
> perceived knowledge translation to clinical practice?

This descriptive exploratory study was a cross-sectional survey research design

(Creswell, 2009), with added qualitative questions that reflect the exploratory nature of

the study and help to specifically target the pharmacist population. Cross-sectional

studies describe a sample population at a certain point in time ('snapshot') allowing one

to examine an outcome and the characteristics associated with it (Levin, 2006; Mann,

2003; Shi, 2008). In this study, the outcome of interest was pharmacists' workplace

contextual organizational factors and how pharmacists' perceived them to influence their

use of knowledge garnered through continuing education to inform their clinical practice.

It is not possible to make causal inferences with cross-sectional studies because this type

of design can only measure differences between or among subjects rather than change

over time. That is, cross sectional studies measure prevalence and "do not permit distinction between cause and effect" (Mann, 2003, p. 54). They can investigate a number of different groups of individuals or cohorts (Christensen, 2004) but only provide a snapshot of a current timeframe (Creswell, 2009; Cohen, Manion & Morrison, 2007). As this study was an exploratory study, it was not imperative to make casual inferences; it was meant to gain insights and familiarity with the area of exploration and discern directions for further research. It provides basic details and gives a well-grounded picture of the contextual factors affecting Alberta pharmacist practice within their organizations and perceptions of knowledge translation. The 'snapshot' in time approach is particularly suitable as the pharmacy profession in Alberta is currently undergoing change due to an expanded scope of practice and other social and technological changes, discussed earlier. This study provides a quasi-baseline of perceptions of organizational context and KT and sets up the possibility of a follow-up comparison study when pharmacy practice change in Alberta is further developed.

This study utilized the Alberta Context Tool (Estabrooks, et al., 2009), as noted earlier, a validated questionnaire tool that explores contextual elements of knowledge use by individual healthcare practitioners within their healthcare workplace. See Appendix F for ACT permission.

This study utilized a similar population to the ACT validation studies (healthcare workers but specifically pharmacists) and employed somewhat similar methodology (comparison of different organizational contexts within healthcare in Alberta, cross-sectional design, and comparable data analysis methods) to previous studies using the ACT tool.

In addition to the quantitative questions in the ACT survey, two qualitative questions were added by the researcher to provide an additional element of participant voice and to determine if there were factors other than those mentioned in the ACT that were perceived to influence knowledge use in patient care. According to Foss and Ellefsen (2002), a quantitative approach gives a broad, general view of the surface, while a qualitative approach provides a deeper and more multi-faceted insight.

Qualitative methods are generally more suited for an in depth exploration of attitudes, perceptions, feelings, motivations, and interrelations among factors (Shi, 1997). Qualitative research is concerned with process more so than outcomes or products (Bogdan & Biklen, 1998). According to Shi (2008), qualitative research can be used as an exploratory research method that can complement quantitative approaches such as surveys. It can also be used to improve understanding of what is being researched by examining individuals' own accounts of their thoughts, feelings, or perceptions. Thus, the qualitative questions were used in this research-to improve understanding of pharmacists' perceptions that are questioned using the quantitative Alberta Context Tool (ACT). The ACT broadly examined the concepts of leadership, culture, feedback (evaluation), social capital, formal and informal interactions, structural and electronic resources, staff, space, and time, while the additional qualitative questions focused more closely on specific perceptions of pharmacists and provided opportunity for them to highlight issues in their own words. The added qualitative questions were as follows:

1. Can you describe in your own words the most significant factors that inhibit you from applying knowledge gained in continuing education activities in your workplace?

2. Were there any other factors not addressed in this questionnaire that would help

you to use the knowledge gained through continuing education in patient care?

This study design with added qualitative questions allowed for further scrutiny of

organizational contextual factors and their influence on KT in clinical pharmacy practice.

This research study primarily focused on the quantitative component, and utilized the

qualitative analysis to gain a wider and exploratory sense of pharmacists' perceptions.

The following section outlines the research process for this study.

Outline of Research Process

Based on the previously described methodology, Table 1 below outlines the

research design phases and step-by-step procedures for this research.

Table 1- *Outline of the Study's Phases and Procedures*

Phase	Procedures
Phase 1 Quantitative Data Collection	1. Obtain ethics review board approval (AU REB/HREBA) See Appendix D for AU REB approval. 2. Obtain permission for use of the Alberta Context Tool and access to study populations. 3. Import survey questions into an online survey tool (AU's Lime® survey). 4. Disseminate survey link and consent form (see Appendix B) for pharmacists via Alberta Health Services, the Alberta Pharmacists' Association, and select Alberta College of Pharmacists members. 5. Obtain survey results.
Phase 2 Quantitative Data Analysis	6. Cleaning and coding of data. 7. Statistical analysis of survey results using SPSS® v. 22 software.
Phase 3 Qualitative Data Analysis	8. Thematic inductive hand coding and analysis of qualitative questions.
Phase 4 Integration of Quantitative and Qualitative Findings	9. Interpretation of quantitative and qualitative findings to obtain study results.

Survey Instrument and Related Hypotheses

The Alberta Context Tool is a validated ten dimension measure of organizational context for healthcare settings (Estabrooks et al., 2009; Estabrooks et al., 2011a). It was developed to quantify and assess context in complex healthcare settings by assessing perceptions of context related to a specific patient care unit or organization. The premise of this instrument is based in knowledge translation theory; more specifically, the PARIHS framework (discussed in the literature review) and other related literature. The ACT concepts and hypotheses regarding their association to the uptake of research evidence have been summarized by Estabrooks et al. (2011b) in their validity study. The same concepts and definitions are outlined in the following table, along with this study's anticipated results in regarding each concept. As Estabrooks et al., I believe that in the pharmacist population, the ACT concepts will be similarly associated as the previous populations studied: nurses, and healthcare aides (Estabrooks et al., 2009; Estabrooks et al., 2011a; Estabrooks et al., 2011b). I have reworded the Estabrooks et al.'s (2011b) summary to reflect my pharmacist study population to show the anticipated similarities between pharmacists, nurses, and healthcare aides.

Table 2 – *Concepts in the ACT Survey and Anticipated Responses*

Concept	Definition	Anticipated Responses regarding Barriers/Facilitators of CE use in Patient Care	Sample Item
Leadership	The actions of formal leaders in an organization to influence change and excellence in practice	Pharmacists who perceive strong leadership report higher ability to use CE in patient care	The leader focuses on successes rather than failures
Culture	The 'way that we do things' in our organization; items generally reflect supportive work culture	Pharmacists who perceive a more supportive organizational culture report higher ability to use CE in patient care	I am supported to undertake professional development
Feedback (evaluation)	The process of using data to assess performance and to achieve outcomes within an organization	Pharmacists who perceive greater use of evaluation within an organization report higher ability to use CE in patient care	Our team routinely formulates actions based on data
Social Capital	The active connections among people.	Pharmacists who perceive more organizational connections with people report higher ability to use CE in patient care	People in the group share information with others in the group
Informal Interactions	Informal exchanges that occur between individuals working within an organization that can promote the transfer of knowledge	Pharmacists who perceive a larger number of informal organizational interactions report higher ability to use CE in patient care	How often do you interact with people in the following roles or positions? – Someone who *champions* research in practice
Formal Interactions	Formal exchanges that occur between individuals working within an organization through scheduled activities that can promote transfer of knowledge	Pharmacists who perceive a larger number of formal organizational interactions report higher ability to use CE in patient care	How often do these activities occur? -Patient case review
Structural/Electronic Resources (SER)	The structural and electronic elements of an organization that facilitate the ability to assess and use knowledge	Pharmacists who perceive they use a larger number of resources report higher ability to use CE in patient care	How often do you use the following? -Clinical practice guidelines/best practice guidelines/ practice tools

'Organizational Slack'	The cushion of actual or potential resources which allows an organization to successfully adapt to internal pressures for adjustments or external pressures for changes		
Staff		Pharmacists who report sufficient staffing levels report higher ability to use CE in patient care	Enough staff to deliver quality care
Space		Pharmacists who perceive having sufficient space to practice report higher ability to use CE in patient care	We have 'private space' to discuss confidential information about patient care
Time		Pharmacists who perceive having sufficient time for clinical practice report higher ability to use CE in patient care	Time to look something up (e.g. in a journal, book or on the internet)

Estabrooks, C.A., Squires, J.E., Hayduk, L.A., Cummings, G.G., & Norton, P.G. (2011b). Advancing the argument for the validity of the Alberta Context Tool with healthcare aides in residential long-term care. *BMC Medical Research Methodology, 11*(107).

The next section describes the study recruitment process and the sample population.

Study Population

The population for this study included licensed, registered, practising Alberta community and hospital pharmacists. In 2013 there were more than 4550 registered pharmacists in Alberta (ACP, 2014). These consist of community and hospital pharmacy practitioners; both groups were targeted in this study. This population was chosen in part because the researcher has been a licensed registered practising pharmacist in Alberta for over 20 years. The researcher has been involved in pharmacist CE initiatives both provincially and nationally for most of this time period. It was hoped that the researcher's

personal reputation would facilitate increased response to a request for participation in this study. It is of note that the anonymity provided by the survey helped prevent concerns with personal identification of subjects by the researcher. Additionally, this population was chosen as Alberta recently enacted legislative change to enable a significantly expanded scope of practice for pharmacists. This expanded scope of practice leads to increased need for and hopefully demand by pharmacists for the use of research knowledge in clinical practice, thus this study helped to inform how organizational contextual elements influence the KT process. This population was also selected because within Alberta, there is increasing fiscal restraint put on the healthcare system in general and on the pharmacy profession in particular. Fiscal restraint and an increasing trend toward evidence-informed practice may no longer allow for a 'trial and error' approach to healthcare. Rather, it forces practitioners to focus on therapies that are proven to be effective. In 2012, Alberta Health Services (AHS) implemented Strategic Clinical Networks which are intended to engage stakeholders in the dissemination and implementation of best evidence practices to improve patient outcomes (AHS, 2013, para 2). AHS has a commitment to use research in practice in order to provide quality, evidence-based care to Albertans. Finally, there are an active and growing number of pharmacists in Alberta and KT research in this population provides a baseline for future research as the profession continues to grow.

There are three primary pharmacy organizations within Alberta: the Alberta College of Pharmacists (ACP), the pharmacist licensing body; the Alberta Pharmacists' Association (RxA), a pharmacy economic advocacy body; and the Canadian Society of Hospital Pharmacists (CSHP)-Alberta Branch, a hospital pharmacist advocacy body. All

pharmacists in Alberta, practising and non-practising, hospital, community, academic or consultant must belong to the ACP. While all pharmacists must be members of this organization, it only provided direct contact information for pharmacists that specifically agreed to be contacted for the purpose of research. Because of this, it could not be solely used to recruit pharmacists for this study. The RxA has a voluntary membership which is primarily made up of community practitioners. It will not provide direct contact information for its members, thus also could not be solely used to recruit pharmacists for this study. It did, however, advertise the study in its weekly email member communications bulletin (also faxed to over 900 pharmacies in Alberta). The CSHP Alberta branch has a voluntary membership and is made up of a small number of hospital pharmacists. Since Alberta has one provincial healthcare organization, Alberta Health Services (AHS) which employs the vast majority of the hospital pharmacists in Alberta, accessing hospital pharmacists via their employer was more practical. For the purposes of this study which examines organizational context of both hospital and community pharmacists, the Alberta pharmacist population was stratified into three accessible sample populations. First chosen was the Alberta Pharmacists' Association (RxA) where community pharmacists predominate. The CSHP Alberta branch was excluded as it represents only a small fraction of the hospital pharmacists in Alberta. Instead, Alberta Health Services hospital pharmacists were utilized. AHS did not provide direct contact information for its pharmacists but instead disseminated a link to participate in research to its pharmacist employees. Finally, the list of members of the Alberta College of Pharmacists (ACP) who agreed to be contacted for the purposes of research was also obtained, once approved by the College and their privacy regulations consultant.

At a minimum, participants had a Bachelor of Science in Pharmacy degree and had completed a jurisprudence examination in Alberta. They also had a current licence to practice pharmacy in Alberta. Practice settings, education levels, and years of practice experience are expected to vary. How the study sample was derived is covered in the next sub-section on methodology.

Sampling

Gable (1994) states that the survey (i.e. questionnaire) approach provides only a "snapshot" of the situation at a certain point in time, yielding modest amounts of information on the underlying meaning of the data or why the subjects respond as they have. Information collected in survey research can however cover a vast array of topics ranging from attitudes, values, opinions, or motives to more concrete information such as environment, living situations, or behaviour (Bailey, 1997). As this study was exploratory, survey research, which can cover a broad range of topics in order to provide a better understanding of a minimally researched area, was chosen. In the case of this study, the survey data was also supported by information provided by two additional qualitative open-ended questions, thus expanding and creating a more panoramic view of the perceptions of the study sample. These additional data helped to give meaning to the survey information.

The survey was delivered in an online (Web-based) format utilizing Lime® Survey, Athabasca University's online survey tool. Evans and Mathur (2005) and Wright (2006) describe some of the benefits of online survey methodology as flexibility, time-efficiency, convenience, ability to ask diverse questions, low cost, and ease of data entry and analysis. They contrast these advantages with the potential weaknesses being its

perception as junk mail, respondents' lack of online experience/expertise, technological variations, being viewed as impersonal, and low response rates. Some of these potential weaknesses were mitigated in this study by having the research participation requests sent out from a pharmacy organization or a peer, a fellow practicing Alberta pharmacist, and testing the survey on multiple browsers (Internet Explorer 7, 8, Safari and Firefox). Evans and Mathur (2005) also list what they believe to be the best conditions for which online surveys should be utilized. Some of these include when: a) wide geographic coverage is sought; b) a large sample is desired; c) there is access to a good sample list; d) interviewer interaction with respondents is not necessary; and e) timeliness is desired. As this survey covered a number of potential respondents over a large provincial geographic area within a defined sample list (registered practicing Alberta community and hospital pharmacists within two organizations) this was a good fit with online survey methodology. Additionally, pharmacists are busy professionals with many working shift work, so online surveys can fit in with a respondent's life; respondents can fill them in and return/submit them at their convenience (Duffy, Smith, Terhanian, & Bremer, 2005).

The sample for this study was drawn from the population of Alberta pharmacists who belonged to one or more of these groups:

1. Members of the Alberta College of Pharmacists (ACP) who consented to research participation

2. Members of the Alberta Pharmacists' Association (RxA) or

3. Employed by Alberta Health Services (AHS)

As this sample drew from pharmacists from three accessible organizations it can be considered an attempted census sample since all members of the RxA and AHS

pharmacists were given the opportunity to participate and select members of the ACP

were also given the opportunity to participate. At the time of the survey, there were

4550 registered members of the ACP (2014) which includes all practising licensed

pharmacists in Alberta. Of the 4550 members, there were:

- 2000 pharmacists that were members of the RxA (Cynthia Rousseau,

  personal communication, February 7, 2013)

- 732 pharmacists that were employed by AHS (Ian Creurer, personal

  communication, March 21, 2013)

- 3824 pharmacists who were members of ACP that agreed to be contacted

  for the purposes of research

Since all practising pharmacists must be registered with ACP, the 3824

pharmacists agreeing to contact for the purposes of research could potentially be

members of multiple organizations (i.e. the ACP and/or AHS and/or RxA). Thus,

pharmacists contacted regarding this survey may have been part of the ACP only, the

ACP and RxA or the ACP and AHS, or all three organizations, ACP and RxA and AHS.

However, because all practising pharmacists are ACP members, the number of potential

pharmacists in the census was considered to include only members of the other 2

organizations surveyed. Thus, the suggested highest possible N was considered to be

RxA and AHS pharmacists, 2732, which is a subset of the 4550 ACP member practising

Alberta pharmacists.

In this study a unique type of sampling was used that provided all members of the

population with opportunity to participate, but only a percentage of that population chose

to participate. All the pharmacists included from the three organizations noted above

were invited to participate and had an equal chance to participate. Thus, the study utilized

an attempted census sample; that is, an attempt to get all pharmacists available for

inclusion to participate in the survey (Seale, 2004). Seale (2004) defines a census as "a

count of the characteristics of every member of a given population (as opposed to a

survey of a selected sample from that population)" (p. 506). According to Cohen, Manion

and Morrison (2007), "The epitome of a cross-sectional study is a national census in

which a representative sample of the population...is interviewed on the same day" (p.

213). Just as highlighted by Cohen and colleagues as best case, this provincial cross-

sectional study employed a census format – but I was well aware that not all members of

the population would participate. The following section discusses survey methodology

and its use within this study.

Survey Methodology

Schaefer and Dillman (1998), assert that for an email survey to be successful,

multiple contacts should be made. This study was designed with an initial request for

study participation and one reminder 2 weeks later. Participants were contacted as

follows:

- ACP members emailed by the researcher

- AHS members emailed by AHS Pharmacy Administration

- RxA advertised a request for study participation to its members via its
  weekly emailed communication newsletter, *The Capsule*, which is emailed
  directly to its members and faxed to 900 Alberta pharmacies.

Figure seven is a pictorial outline of the survey methodology.

Figure 7 – *Survey Methodology*

ACP = Alberta College of Pharmacists; AHS = Alberta Health Services; RxA = Alberta Pharmacists' Association

As noted in Figure 7, two weeks after the sentinel wave of requests to pharmacists, a reminder invitation to participate email was sent to AHS pharmacists and ACP members using the same methodology and the RxA also included a reminder in *The Capsule,* which was both emailed and faxed. Pharmacies utilize facsimile technology on a daily basis in their practice so this methodology was effective in reaching a large number of pharmacists. These mechanisms allowed for alternate methods of dissemination of information about the study. Dillman et al. (2009) contend that sequential mixed-mode survey design increases the response rate.

Dillman (2009) suggests that there are several elements needed for high response rates. These include a respondent-friendly questionnaire, multiple contacts via at least two methods, personalized correspondence, and financial incentives. This study met these requirements by:

- The ACT questionnaire has been field tested on multiple occasions in various populations and is restricted to 10 minutes in length.

- Pharmacists were contacted via email on 2 occasions and via facsimile to their place of employment.

- The introductory page for the online survey was personalized in a peer to peer format.

- Two random incentive draws were held.

Response rates of surveys using Internet tools have shown mixed results (Truell, 2003). They have been reported in the literature to range from 30% to 70% (Truell, 2003). The RxA reported that in the past, they generally received response rates to Internet surveys ranging from 10 to 30% (C. Rousseau, personal communication, April 1, 2011). It is unknown whether multiple contacts were used to obtain these results however this study utilized multiple contacts in an attempt to achieve a robust response. As outlined previously, it followed a slightly modified Dillman's (2009) tailored design method, omitting the postal mail step.

Non-response to the survey of Alberta pharmacists was addressed by a repeat email and faxed advertisement/announcement of the request to participate in the research as previously outlined. Moss and Hendrey (2002) purport some factors that may positively affect email survey response rates once a survey invitation has been received by the potential respondent include: a) completion time indicated on the invitation; b) timing of the reminder notice; c) access to the survey; d) perceived anonymity and confidentiality of responses; and e) reward. Statistics from the literature regarding levels of response in online survey research were used as a guide for expected response rates in

addition to historic information provided by the Alberta Pharmacists' Association. In order to potentially maximize response rates, the summer months were not used for the survey as many pharmacists take vacations during this time period. Additionally, the invitation to participate accurately indicated an accurate and previously reported amount of time required to complete the survey and the provisions regarding anonymity and confidentiality of responses were be clearly indicated. A reward of the possibility of receiving a $100.00 gift card was also available to participants.

The online survey contained specific questions pertaining to basic demographic information including age, gender, year licensed, level of education, specialty certification, years of experience at their job, type of practice, and location. This information facilitated the relationship of demographic relationships with perceptions about KT and the various facets of context. It also allowed for a search for correlations between and among specific survey questions. This information assisted in determining the extent to which specific factors were perceived as decisive in facilitating change and in what groups. The demographics section incorporated numerous multiple-choice questions that prescribe a range of responses that allow for comparisons of demographic data within the sample (Cohen et al., 2007). Particular attention was paid to the wording style and question sequence for qualitative questions that were added to the ACT. The additional qualitative questions are outlined in Appendix A.

When doing research involving human subjects, it was important to consider the ethical implications of such research. The Tri-Council Policy Statement (1998) states that "research involving human subjects is premised on a fundamental moral commitment to

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advancing human welfare, knowledge and understanding, and to examining cultural dynamics" (p. i.4). The next section outlines the ethical considerations of this study.

Ethical Considerations

This research proposal underwent ethics review with the Athabasca University Research and Ethics Board (approved November 2013) and the Health Research Ethics Board of Alberta (approved February 2014). Appendix D contains the Athabasca University ethics board approval letter. Free and informed consent, obtained from participants prior to submission of the online survey, was required and participants were informed that they may withdraw from the study at any time. This consent was placed at the beginning of the electronic survey for participants to read and submission of the questionnaire was deemed to constitute informed consent. A final reminder was placed at the end of the survey informing participants that pressing 'submit' entails consent. Thus, participants in the online survey could withdraw at any time during the survey until they submitted their responses at the end of the survey. Participants were given the option of supplying their contact information via a link to a separate survey if they wished to be included in an incentive draw. They were informed that it would not be used for any analysis beyond the incentive draw, was kept separate from the survey data and was deleted after the draw.

The data is stored in a locked cabinet, accessible only to the researcher, and will be kept for a period of five years. After five years, any paper copies of the data will be shredded and destroyed by a professional confidential shredding company. Electronic data is stored on an encrypted memory device external to a computer hard drive. No data is stored on any computer hard drive. Aggregate data (with personal identifiers removed)

was provided to the ACT copyright owner, Dr. Carole Estabrooks, as per the contractual agreement for ACT use in this study. This aggregate data will help contribute to a wider understanding of the contexts of health workers in general. The memory device is stored in a locked cabinet, accessible only to the researcher, except when in use. After five years, it will be electronically erased and physically destroyed. In addition to the security measures for maintaining privacy and confidentiality of the research subject data, the Athabasca University licensed version of LimeSurvey® that hosted the research survey data resides on Athabasca University's server thereby increasing security and storage of data.

As a licensed pharmacist in Alberta, there was a risk that the researcher may encounter information that was identifiable as originating from friends and colleagues. The pharmacists' professional oath and code of ethics was adhered to and all information gathered was kept confidential. The researcher is an employee of the Alberta Health Services organization and was formerly employed as a pharmacist within this organization. Although the researcher is no longer professionally associated with the AHS pharmacy, there were many former colleagues and friends employed within AHS at the time of the survey. Clear separation between the researcher as a manager within AHS and employees of the pharmacy existed however it was indicated that participation in the study was voluntary and no negative consequences would result from refusal to participate. An independent third party contact was utilized (AHS pharmacy management) to disseminate the invitation to AHS pharmacists to ask for participation in the study. Any concerns regarding the research were directed outside of AHS to the AU Ethics contact and my supervisor. It is of note that all information obtained from AHS

employees (as well as other respondents) was collected in aggregate form and did not have individual identifiers.

Survey participants were offered the chance to win one of two $100.00 Visa gift cards. This incentive dollar amount adequately reimbursed the wage of a pharmacist for the amount of time it took to complete the survey. Pharmacists are very busy healthcare professionals and an incentive helped to recognize that their time participating in the study was valued. Using a token of appreciation for participation in the survey abided by the *TriCouncil Policy Statement on Ethical Conduct for Research Involving Humans* that states "free and informed consent must be voluntarily given, without manipulation, undue influence or coercion....Undue influence may take the form of inducement, deprivation, or the exercise of control, or authority over prospective subjects." (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 1998, sec. 2B, Article 2.2). According to Cohen et al. (2007), "incentives may be useful in reducing dropouts, ensuring that respondents continue an online survey to completion (up to twice as likely to ensure completion) and… that they may be useful if intrinsic motivation is insufficient to guarantee completion" (p. 239). Names of those participants agreeing to be part of the incentive draw were placed on a numbered Excel spreadsheet. To ensure fairness and non-bias, a computerized random number generator was used to select 2 numbers. The Excel spreadsheet was then referred to and the corresponding names beside the selected numbers received a $100.00 Visa gift card. A witness documented the distribution of the token of appreciation. Confidentiality of identifiable personal information collected for the token of appreciation distribution purposes was maintained and the only

correspondence with the incentive recipients was to determine a mailing address for the gift card. The spreadsheet containing personal email addresses was then deleted from the memory device. Prior to beginning the study, the research study was reviewed and approved by the Athabasca University Research Ethics Board and the Community Research and Ethics Board of Alberta.

Quantitative data is presented in aggregate form. Qualitative data is presented without any personal identifiers beyond hospital and community pharmacy identifiers. Data analysis is outlined in the next section.

Data Analysis

According to Cohen, Manion, and Morrison (2007), data analysis involves organizing, accounting for, and explaining the data; in essence, it is making sense of the data obtained. The research objective for this study was exploratory in nature therefore, descriptive statistics, along with traditional thematic analyses, were the most appropriate techniques (Onwuegbuzie & Leech, 2005). Quantitative data from the online surveys was analyzed using Statistical Package for the Social Sciences for Windows (SPSS® Version 22) software. A level of significance of 0.05 (alpha value) was selected for this study. Cohen (1988) indicated that this value was appropriate for use in most behavioural research studies, as it represents a difference that is generally visible in a population. Tabachnick and Fidell (2013) also state that the use of the significance level of 0.05 is what is traditionally used.

In order to obtain high quality data for this dissertation research study, online survey responses that were incomplete or were considered unusable were eliminated from the sample. Prior to analysis, all data were screened for missing values for both the extent

and pattern (El-Masari & Fox-Wasylychyn, 2005; Tabachnick & Fidell, 2013). If the survey was answered by someone other than a pharmacist (e.g. a pharmacy technician) then the survey was excluded. Additionally, if greater than 50% of the questions were unanswered, the survey was excluded.

In this study, the data obtained from the quantitative online surveys and qualitative questions were analyzed in the following three steps:

1. Descriptive parametric and non-parametric statistics were obtained from the data gathered from the online surveys. Descriptive analysis does not make any predictions or inferences, but rather describes and synthesizes the data to provide organization and give meaning (Cohen et al., 2007). SPSS® statistical data and predictive analytics software (version 22) reduced the survey data into manageable proportions for summarization and description of characteristics to gain understanding of the study variables (LoBiondo-Wood & Haber, 2005). The findings of the descriptive analysis are included in the quantitative results in Chapter 4.

2. Analysis of the qualitative survey questions was completed by hand-coding the data into themes, then quantifying the resultant themes for further interpretation and explanation of the study phenomena based on the research questions. Details of the analysis are provided in Chapter 4.

3. The findings from the quantitative and qualitative analyses were integrated for the interpretation of the results. This was to done in order to obtain greater depth and breadth of understanding of the study phenomena. Findings are included in Chapter 4. These steps are further described below.

Data used in this study was collected from an online survey, The Alberta Context Tool (ACT). The tool consisted of a demographics section with 9 questions, a leadership section with 6 questions, a culture section with 6 questions, a feedback (evaluation) section with 6 questions, a formal interactions section with 4 questions, an informal interactions section with 11 questions, a social capital section (connections among people) with 6 questions, a structural and electronics resources section with 11 questions, and an 'organizational slack' section with three parts: a staffing section with 2 questions, space section with 3 questions, and a time section with 4 questions. Two open-ended questions were at the end of the ACT.

Participant demographic data was analyzed using descriptive statistics (frequency distribution, percent). For the question regarding work location, choices were hospital, community, or other pharmacy. Respondents described 'other' as academia, nursing homes, management, and industry. For the purposes of data analysis, academia, management, primary care networks and industry were in classed as community pharmacy, while auxiliary and nursing home respondents were grouped as hospital pharmacy.

Data captured by Likert-scale questions in the survey was analyzed by both parametric and non-parametric analyses (Robertson, Shema, Mundfrom & Holmes, 1995). However, in alignment with the way data analysis was performed in a previous study utilizing the ACT tool (Schultz and Kitson, 2010) parametric analysis was performed as a comparator. Descriptive statistics (variance, mean, histograms) were generated for each item and examined for amount of variance. Additionally, the Alberta Context Tool LTC (Regulated) Concepts and Scoring Tool was used as a guide to data

analysis. This scoring tool was obtained from the University of Alberta Knowledge

Utilization Studies Program (KUSP), the program where the ACT tool originated. This

approach also allowed for comparisons to previously published data which was scored in

a similar fashion (Estabrooks et al., 2009; Estabrooks et al., 2011a). This tool divided

each of the main variables into concepts as follows:

Table 3 - *Alberta Context Tool LTC (Regulated) Concepts and Scoring*

Variable (Dimension)	Associated Concepts
Leadership	openness, optimism, self-control, empathetic, developing others, conflict management
Culture	recognition, autonomy, work/life balance, development opportunity, focus on service/mission, support
Feedback (Evaluation)	data access, informal data review, formal data review, action planning, performance monitoring, benchmarking
Formal Interactions	interactions with others through formal engagement in formal organizational activities
Informal Interactions	interactions with others through informal organizational activities
Social Capital (Connections among people)	bonding, bridging, linking
Structural and Electronic Resources	availability/use of structural resources and electronic resources
Staffing, Space, Time (Organizational slack)	available time/space/ staffing for patient care; use of space and time; staffing resources

(University of Alberta KUSP Program *ACT LTC Regulated Concepts and Scoring*,
February 26, 2011)

The concepts and scoring guide described in Table 3 outlined specific procedures

for the scoring of each concept within the variables (dimensions). These procedures were

used to determine the scores for the survey data collected in this study.

The first step in quantitative data analysis was to test each dimension of the ACT for normality. Histograms for each dimension showed non-normal distribution for every dimension. The next step in the data analysis of each dimension was to examine the means and standard deviation (SD) of the data according to the dimensions outlined in the ACT. Cronbach's alpha was used to determine reliability (internal consistency) of the items contained in each dimension. Finally, other components of the data were examined according to the dimensions outlined in the ACT.

Missing values in the analysis of the ACT were dealt with via listwise deletion within SPSS® v.22. This technique was used for each of the 10 individual dimensions of the ACT. All cases not having valid scores on all measures were excluded from the computations from individual dimensions of the ACT. This allowed for more dimensions of the ACT survey to be analyzed. Consequently, if a survey contained a complete set of answers for a dimension of the ACT, it was used to determine the derived score for that dimension. This approached was in alignment with the previously published literature on the ACT (Estabrooks, Squires, Cummings, Birdsell & Norton, 2009).

Data analysis of the dimensions of the ACT was conducted utilizing the LTC (Regulated) Concepts and Scoring Guide (2011) developed by the ACT author, Dr. Carole Estabrooks, University of Alberta and the Knowledge Utilization Studies Program (KUSP) team. This scoring guide divides the ACT into dimensions (leadership, culture, feedback, formal and informal interactions, connections among people, structural and electronic resources, and organizational slack [staffing, space and time]), and corresponding concepts. These dimensions are given an overall score (a mean of the items or a count of items recoded according to a specific key, weighting items as either,

0, 0.5 or 1 and totalling them). The dimensions as outlined in the scoring guide are listed

in Table 4 below.

Table 4 - *Dimensions in the ACT Survey as Outlined in the LTC (regulated) Concepts*

and Scoring Guide

Dimension	Definition	Number of Items	Scale
Leadership	The actions of formal leaders in an organization (pharmacy) to influence change and excellence in practice	6	Likert Scale of Agreement: (1) strongly disagree (2) disagree (3) neither agree or disagree (4) agree (5) strongly agree
Culture	The way that "we do things" in our organizations and work teams; items generally reflect a supportive work culture	6	Likert Scale of Agreement: (1) strongly disagree (2) disagree (3) neither agree or disagree (4) agree (5) strongly agree
Feedback (Evaluation)	The process of using data to assess group/team performance and to achieve outcomes in organizations (pharmacies)	6	Likert Scale of Agreement: (1) strongly disagree (2) disagree (3) neither agree or disagree (4) agree (5) strongly agree
Social Capital (Connections Among People)	Active connections among people. There are three types: bonding, bridging, and linking	6	Likert Scale of Agreement: (1) strongly disagree (2) disagree (3) neither agree or disagree (4) agree (5) strongly agree
Informal Interactions	Informal exchanges that occur between individuals working within an organization (pharmacy) that can promote the transfer of knowledge	7	Frequency Scale: (1) never (2) rarely (3) occasionally (4) frequently (5) almost always
Formal Interactions	Formal exchanges that occur between individuals working within an organization (pharmacy) through	5	Frequency Scale: (1) never (2) rarely (3) occasionally (4) frequently

	scheduled activities that can promote the transfer of knowledge		(5) almost always
Structural and Electronic Resources	The use and availability of resources such as books, computers, practice guidelines, etc.	11	Frequency Scale: (1) never (2) rarely (3) occasionally (4) frequently (5) almost always (6) not available
Human Resources (Staffing)*	The cushion of actual or potential resources which allows an organization (pharmacy) to adapt successfully to internal pressures for adjustments or to external pressures for changes	2-3	Likert Scale of Agreement: (1) strongly disagree (2) disagree (3) neither agree or disagree (4) agree (5) strongly agree
Space*	Available space to provide patient care	3	Likert Scale of Agreement: (1) strongly disagree (2) disagree (3) neither agree or disagree (4) agree (5) strongly agree
Time	Time available to respond to daily needs	4	Frequency Scale: (1) never (2) rarely (3) occasionally (4) frequently (5) almost always

*The space and staffing questions in the Allied Professionals version of the ACT used in this study varied slightly from this LTC version of the ACT Scoring Guide in the number of questions in this dimension. Staffing had 2 questions, while space had 2-3 questions. However, the mean of the item was still used to determine the overall score for this dimension.

The data obtained from Likert scales such as the one used in this study, is ordinal in nature and no assumptions can be made regarding the population distribution (Motulsky, 1995; Tomkins, 2006). Non-parametric analysis makes no assumptions about normality of distribution (Cohen, Manion & Morrison, 2007) and non-parametric tests are better suited to an unequal group size, which could bias parametric tests (Huck, 2000;

Tomkins, 2006). Based on known Alberta pharmacist demographics (CIHI, 2013) it was anticipated that comparisons of various demographic characteristics could result in multiple unequal group sizes. For example, the 2013 CIHI data outlined that 79% of the pharmacists in Alberta identify as community and related practitioners, while 21% identified themselves as hospital practitioners. As such, non-parametric tests were deemed to be most suitable for data analysis; however parametric tests were also conducted as comparators. This followed the methodology utilized in previously published data analyses of the ACT (Estabrooks et al., 2009; Estabrooks et al., 2011a).

Additional analyses varied according to the pairing of the data. Comparisons of two unpaired groups (i.e. having no relationship) utilized a Mann-Whitney U test and a two sample t-test (Motulsky, 1995; Cohen, Manion & Morrison, 2007). The dependent variables in this study were the contextual concepts of the ACT: leadership, culture evaluation, social capital, informal interactions, formal interactions, resources, staff, time, and space. Independent variables included: education level, employment status, gender, employment length at site, specialization (certification, residency), work role, and type of practice (hospital versus community).

Factor analysis is a statistical technique that relates measured variables to unmeasured variables or factors (Grimm & Yarnold, 2000). Factor analysis can be exploratory or confirmatory. Confirmatory factor analysis (CFA) can be used to examine the nature of and relations among latent constructs (Yong & Pierce, 2013; Jackson, Gillaspy & Purc-Stephenson, 2009; Grimm & Yarnold, 2000). It is often the tool of choice for assessing construct validity. As the ACT has not been widely utilized singularly in pharmacists, nor in a community setting at the time of this study, validity

testing was performed utilizing exploratory factor analysis. According to Tabachnick and

Fidell (2013), they note that in exploratory factor analysis, "one seeks to describe and

summarize data by grouping together variables that are correlated" (p. 614). I wanted to

determine if the constructs were captured by the scale and compare to previously

published results in the nursing population. Estabrooks et al. (2009) tested the ACT on

nurses and their principal component analysis indicated a 13 factor solution accounting

for 59.26% of the variance in organizational context. I anticipated a similar result.

Total survey sample size met size recommendations for factor analysis.

Tabachnick and Fidell (2013) note that correlation coefficients tend to be less reliable

when they are estimated from small sample sizes so the sample size must be large enough

to allow for reliable estimations. MacCallum, Widaman, Zhang, and Hong (1999) show

that samples in the 100-200 range are acceptable if the factors are well determined; that

is, most of the factors have a number of indicators and commonalities in the range of 0.5.

A minimum of 300 cases are required when commonalities are low and there are few

indicators for each factor. A larger sample size diminishes error in the data (Yong &

Pierce, 2013). MacCallum, Wideman, Preacher and Hong (2001) reinforce that while the

'rule of thumb' for factor analysis is considered to be a ratio of subjects to variables of

4:1, samples smaller than recommended may be sufficient if commonalities are high. The

sample size of 300 for factor analysis in this study, derived at by listwise deletion

ensuring that every domain of the ACT had complete responses, exceeded the 'rule of

thumb' 4:1 ratio and was acceptable for factor analysis. This was in line with the

recommendations of Tabachnick and Fidell (2013) who advised that missing values

should be deleted to prevent overestimation.

After looking at the descriptive statistics and viewing the results of the factor analysis, multiple regression was chosen to further investigate whether or not employment status and length of employment for community or hospital pharmacists could help predict perceptions of the 10 ACT variables. The dependent variables were the contextual concepts (dimensions) of the ACT: leadership, culture, feedback (evaluation), formal and informal interactions, structural and electronic resources (SER), connections among people (social capital), staff, space, and time (organizational slack). The independent variables were years worked in role, years worked at location (continuous variables), employment status (full-time, part-time, casual) and hospital and community pharmacy practice (categorical variables).The reference group for employment status was casual employment and the reference group for type of practice was hospital pharmacy. This combination was chosen because the scope of practice changes in Alberta pharmacists were still relatively new when the survey was conducted and I wondered if the length of time a community or hospital pharmacist worked in a role or the length of time working at the same pharmacy had any correlation to perceptions of the organizational context dimensions of the ACT. The Likert items of 7 ACT dimensions (leadership, culture, feedback, connections among people, staff, space, and time) were collapsed into one mean and coded as continuous. Three dimensions, informal and formal interactions and structural and electronic resources were generated using a count method. The variables were loaded into the model all at once. Preliminary analysis was conducted using Pearson product moment correlation and Spearman's rank correlation prior to the multiple regression analysis.

The two open-ended questions were placed at the end of the questionnaire and were analyzed using qualitative analysis methodology. The choice of a coding method was made by reviewing the various methodologies. Saldana (2013) proposes First and Second Cycle coding methods. First Cycle methods are processes that happen during initial coding of the data while Second Cycle methods are more advanced and can lead to theory building. Saldana notes that one coding may suffice, depending on the nature and goals of the study. Coding should be influenced by the research questions. This research study had epistemological questions that addressed knowing and understanding pharmacists' perceptions of organizational context. According to Saldana (2013), questions that explore participant actions or processes and perceptions are best suited to certain types of coding methods such as descriptive, process, initial, pattern, themeing, domain, and others. This was used to guide the method selection. After review, descriptive coding was chosen. This method summarized in a word or phrase (most often a noun) the basic topic of the data (Saldana, 2013). It helped to develop a categorized inventory of the data and laid the groundwork for Second Cycle coding. Since the qualitative questions asked participants information about perceived workplace 'factors' influencing KT, the Second Cycle coding included frequency counts. Frequency counts are a basic descriptive statistical summary of information about a set of data (LeCompte & Schensul, 1999). Frequency counts quantified the factors described in the data. The first step to this analysis, however, was to read through the data to gain a feel for it. After that, the coding cycles began. During this process, the chosen coding methods were evaluated to determine if alternate methods would provide further information and another method should be added if necessary (e.g. sub-coding). The final step was to

identify major trends noticed and include both a summary and examples of descriptive text quotes.

The preceding section reviewed the methodology of the study and the next section describes how the rigour of this study was ensured.

Study Rigour

Rigour of this study was ensured in the following manner:

- Recognition of limitations

- Assumptions challenged and discussed with supervisor

- Discussions of critical reflections

- Following literature guidelines and suggestions for rigour

- Consultations with supervisor and doctoral committee

- Consent process allowed participants the ability to refuse to answer or withdraw from the study at any time without consequence

- The online survey was anonymous

- Contentious effort to avoid non-response to the survey

- Use of a validated survey instrument

- Space triangulation involving the collection of data from multiple sites

- Person triangulation as data was collected from hospital and community pharmacists

- Scrutiny of the study occurred via peer debriefing

Summary

This chapter began by reiterating the research questions and describing the study design employed to answer them. It specifically outlined the research process, the survey

instrument, the study population, and survey sampling. The study methodology and ethical considerations were described. It concluded with a synopsis of the data analysis procedures and explained the methods to ensure study rigour. The next chapter presents the study results.

CHAPTER IV - RESULTS

Study Sample

A total of 678 respondents participated in the survey. Of the 678 surveys that were registered, 153 were noted as incomplete. Of the 153 incomplete surveys, 3 were excluded as they were partially completed by pharmacy technicians rather than pharmacists. Forty eight surveys were excluded as the survey link was opened but no survey questions were completed. Another forty four surveys were excluded as over 50% of the questions were not answered. A total of 569 surveys were kept for data analysis. Some of these surveys included missing values; however they were included in the data analysis as they contained fully completed answers to questions related to a specific variable (dimension) of the ACT. This followed data analysis protocols of the data analysis methodology outlined by the ACT developer in the Alberta Context Tool LTC (Regulated) Concepts and Scoring guide (2011).

A total response rate could not accurately be calculated for this survey as it was an attempted census of 3 groups of pharmacists: members of the Alberta Pharmacists' Association (RxA), specific members of the Alberta College of Pharmacists (ACP), and hospital pharmacists employed by Alberta Health Services (AHS). Survey participants could have been members of all of these groups so an exact total population of pharmacists could not be obtained. An estimated total of this population was 2732, thus the estimated response rate for this survey was 20.8%. When viewed as an online survey, this rate was considered satisfactory, as Cohen, Manion, and Morrison (2007) state that response rates for online surveys are typically lower than paper-based surveys and can be as "low as 10 percent or even lower" (p. 238). This is also corresponds to the typical

survey response rate range of less than 30% given to me by the Pharmacists' Association of Alberta (Cynthia Rousseau, personal communication, February 13, 2013).

Demographic and Descriptive Profile

Data collected from the demographics section of the online survey included all information that was obtained and number of respondents for each question were noted. This helped determine a descriptive profile of the 569 respondents. In the following descriptive profile, demographic characteristics on age range, gender, population of community, primary role, education, length worked in role, primary type of employment, status of employment and length of employment at current site are outlined. The demographic portion of the survey included 9 questions and each one is outlined in the following section.

Occupational role

When asked about their primary role, the majority of the pharmacists (68.8%) identified as Staff Pharmacists, with 18% identifying as Clinical Pharmacists. Almost 5% were Managers, 2.6% Clinical Practice Leaders, and 3% Specialty Pharmacists. Pharmacists identifying as Other (2.6%) included pharmacist educator/academic, ambulatory practice, administrator, relief, and consultant pharmacists.

Length of employment in current occupational role

The mean length of employment by pharmacists in their current role was 12.1 years (*N = 568*). The range was from < 1 year to 56 years (*SD* 11.22).

Gender

Respondents identified as follows: 420 female, 141 male and 8 did not respond to this question. Of those indicating a response, 73.8% were female and 24.8% were male.

Age categories

Respondents were divided into 11 age categories as noted in Table 5.

Table 5 – *Age Groups of Respondents* ($N = 563$)

	Variable	Frequency	Percent (%)
	20-24 years	16	2.8
	25-29 years	89	15.8
	30-34 years	95	16.9
	35-39 years	71	12.6
	40-44 years	63	11.2
Age	45-49 years	71	12.6
	50-54 years	67	11.9
	55-59 years	48	8.5
	60-64 years	35	6.2
	65-70 years	7	1.2
	> 70 years	1	.2

Completed education

Results of responses to selecting all completed education programs are listed

below in Table 6.

Table 6 – *Completed Education Programs* (*N* = 544)

Variable		N	Total Percent (n= 544)	Community Pharmacist N	Hospital Pharmacist N
Education (Multiple responses allowed)	Bachelor of Science in Pharmacy	552	97.5%	312	232
	Other Bachelor Degree	83	14.7%	45	37
	Master Degree	29	5.1%	14	14
	PharmD (Doctor of Pharmacy)	24	4.2%	4	19
	PhD	7	1.2%	5	2
	Prescribing Authority in Alberta	96	17.0%	43	52
	Injection Certification in Alberta	248	43.8%	185	60
	Certified Asthma Educator	13	2.3%	8	5
	Certified Diabetes Educator	28	4.9%	20	7
	Geriatric Pharmacy Certification	20	3.5%	7	10
	U.S. Board Certification	8	1.4%	2	6
	Other*	63	12.5%	8	27

*Other described as Accredited Canadian Pharmacy Residency (ACPR) [Community Pharmacists *N = 1*; Hospital Pharmacists *N = 22*], Certifications in Insulin Pump Training, Compounding, Travel Health, Smoking Cessation or ADAPT training.

Employment setting

Responses to the question asking where pharmacists work most of the time are found

in Table 7.

Table 7 – *Work Location* (*N* = 560)

Variable		Frequency	Percent
Where do you work most of the time*	Community Pharmacy	323	57.7
	Hospital Pharmacy	237	42.3

*responses in the category 'Other' on the survey were reviewed by the pharmacist researcher and respondents were placed in the most relevant category of community or hospital pharmacy

Length of Employment at current employment setting

When asked how long respondents had worked at their current location, the mean response for this question was 8 years and 1 month (n = 566). The range was from <1 year to 48 years (*SD* 8.04).

Employment status

When asked about their employment status at their current location, the majority of respondents (n = 564) to this question (69%) were employed full-time, followed by part-time employees (26.1%) and casual (5%).

Employment community population

Respondents were asked about the population of the community your pharmacy was located in. The majority of participants responding to this question (n = 564) were from urban areas of Alberta (56.6% from community with population 100, 000 and over) with 27.3% from a community of 1000 to 29,000 people. Almost 15% were from an urban area of 30,000 to 99,999 people and only 1.4% were in an area of less than 1000 people. The next section outlines the results of the quantitative data analysis of the ACT responses, beginning with factor analysis of the ACT.

Factor Analysis of the ACT

Exploratory factor analysis using principal component analysis was completed on the ACT and the results are listed in Table 8.

Table 8 – *Factor Analysis of the ACT*

Survey Concept	# Items	Mean Response	SD	Factor Analysis[1] (N = 300)		
				Factor rank	Factor loading (range)	Eigenvalue
Feedback (Evaluation)	6	2.86	.935	1	.734-.863	10.425
Informal Interactions						
Non-physician, nurse or pharmacist	6	3.59	2.15	2	.534-.892	5.681
Leadership	6	3.67	.842	3	.753-.848	3.328
Social Capital	6	3.90	.640	4	.687-.772	2.825
OS Time	4	3.27	.734	5	.694-.773	2.584
Culture	6	3.81	.649	6	.455-.683	2.384
Informal Interactions						
Physician, nurse or pharmacist	6	3.59	2.15	7	.448-.756	2.109
Formal Interactions	3	2.41	1.67	8	.801-.838	1.700
Structural and Electronic Resources						
Internet related	4	4.79	1.89	9	.409-.774	1.647
OS Staff	2	2.97	1.13	10	.819-.822	1.428
Structural and Electronic Resources						
Non-Internet related	4	4.79	1.89	11	.433-.766	1.295
OS Space	2	3.91	.561	12	.733-.739	1.204
Formal Interactions	2	.869	.970	13	-.294-.729	1.098
Structural and Electronic Resources						
Policies and procedures	1	4.79	1.89	14	.719	1.039

[1]Extraction method: Principal Component Analysis; Rotation Method: Varimax method with Kaiser normalization

Fourteen factors with Eigenvalues greater than 1 can explain 65.67% of the total variability in this instrument. The next section examines the qualitative data analyses of the two open-ended questions in the survey.

Qualitative Data Analysis

There were 2 open-ended qualitative questions on the online survey. The first question (Question 1), "Please describe in your own words the most significant factor(s) that inhibit(s) you from applying knowledge gained in professional development activities in your workplace" was answered by 422 participants (74.2% response rate from the sample). After reading through the answers to become familiar with the responses, the answers were coded into descriptive themes. These themes were then further examined to determine the themes occurring with greatest frequency. The most prevalent themes were: time, staff, confidence, workload, resistance, and leadership. Frequencies are outlined in Table 9 below.

Table 9 – *Qualitative Theme Frequencies for Qualitative Question #1* (*N* = 422)

Theme	Frequency (#)
Time	196
Staff	75
Resistance	52
Leadership	33
Workload	29
Confidence	28

With regards to time, pharmacists had a variety of reasons why time was perceived to be a significant barrier, such as, "I guess 'having enough time/resources to get the work done' is open to interpretation. I have time to get the work done, but that does not always include time to reflect, speak with colleagues, and/or strategize re how to incorporate new learnings." This was also reflected in similar comments such as, "Time.

We do not have enough time to thoroughly apply our knowledge…" and "Lack of time to reflect upon the new knowledge gained", as well as, "Time is the biggest issue. It can be very difficult to find the time to use the knowledge gained in various activities in your daily work flow.". Multiple respondents declared that, "Time is always a factor", while another summed it up as, "Time. We all want to do it all, but it's just not feasible.". Other ways time was a factor were described as, "Time to learn a new way" and "The time needed to get either the Physician's attention or the nursing attention", "Time constraints, especially from patients themselves. They are often in a hurry" and "Order entry time limits my time with the patient".

Regarding staffing, one person commented that, "We have insufficient staff in order to get work done beyond essential patient care services", while another noted, "We are chronically understaffed. As a result, I often find that I have to skip professional development activities that I had wanted to attend in order to have enough time to complete the regular tasks of my job." There appeared to be an underlying tone of guilt or regret regarding staffing as indicated by one pharmacist," …there are times when I feel I should give a patient some extra attention but there isn't adequate staffing". This sentiment was echoed repeatedly throughout the qualitative responses.

Resistance was noted to be the third most important perceived barrier for pharmacists in this study, and included resistance from patients, other health professionals and pharmacists themselves. A description of the resistance was noted by one respondent as, "Reluctance of other health care practitioners to agree/make changes based on the new information that you present to them does occur." Another explained that,

"…Another barrier that I have personally experienced is the resistance of other healthcare providers to the "overlap" of provider roles. For example, I recently took a course that focused on physical assessment of the patient that was geared toward pharmacist[s]. I thought that it would be a good addition to my additional prescribing status and would expand my role in a clinic that has a multitude of patients with complex chronic disease. I have found that some of the nurses that I work with are openly unsupportive of my expanding my duties with the patient beyond medication reconciliation or answering drug information questions, even though it might help to manage patient workload to have another "body" available to assess patients as needed."

Others were more succinct, stating it simply as, "Resistance from physicians.", "Lack of buy-in from caregiver groups", and "…patient interest in their own health is not always there..." The concept of resistance was not addressed in the ACT but nonetheless seemed important to the respondents.

Leadership was the fourth most frequently mentioned barrier. Pharmacists outlined their difficulties with leadership as, "Too much red tape from head office", "Despite the potential for greatness, the current management mind-set and direction is for the status quo and maintaining the average", and "Lack of support/encouragement from management". One pharmacist stated, "There is no leadership…There is no vision".

Workload was perceived to be a fairly significant barrier and was often mentioned in conjunction with other perceived barriers. It was noted by one pharmacist that, "Workload is heavy in our PCN. We have a number of clinical interests in expanding care for our patients, but are limited by the workload and staff to do that work". Another

said that, "Participating in professional development activities is difficult as the workload in a typical workday is often too busy to learn or research new knowledge".

Confidence was the final theme that prevailed in the qualitative responses. At times, it overlapped with the theme of resistance to change. One respondent confessed that, "The most significant factor is me. Reluctance for change. Not a lack of knowledge but inability to apply knowledge into action". Another said, "…it is my confidence that I am making the right decision that holds me back". Others noted that it was, "My own lack of confidence" and "Confidence in applying new knowledge, resistance to change, and forgetfulness (automatically doing things the way you used to)" and "Scared to break out of the current way things are done".

The second open-ended qualitative question, "Please outline any other factors not addressed in this questionnaire that would help you to use the knowledge gained through professional development in caring for your patients" (Question 2) was answered by 168 participants (29.5% response rate). The main themes noted by respondents included communication/networking, technology, collaboration, system inefficiencies, regulated technicians, and availability of professional development opportunities. Table 10 below outlines the frequencies for each theme.

Table 10 – *Qualitative Theme Frequencies for Qualitative Question #2* (*N* = 168)

Theme	Frequency (#)
Professional development	15
System inefficiencies	14
Communication/networking	13
Technology	13
Collaboration	13
Regulated technicians	10

With regards to professional development, participants noted that availability and subject matter were barriers. This was outlined in the qualitative responses as, "The biggest difficulty for me is getting to relevant education sessions for my practice" and "Rural Alberta…not many opportunities for inservice/workshops in our area". Another noted they would like to have, "routine education days – eg. A certain number of education days allotted to each pharmacy per year". Another noted,

> "My biggest challenge in ongoing professional development is time and location. There are many conference programs that sound very interesting and applicable to my practice, but they always require time and travel which can be expensive. It is a challenge to use limited vacation time to go to conferences".

Overall, the qualitative comments endorsed the notion that participation in and availability of CE was perceived as a barrier to KT. Comments indicated that there was a lack of availability of CE, a deficit in specialized CE to meet their needs, and that accessibility to CE was also a problem.

System inefficiencies were perceived to be inadequately addressed in the ACT. This theme included comments about workflow, care delivery, and autonomy. Pharmacists outlined these elements in comments such as, "Change in work flow and change in dispensary configuration are huge challenges.", "Perception of profession. There is not consistent delivery of services and gap in competencies/desire to 'go extra mile for best patient outcome/experience" and,

> "Give us more responsibility and empowerment to make judgements, to evaluate and monitor outcomes. Maybe then it would bring us together more, we wouldn't be so fractured; feeling like our contribution is only as good as the revenue we

collect. Maybe we would make a stand for the profession itself and recognize our value and respect that in each other more."

Communications and networking was noted to be a factor not adequately addressed in the ACT that would help in pharmacists' perceived KT. One pharmacist stated that there was a "lack of communication", while another said, "team discussion/learning together and with each other" would help. Another viewed informal communication more broadly saying that they would like to be able to "…speak with other pharmacists in my clinical area at other sites to see how they have implemented their new knowledge". One pharmacist commented that there should be "A forum to discuss with other HCPs knowledge gained through PD activities and how it aligns with knowledge others have, how they applied their knowledge in practice and then the outcomes they've achieved."

Pharmacists mentioned technology the qualitative responses, referring mainly to software is indicated by, "Better software programs to eliminate or reduce the need to hand write notes" and "Integrated computer systems...many data elements captured in various systems that do not communicate/integrate with each other". Other technological concerns related to hardware and Internet capabilities as outlined with the comments, "Computer hardware that is in good operating conditions and doesn't crash all the time" and "Faster computers. Full Internet access".

Pharmacy technicians were mentioned in terms of scope of practice, which was also in conjunction with levels of staffing. Most of the comments referred to regulated technicians who are licensed and can perform more duties than unregulated technicians. One pharmacist described it as, "Enough of other staff. ie/If we had enough pharmacy

technicians practicing to their full scope of practice [regulated], we would have enough time for our full scope" and another said, "Increased use of adequately trained pharmacy technicians…".

What follows is individual ACT data for each dimension, organized by its contribution to answering the research questions.

Research Question 1

Analysis was conducted to answer the first research question, "To what extent do organizational contextual factors influence the perceived use and translation of knowledge garnered through continuing education by pharmacists in Alberta?"

Table 11 provides a summary of the responses to the questions on the ACT divided by the 10 ACT dimensions. The dimensions of leadership, culture, feedback, social capital, staffing and space used a 5-point Likert agreement scale (strongly disagree to strongly agree), while the remaining dimensions used a 5-point Likert frequency scale (never to almost always).

Table 11 – *Summary of ACT Dimensions*

ACT Dimensions	N	Min	Max	Mean	SD	Cronbach's Alpha
Leadership	559	1.00	5.00	3.66	0.842	0.909
Culture	565	1.00	5.00	3.81	0.649	0.817
Feedback	553	1.00	5.00	2.86	0.935	0.920
Formal Interactions	473	1.00	4.00	0.86	0.970	0.738
Informal Interactions	454	1.00	9.50	3.59	2.158	0.859
Social Capital	521	1.00	5.00	3.90	0.640	0.868
SER	506	1.00	11.00	4.79	1.897	0.685
OS Staff	526	1.00	5.00	2.97	1.132	0.865
OS Space	344	2.33	5.00	3.91	0.561	0.297
OS Time	519	1.50	5.00	3.27	0.734	0.819

ACT = Alberta Context Tool SER = Structural & Electronic Resources;
OS = Organizational Slack; SD = Standard deviation

The mean scores of the 10 dimensions of the ACT tool show that each dimension is perceived to be present in Alberta pharmacists, however they vary in degree.

The questions making up the dimension of leadership on the ACT showed means ranging from 3.43 to 3.88 on a 5 point Likert–like scale and standard deviations ranging from .959 to 1.095, with leadership overall having a mean of 3.66 ($SD = 0.842$). The perceptions of the majority of the pharmacists were neutral or approached agreeing that their leaders are able to do such things as listen, mentor, resolve conflicts, and calmly handle stressful situations. Below in Table 12, the mean and standard deviation of the individual questions in the leadership dimension are listed.

Table 12- *Mean and Standard Deviation for Leadership Dimension Questions* ($N = 559$)

Survey Question Concepts for Leadership	Mean	SD
Looks for feedback	3.59	1.058
Focuses on successes	3.73	.965
Calmly handles stress	3.88	.973
Listens, acknowledges, and responds	3.85	.959
Actively mentors or coaches	3.43	1.095
Resolves conflicts	3.52	1.040

The questions making up the dimension of organizational culture on the ACT showed means ranging from 3.46 to 4.21 and standard deviations ranging from .705 to 1.01 with the overall combined scores for this dimension showing a mean of 3.81 ($SD = .649$). The perceptions of the majority of pharmacists were that they viewed their organizational culture positively, endorsing that the culture allows them to work meeting patient needs ($M = 4.21$; $SD = .705$) and that they have control over their work ($M = 3.93$; $SD = .833$). They were slightly less positive regarding the balance between best practice and production ($M = 3.46$; $SD = 1.01$). For the 6 items in the culture dimension,

Cronbach's alpha was 0.817. Below in Table 13, the mean and standard deviation of the

individual survey questions are listed.

Table 13 - *Mean and Standard Deviation for Culture Dimension Questions* ($N = 565$)

Survey question Concepts for Culture	Mean	SD
Receive recognition from others	3.62	.920
Control over work	3.93	.833
Organization balances	3.46	1.002
Supported CE	3.79	1.013
Clear on what patients need	4.21	.705
Supportive work group	3.88	.882

The individual questions of the feedback construct (which can also be thought of

as evaluation of team performance) on the ACT showed means ranging from 2.76 to 3.09

and standard deviations ranging from 1.07 to 1.15 with a combined mean of 2.86 ($SD =$

.935). Pharmacists perceived that using data or assessing performance to achieve best-

practice was generally not performed in their organizations. Pharmacists did not endorse

a formal process for discussing data or using it to plan or evaluate performance. The

strongest agreement was that they received information about team or store performance

($M = 3.09$; $SD = 1.15$). For the 6 items in the feedback dimension, Cronbach's alpha was

0.920. Below in Table 14, the mean and standard deviation are listed.

Table 14 - *Mean and Standard Deviation for Feedback Dimension Questions* ($N = 553$)

Survey Question Concepts for Feedback	Mean	SD
Routinely receive information	3.09	1.150
Discusses this data informally	3.08	1.115
Formal processes	2.68	1.122
Formulates action plans	2.79	1.099
Monitors our performance	2.77	1.081
Compares our performance	2.76	1.072

The individual questions in the dimension of formal interactions on the ACT

showed means ranging from 2.02 to 2.80 and standard deviations ranging from .885 to

1.88 with an overall mean of .869 (*SD* = .970). Pharmacists indicated that they rarely (1

to 5 times per month) had meetings or conferences about patients or participated in

continuing education outside of their workplace in the past year.

For the 4 items in the formal interactions dimension, Cronbach's alpha was 0.738.

Below in Table 15, the mean and standard deviations for individual questions are listed.

Table 15 - *Mean and Standard Deviation for Formal Interactions Dimension Questions*

(*N* = 545)

Survey Question Concepts for Formal Interactions	Mean	SD
Team meetings	2.71	1.657
Patient rounds	2.80	1.882
Family conferences	2.02	1.605
Continuing education	2.35	.885

The individual questions in the dimension of informal interactions on the ACT

showed means ranging from 1.57 to 3.69 and standard deviations ranging from 1.23 to

1.53 with an overall mean of 3.59 (*SD* = 2.15). In the last month prior to completing the

survey, pharmacists rarely had informal discussions about patient care with people who

specialize in research, quality improvement, or clinical specialists. They more

occasionally interacted with other healthcare professionals such as pharmacists,

physicians, nurses, pharmacy technicians and had some occasional informal discussions

or 'hallway talks'.

For the 11 items in the informal interactions dimension, Cronbach's alpha was 0.859. Below in Table 16, means and standard deviations for individual questions are listed.

Table 16 - *Mean and Standard Deviation for Informal Interactions Dimension Questions* (*N* = 517)

Survey Question Concepts for Informal Interactions	Mean	SD
Colleagues in my identical field	3.69	1.236
Physicians	3.42	1.288
Nurse providers	3.00	1.455
Pharmacy Technicians	3.33	1.525
Other healthcare providers	2.65	1.452
Research pharmacist or clinical coordinator	1.85	1.441
Any clinical educator/instructor/clinical specialist	1.98	1.307
Quality improvement	1.60	1.334
Champion	1.57	1.354
'Hallway talks'	3.03	1.518
Informal patient teaching	2.87	1.536

The individual questions in the dimension of social capital (connections among people) on the ACT showed means ranging from 3.53 to 4.06 and standard deviations ranging from .764 to .918 with an overall mean of 3.90 (*SD* = 1.89). Pharmacists agreed that they could share information with their pharmacy team and were comfortable doing so. They generally report feeling valued for participation in the team and felt they were taken seriously. In the qualitative data, one person outlined a desire for the "ability to share info and compare notes with others already using this knowledge", while another wanted to "…share innovative practices" while another summed it up as, "we need to work with others in our profession in order to align ourselves with current professional developments in the same areas of interest".

For the 6 items in the social capital dimension, Cronbach's alpha was 0.868.

Below in Table 17, means and standard deviations for each question are listed.

Table 17 - *Mean and Standard Deviation for Social Capital Dimension Questions* ($N =$ 521)

Survey Question Concepts for Social Capital (Connections Among People)	Mean	SD
Share information with others	3.99	.804
Observations are taken seriously	3.88	.876
Information is shared	3.53	.918
Comfortable talking in authority	4.06	.808
Aim is to help others	3.98	.764
Group participation is valued	3.99	.766

The individual questions in the dimension of structural and electronic resources (SER) on the ACT showed means ranging from 1.59 to 4.83 and standard deviations ranging from .520 to 1.65 with an overall mean of 4.79 ($SD = 1.89$). Pharmacists indicated that in the month prior to completing the survey they have frequently used resources such as a computer connected to the Internet ($M = 4.83$; $SD = .520$) and websites on the Internet. More occasionally they had used things like clinical practice guidelines, journals, and textbooks. They rarely or never used a library ($M = 1.59$; $SD = 1.09$) or notice boards.

For the 11 items in the informal interactions dimension, Cronbach's alpha was 0.685. Below in Table 18, means and standard deviations for individual questions are listed.

Table 18 - *Mean and Standard Deviation for Structural and Electronic Resources*

Dimension Questions ($N = 517$)

Survey Question Concepts for Structural and Electronic Resources	Mean	SD
Library	1.59	1.094
Textbooks	2.49	1.117
Journals	2.83	1.305
Notice boards	1.74	1.101
Policies and procedures	2.36	1.025
Clinical practice guidelines	3.06	1.174
Computer connected to Internet	4.83	.520
Computerized decision support	2.76	1.658
Reminders	3.07	1.490
Websites	4.39	.949
CE provided at or by your pharmacy	2.29	1.313

The components of the ACT termed organizational slack contain three dimensions: staffing, space and time. Each dimension is presented separately below.

The staffing dimension on the ACT had two statements for participants to rate. The idea that there was enough staff to get the necessary work done had a mean of 3.14 ($SD = 1.19$) indicating that an overall neutral response but the SD showed that responses ranged from disagree to agree. The idea that there was enough staff to deliver the best possible care had a mean of 2.80 ($SD = 1.21$) indicating overall disagreement, with the SD showing a range from strongly disagree to neutral. The overall mean for this dimension was 2.97 ($SD = 1.13$).

For the 2 items in the staff dimension, Cronbach's alpha was 0.865. Below in Table 19, means and standard deviations for each question are listed.

Table 19 - *Mean and Standard Deviation for Staff Dimension Questions* ($N = 526$)

Survey Question Concepts for Staff	Mean	SD
Get the necessary work done	3.14	1.196
Deliver the best possible care	2.80	1.216

The individual questions in the dimension of space on the ACT showed means ranging from 3.63 to 4.42 and standard deviations ranging from .495 to 1.03. The overall mean for this dimension was 3.91 (SD = .561). Pharmacists were either neutral or in agreement that they had adequate space to provide patient care and occasionally used a private space for that care.

For the 3 items in the space dimension, Cronbach's alpha was 0.297. In the qualitative responses, one respondent stated that, "Office space is very limited and often is the factor which restricts my practice". Another mentioned that, "The small space we do have is not very clean and used for storage, so I am embarrassed to bring patients into the counselling room".

Below in Table 20, means and standard deviations for each question are listed.

Table 20 - *Mean and Standard Deviation for Space Dimension Questions* (N = 344)

Survey Question Concepts for Space	Mean	SD
Adequate space	3.69	1.030
Private space	4.42	.495
Use of private space	3.63	.984

The individual questions in the dimension of time on the ACT showed means ranging from 3.05 to 3.58 and standard deviations ranging from .854 to .978, with an overall mean of 3.27 (SD = .734). For the 4 items in the time dimension, Cronbach's alpha was 0.819. Below in Table 21, means and standard deviations for each question are listed.

Table 21 - *Mean and Standard Deviation for Time Dimension Questions* ($N = 519$)

Survey Question Concepts for Time	Mean	SD
Do something extra for patients	3.05	.896
Talk about the plan of care	3.36	.978
Look something up	3.58	.854
Talk about new clinical knowledge	3.12	.914

The next section outlines the results for the second research question.

Research Question 1A

The second research question asked, "What components of organizational context are perceived to have the greatest influence on pharmacists' perceived use of research knowledge garnered through CE to improve or at least influence clinical practice?"

There were several components of organizational context as defined by the ACT that were perceived to influence pharmacists' use of knowledge in patient care. By a wide margin, the least frequently endorsed dimension was formal interactions ($N = 473$; $M = .869$; $SD = .970$; $\alpha = .738$). Some pharmacists (30.8%) never had team meetings about patients, 39% said they never participated in patient rounds, 56.2% never participated in family conferences, and 63.7% said they rarely participated in CE held outside of their workplace.

The dimension of feedback as a perceived contributor to knowledge translation was not strongly endorsed ($N = 553$; $M = 2.86$; $SD = .935$; $\alpha = .920$). Overall, the results showed that 50.6 % of the pharmacists strongly disagreed or disagreed that they formally review data (such as medication errors, therapeutic drug levels, etc.), formulate action plans using the data (44.4%) or monitor (45.1%) and compare (44.5%) results. However, only 33.7% agreed that they received this type of data and 38% agreed they informally discuss it on a routine basis.

The dimension of the ACT with the greatest endorsement was structural and electronic resources ($N = 506$; $M = 4.79$; $SD = 1.89$; $\alpha = .685$). Pharmacists almost always (87.8%) use computers, the Internet, search Internet websites (62.9%) and use clinical practice guidelines (14.3%) at work but rarely use textbooks (43.5%), journals (29%), policies and procedures (46%), or attend internal inservices (internal CE) provided at or by their pharmacy (34.4%).

The dimension of space was highly endorsed by pharmacists ($N = 524$; $M = 3.91$; $SD = .561$; $\alpha = .297$) but the Cronbach's alpha level indicates that the reliability of these questions is relatively low compared to the other ACT dimensions. This dimension had 3 statements, with the first asking pharmacist's opinions on whether they had adequate space to provide patient care. There was variation in perceptions ranging from strongly disagree (8%) to disagree (21.4%) to agree (42.6%) or strongly agree (12.8%). About 60% of pharmacists agreed that they had a private space to discuss patient care, while almost 16% did not. If they were in agreement regarding private space, they were asked how often they used it. These majority of these pharmacists ($N = 344$) said they used it frequently (39.5%) or occasionally (28.5%) with 2.3% saying they never used the available space.

The dimension of social capital was also strongly endorsed ($N = 521$; $M = 3.90$; $SD = .640$; $\alpha = .868$). Most pharmacists (60.1%) agreed or strongly agreed (22.9%) that the people on their team shared information with others in the group. When asked about being taken seriously about their observations about a patient, the results were similar with 51.7% of pharmacists agreeing or strongly agreeing (22.2%). When asked if people in other groups share information with them, 49.9% agreed, 26.1% were neutral and

11.4% disagreed. In terms of comfort with talking about patient care issues with people in authority, most pharmacists strongly agreed (28.5%) or agreed (53.9%), while only 5% disagreed. When asked about why group sharing occurs, most felt it was to help others do their job (23.3% strongly agreed; 55.8% agreed). They also agreed (56.8%) or strongly agreed (22.9%) that individuals who participate in group activities are valued by others in the group.

The dimension of culture was strongly endorsed ($N = 565$; $M = 3.81$; $SD = .649$; $\alpha = .817$) with 55.8% of pharmacists agreeing and 11.6% strongly agreeing that they receive recognition from others for their work. 14.1% disagreed or strongly disagreed with this statement. Many (56.5% agreed; 22.7% strongly agreed) that they had control over their work while 6.9% disagreed. Another 13.2 percent were neutral. Reduced agreement occurred when pharmacists were asked whether their organization balances best practice and productivity with 15.7% disagreeing and 3.3% strongly disagreeing. Another 23.9% were neutral and the others (45.2%) agreed or strongly agreed (11.8%). Support for professional development by their organization was also mixed. 61.1% felt supported while 16% were neutral and 13.9% did not feel supported. The vast majority (89.4%) agreed or strongly agreed that they work to provide what patients need. In terms of feeling like they are a member of a supportive work group, results were varied with most (51.4%) agreeing or strongly agreeing (23%), however 5.8% disagreed or strongly disagreed (1.6%). The rest neither agreed nor disagreed (18.2%).

The leadership dimension of the ACT was also fairly strongly endorsed ($N = 559$; $M = 3.83$; $SD = .842$; $\alpha = .909$) with most pharmacists generally feeling positive about their leaders, especially in terms of their leaders looking for and appreciating feedback

even when it is difficult to hear (46.2% agreed and 17.6% strongly agreed), that their

leader was calm under stress (51.5% agreed and 25% strongly agreed) and that their

leaders focused on successes rather than failures (51% agreed and 18.9% strongly

agreed). Actively listening by the leader was viewed positively with 52% agreeing or

strongly agreeing (23.6%). There was variation in agreement with conflict resolution by

the leader (17.1% disagreed or strongly disagreed), 24.9% were neutral regarding this

statement, and 42.3% agreed that their leader effectively resolved conflict. When asked

whether their leader actively mentors or coaches, 54.1% agreed or strongly agreed, 24.3%

were neutral, 14.7% disagreed and the remaining 5% strongly disagreed.

The remaining 3 domains were only moderately endorsed. Informal interactions

with others varied in frequency (N= 454; M = 3.59; SD = 2.15; α = .859) and response.

For some, interactions with other pharmacists were rare (22.2%) or occasional (17.2%)

but for others were frequent (23.3%) or almost always (33.8%) in the last typical month.

Interactions with physicians were occasional (22.4%) or frequent (19%), but rare (25.8%)

or never for others (4.5%). Interaction with nurses was generally infrequent (16.7%

never; 27.2% rarely), with 21.8% interacting often. Patient care related discussions with

pharmacy technicians also varied with 14.5% never discussing patients with technicians,

21.5% rarely, 15.7% occasionally, 17.7% frequently and 25.8% almost always. More

than 55% of pharmacists never discussed patients with other healthcare providers outside

of doctor or nurses, or with specialty pharmacists (83.3%), quality improvement staff

(87.8%), clinical specialty pharmacists (77.1%), or researchers (88.9%). Informal

discussions [hallway talk] were more prevalent with 17.7% stating they almost always

participated, 14.9 % frequently, 21% occasionally. A large number never did so (19.9%)

or rarely did so (21.9%). Most pharmacists did not or rarely participate in informal patient teaching sessions (22.8 and 25.5%).

The dimension of time ($N = 519$; $M = 3.27$; $SD = .734$; $\alpha = .819$) dealt with numerous aspects of patient care and knowledge acquisition. When asked how often they had time to do something extra for patients, 23.6% of pharmacists said rarely or never, while 49.1% indicated occasionally, 21.7% frequently, and 5.6% almost always. Discussing care plans with others ranged mainly from occasionally (35.9%) to almost always (11.5%). Having time to find information ('look something up') was rarely (9.2%), occasionally (38%), frequently (37.8% or almost always (15.1%) with no one stating that they never had time for this. Discussions about new clinical knowledge with others were rare (23.3%), occasional (43.4%), or frequent (23.7%) for most pharmacists.

The dimension of staff capacity ($N = 526$; $M = 2.97$; $SD = 1.13$; $\alpha = .865$) had 2 questions and having enough staff to get necessary work done had varied responses from pharmacists. Almost 42% agreed, 15% were neutral, 23.3% disagreed, and 11% strongly disagreed. When asked about whether they had enough staff to give the best possible care, 14.4% strongly disagreed, 34.4% disagreed, 16.2% were neutral, 26.8% agreed, and only 8.2% strongly agreed.

The next section outlines the results for the final research question.

Research Question 1B

Research question three asked, "Are there similarities or differences between the two main contexts in which pharmacists in Alberta work, hospital, and community, in perceptions of organizational contextual factors influencing pharmacists' perceived research knowledge translation to clinical practice?"

This study examined 569 Alberta pharmacists. The population studied included 323 community pharmacists (57.7%) and 237 hospital pharmacists (42.3%). Demographically, they were similar in that they had worked in their current role for similar periods of time (hospital - 11.2 years; community – 12.6 years) and had been working at their current location for a similar time period (hospital – 8.4 years; community 7.7 years). Hospital pharmacists included a slightly younger workforce than community but both had a majority of staff pharmacist positions (non-management, includes clinical pharmacists). Overall, these two components of the Alberta pharmacist population participating in this study were largely demographically similar.

When examining the dimensions of the ACT in terms of each type of pharmacist (community and hospital), there was a significant difference of the ACT scores in all dimensions except for two elements of the organizational slack area, space and time. Figure 9 below shows the comparison of means by hospital and community pharmacy categories.

Figure 8 – *Mean Comparison of ACT Scores by Hospital and Community Pharmacy*
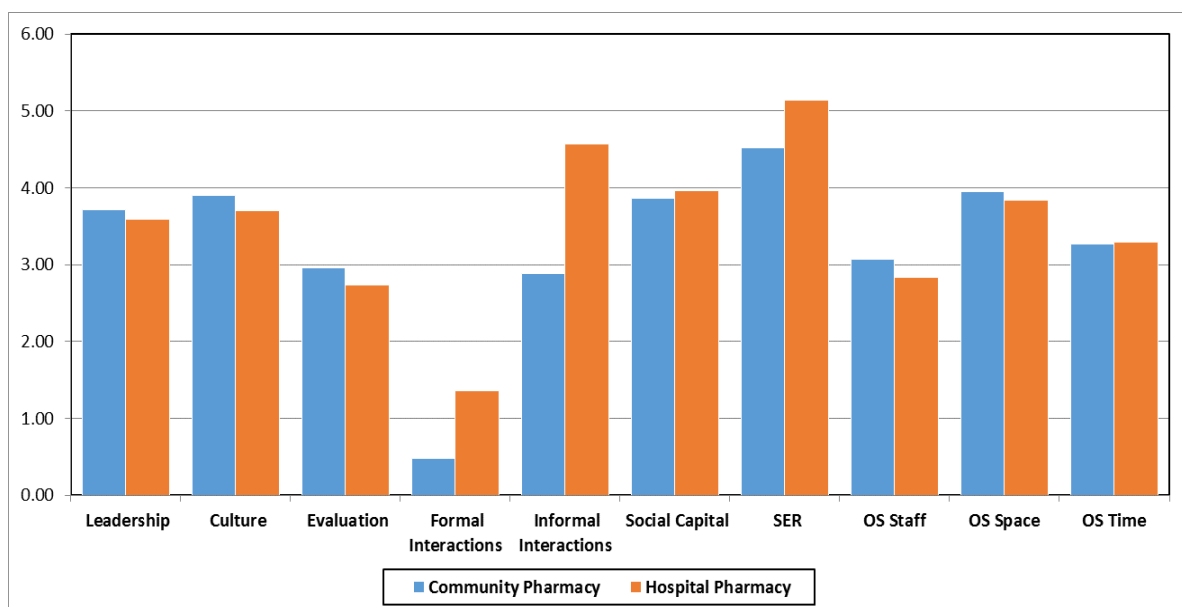
A Mann-Whitney U test showed a statistically significant difference (p <.05) between hospital and community pharmacists on all dimensions of the ACT except for space and time. Table 22 below shows a comparison of the dimensions of the ACT categorized by workplace (hospital or community pharmacy).

Table 22 – *Comparison of ACT Dimensions by Type of Pharmacy*

ACT Dimension	Workplace	N	Mean	SD	Test of Normality		p-value	
					Kolmogorov-Smirnov	Shapiro-Wilk	T-test	Mann-Whitney U
Leadership	Community	317	3.721	0.868	**<0.001**	**<0.001**	0.069	**0.026**
	Hospital	233	3.589	0.804				
Culture	Community	320	3.901	0.658	**<0.001**	**<0.001**	**<0.001**	**<0.002**
	Hospital	236	3.703	0.628				
Feedback (Evaluation)	Community	315	2.958	0.952	**<0.001**	**<0.001**	**0.005**	**0.004**
	Hospital	230	2.731	0.903				
Formal Interactions	Community	265	0.485	0.729	**<0.001**	**<0.001**	**<0.001**	**<0.001**
	Hospital	203	1.360	1.017				
Informal Interactions	Community	257	2.887	1.892	**0.007**	**<0.001**	**<0.001**	**<0.001**
	Hospital	193	4.575	2.115				
Social Capital	Community	291	3.865	0.666	**<0.001**	**<0.001**	0.101	**0.020**
	Hospital	223	3.957	0.605				
SER	Community	278	4.523	1.885	**<0.001**	**0.017**	**<0.001**	**0.001**
	Hospital	219	5.144	1.861				
OS Staff	Community	294	3.070	1.167	**<0.001**	**<0.001**	**0.018**	**0.021**
	Hospital	224	2.833	1.083				
OS Space	Community	230	3.946	0.558	**<0.001**	**<0.001**	0.111	0.111
	Hospital	110	3.842	0.571				
OS Time	Community	290	3.270	0.759	**<0.001**	**0.003**	0.699	0.581
	Hospital	222	3.295	0.696				

SD = Standard deviation

Multiple regression was used to examine the relationships between hospital and community pharmacists, their years worked at a location and their years in their current position and the 10 dimensions of the ACT. Preliminary analysis was completed using

Pearson product moment correlation (r) and Spearman's rank correlation. Pearson product moment correlation showed negative correlations with the ACT dimensions of time (years worked in role) and informal interactions (-.097), structural and electronic resources (-.116), space (-.129) and time (-.091). There were also negative correlations with years worked at location and structural and electronic resources (SER) (-.103).

The results of the Spearman's rank correlation (ρ) in relation to the 10 ACT dimensions showed negative correlations in years worked in role for the dimensions of SER (-.121) and space (-.141). Negative correlations were also indicated for years worked at location and SER

(-.103), staff (-.094), and space (-.117).

Multiple linear regression analysis was completed with the dimensions of the ACT and covariate parameters of employment status, type of practice (community or hospital), length in work role (years) and employment length at site (years). The results are listed in Appendix E.

Full-time employment status showed statistical significance ($p < .05$) for multiple ACT dimensions (leadership [$p = .034$], formal interactions [$p = .014$], informal interactions [$p = .013$], SER [$p = .017$]). Community pharmacy practice showed statistical significance on multiple dimensions of the ACT (culture [$p = .002$], evaluation [$p = .010$], formal interactions [$p = .000$], informal interactions [$p = .000$], SER [$p = .000$], staff [$p = .031$], and time [$p = .002$]). The R^2 results showed that the grouping of independent variables explained 21.5% of variability for formal interactions, and 17.8% variability for informal interactions, the dimensions with the highest R^2 values. All other dimensions had very low R^2 values. The following section summarizes the results.

Summary

The findings of this study indicated that the organizational factors, as outlined by the 10 dimensions of the ACT, that are not perceived by pharmacists in this study to be major barriers to KT within their organizations include social capital, SER, space, culture, leadership, and informal interactions. Areas perceived to be key barriers include formal interactions, staff, time and feedback. Factor analysis showed 14 factors explained 67.65% of the variance within the ACT. There were statistically significant differences between hospital and community pharmacists on all dimensions of the ACT except for space and time. A standard multiple regression was performed between the dimensions of the ACT as the dependent variables and employment status, length at work role and length at work site as independent variables. Results of the multiple regression showed that whether you were a full-time or community pharmacist could partially predict perceptions of formal and informal interactions in the ACT, however these results were not strong enough overall to conclude that the model was an accurate predictor. Qualitative results most strongly endorse the dimensions of time and staff as being perceived as the main barriers to the use of CE in patient care. Elements regarding the system (workflow, technology, etc.) mentioned in the open-ended questions were deemed to be important elements missing from the survey. This chapter described the data collected and the results of the data collection and analysis aligned with the research questions. The next chapter discusses how the resultant data answers the research questions.

CHAPTER 4 - DISCUSSION

The purpose of this study was to determine the organizational factors in pharmacists' workplaces that they perceive influence their ability to using continuing education in patient care. While the previous chapter in this dissertation outlined the quantitative and qualitative results of the data analysis, this chapter represents an analytical integration of the qualitative and quantitative results and how these results fit within the existing body of literature. Discussion of the results of this study begins below with a brief discussion of the demographics, followed by discussion according to each research question.

Demographics

This dissertation examined the perceptions of 569 Alberta pharmacists practising in both community and hospital settings within Alberta. There was a relatively equal proportion of each and this ensured representation from individuals in each setting. The majority of respondents were staff pharmacists from an urban setting and had worked in that role an average of 12 years. The Canadian Institute for Health Information (CIHI) 2011 report, *Pharmacists in Canada*, showed that the majority of pharmacists in Canada were staff pharmacists and that was also true for Alberta. The 2011 CIHI report also indicated that of all pharmacists in Canada, 59.7% were female and 40.2% were male, and in Alberta there were 63% female and 37% male. This study showed a greater percentage of females that likely reflects gender of the specific respondents, which had a higher percentage of females than the general population of pharmacists in Alberta. The 2011 CIHI report also noted that the majority of pharmacists in Alberta were from an urban setting and that was also found to be true in this study. The majority of Canadian

pharmacists in the 2011 CIHI report were noted to be between 30 and 59 years of age, and results were similar for Alberta in this report. Also in alignment with the 2011 CIHI report, the majority of pharmacists in Canada, Alberta, and responding to this survey, had a baccalaureate degree in pharmacy. It is of note that more than half of the respondents to the survey had some sort of additional training beyond their pharmacy degree (e.g. injection certification, prescribing authority, specialty disease educator, etc.). The 2011 CIHI report listed 20% of Alberta pharmacists as hospital and 80% as community pharmacy workers. The respondents to this survey varied from the CIHI demographic profile showing a more balanced proportion of hospital and community pharmacists. This result indicates that Alberta pharmacists employed in hospitals were more likely to complete the survey than those in community worksites.

Factor Analysis

The exploratory factor analysis results of this study were in alignment with Estabrooks et al. (2009) who determined there to be a 13-factor solution, accounting for 59.26% of the variance, when the ACT was used in nurses. Fourteen factors with Eigenvalues greater than 1 can explain 65.67% of the total variability in this instrument (see Table 8 for results). Like Estabrooks et al., the feedback dimension included all items in the subscale and accounted for the most variance at 17.67%. Responsible for the second largest amount of variance at 9.63% were six items of the subscale of informal interactions. Third were all the subscale items of leadership at 5.64%. Social capital, time and culture, were represented in the fourth, fifth and sixth factors and accounted for 4.97%, 4.38% and 4.04% of variance respectively. Part of the subscale (6 items) of informal interactions accounted for 3.58% of the variance of the seventh factor. The

items from the subscale included in this factor were interactions with various direct

healthcare providers. The eighth factor, made up of most of the subscale of formal

interactions, and was responsible for 2.88% of variance. The ninth to twelfth factors

ranged in variance percentages from 2.79 to 2.04%. They included structural and

electronic resources (Internet and non-Internet related components of the subscale), staff,

and space. The final factors, thirteen (formal interactions) and fourteen (SER) were

respectively responsible for 1.86% and 1.76% of variance.

Some items did not load as expected. The item on the frequency of the use of

space for patient counselling was included in the space dimension but loaded in the

informal interactions dimension. The item on inservices provided by your pharmacy, part

of the structural and electronic resources dimension of the ACT, loaded in informal

interactions as well. The factor loadings for informal interactions had the largest amount

of items from other dimensions loading with it. Similar to Estabrooks et al. (2009), I

found that informal interactions had multiple other factors, indicating increased

complexity in this dimension.

The PARIHS framework guided the development of the ACT (Estabrooks et al.,

2009) so the elements of context within that framework are important to delineate.

Together, the dimensions of the ACT according to the PARIHS framework that constitute

context: culture, leadership, evaluation, and structural and electronic resources, make up

34.10% of the variance in organizational context as measured by the ACT. This was

almost identical to Estabrooks et al.'s (2009) study of nurses at 34.36%.

Research Question 1

The first research question was, "To what extent do organizational contextual factors influence the perceived use and translation of knowledge garnered through continuing education by pharmacists in Alberta?" It was expected that the results found by Estabrooks et al. (2009) in nurses would be similar to pharmacists. This was mainly correct, except regarding the ACT dimension of structural and electronic resources where it was found that these were present to a much greater degree in pharmacists versus the nurse population in the Estabrooks et al. study. There were also some smaller differences in space and time dimensions that again were more strongly endorsed by pharmacists than nurses.

It was clear from the ACT survey and the qualitative questions that pharmacists participating in this research perceived that aspects of their workplace organization influenced their ability to translate their continuing education into clinical practice. What follows is a discussion of the individual ACT dimensions and how they answer the research question.

When compared to the Estabrooks et al. (2009) and Estabrooks et al. (2011b), the Cronbach's alpha results for this study were similar, but slightly larger, for most of the dimensions of the ACT except for space, which was substantively lower and informal interactions where it was much higher. This shows that for this sample of community and hospital pharmacists, the ACT survey is a reliable measure for most of the dimensions.

As shown in results chapter (see Table 12), the elements of leadership that were most endorsed on the ACT were calmness during stress, active listening, and response to concerns This finding was similar to Estabrooks et al. (2009) and Estabrooks et al.

(2011b) for the leadership dimension, despite being different populations. This could be considered further evidence of the stability of this key construct within the instrument. Perceptions of the majority of the pharmacists were neutral or approached agreeing that their leaders are able to do such things as listen, mentor, resolve conflicts, and calmly handle stressful situations. This suggested that organizational leaders were viewed in a slightly positive fashion. The qualitative data however, was contrary to these results as leadership was perceived to be the most significant barrier for many pharmacists. When asked what the most significant factors were that influenced their ability to use their knowledge in patient care, the theme of leadership appeared with the fourth most frequency. This may mean that pharmacists view their leaders as having specific positive leadership characteristics but overall they are not perceived as supportive. Some of this disparity between the ACT and qualitative responses of pharmacists could be due to varying interpretations of the leadership dimension. While pharmacists were instructed in the ACT questions to focus on the leadership behaviour of the person they primarily report to, a number of the qualitative responses appeared to address overall organizational leadership, rather than their direct supervisor. It appears that some pharmacists were more in agreement with the dimensions on the ACT regarding their direct supervisor and qualitatively expressed less endorsement for their organizational leadership. These results support Grol and Wensing's (2004) contention that the degree of support by management influences change in professional behaviour and Forbes et al. (2015) that leaders 'set the tone' for context . Fink, Thompson and Bonnes (2005) and Williamson, Almaskari, Lester and Maguire (2015) found that nurses believe that management support is important for implementation of evidence-based practice changes.

The dimension of organizational culture on the ACT (results in Table 13), indicate that the perceptions of the majority of pharmacists were that they viewed their organizational culture positively. They endorsed that their workplace culture allows them to work to provide what patients need and that they have control over their work. They were slightly less positive regarding the balance of best practice and production. The qualitative themes largely did not refer to workplace culture, however there were several comments regarding the perceived desire for not just workplace support for participation in CE but fiscal support for it as well. Comments such as, "Monetary support for professional development/training…" were evident. Another pharmacist noted that, "…I am encouraged by the colleagues I work with to share knowledge in my workplace and use it to improve patient care". Rosenthal, Houle, Eberhart and Tsuyuki (2015) specifically examined how culture relates to prescribing in Alberta pharmacists and noted that the influence of professional culture should be considered, along with personality traits of pharmacists, when considering the adoption of new practices. Grol and Wensing (2004) and Mitten, Adair, McKenzie, Patten & Waye-Perry (2007) purport that lack of a supportive culture is a barrier to knowledge translation or exchange but in this study it appears that pharmacists generally perceived that their workplace culture was not a significant barrier to using their CE in patient care.

The dimension of feedback (results in Table 14) showed results similar to Estabrooks et al. (2009) and substantively different than Estabrooks et al. (2011b). This could be the result of the 2009 study examining a similar professional population to pharmacists versus the 2011 study examining healthcare aides. Pharmacists perceived that using data or assessing performance to achieve best-practice was generally not

performed in their organizations. They did not endorse the existence of a formal process

for discussing data or using it to plan or evaluate performance. The strongest agreement

was that they received information about team or store performance. Some of the types of

data that pharmacists might use for evaluation (e.g. therapeutic drug levels) may not have

been readily accessible to all Alberta pharmacists at the time of the survey however, the

majority of hospital pharmacists likely had access to this kind of data via patient charts or

through a provincial software program called Netcare®. The use of data in patient care

was still relatively new for community pharmacists who prior to a change in scope of

practice, did not have access to patient-specific data. Other data such as blood glucose,

blood pressure, and pain control measures may not have been collected at all pharmacies.

Medication error data was likely the most prevalent data source available. Despite this, it

appears that the use of data to influence practice is not part of many organizations, nor

was it mentioned in the qualitative responses. From the responses to the ACT, it would

appear that feedback (evaluation) could potentially be a barrier to achieving best-practice

for Alberta pharmacists. These results also speak to the relevance of the PARIHS

framework that this study is based on. While this research focused on the pillar of context

within the PARIHS framework, one of the other main pillars influencing KT as noted by

Rycroft-Mallone (2004) is evidence. The use of this type of evidence in patient care is

relatively new for community pharmacists so it is not surprising that this dimension was

not strongly endorsed. A repeat study when pharmacists' practice change is better

developed might show a stronger endorsement.

In the dimension of formal interactions on the ACT (see Table 15) pharmacists

indicated that they rarely (1 to 5 times per month) had meetings or conferences about

patients or participated in continuing education outside of their workplace in the past year. This was a perceived to be a very significant barrier to pharmacists' KT as shown in the qualitative responses, as noted in the results section of this paper. Continuing education (also referred to as professional development) was the most frequently mentioned factor perceived to influence pharmacists' ability to use CE in patient care outside of the factors mentioned in the ACT. Clearly, CE is perceived to be extremely valuable to pharmacists in their KT efforts. One could speculate that the changing scope of practice could put added pressure on pharmacists to learn more skills related to direct patient care (such as administration of injections and more complex patient assessments) and because of that, pharmacists perceive there to be a deficit in CE.

The informal interactions dimension (results in Table 16) noted that in the last month prior to completing the survey, pharmacists rarely had informal discussions about patient care with people who specialize in research, quality improvement, or clinical specialists. They perceived that they more occasionally interacted with other healthcare professionals such as pharmacists, physicians, nurses, pharmacy technicians and had some occasional informal discussions or 'hallway talks'. When asked to outline any other factors not addressed in the ACT that would help them to use the knowledge gained through professional development in caring for patients, a prevalent theme was communication or networking. These qualitative comments supported Mitten et al.'s (2007) contention that lack of communication can be a barrier to KT. Overall, the results suggested that pharmacists perceive that a lack of informal interactions or communication is a barrier to using their knowledge in practice.

Results from the dimension of social capital (see Table 17) showed that pharmacists agreed they could share information with their pharmacy team and were comfortable doing so. They felt valued for participation in the team and felt they were taken seriously. As noted in the results section, the qualitative comments indicated that connecting via collaboration was important. While pharmacists did not perceive connections with others to be a significant barrier to using their knowledge, they indicated that it could be enhanced to further improve this dimension. This aligns with Pentland et al. (2011) who found sharing knowledge was key to KT.

Nurses in the Williamson et al. (2015) study felt that a lack of resources was an organizational barrier to evidence-based practice, as did Williams, Perillo and Brown (2015). In the ACT dimension of structural and electronic resources (see Table 18), pharmacists indicated that in the month prior to completing the survey they have frequently used resources such as a computer connected to the Internet and websites on the Internet. More occasionally they had used things like clinical practice guidelines, journals, and textbooks. They rarely or never used a library or notice boards. Related to this, the qualitative data outlined that technology was perceived to be a barrier to knowledge use in patient care that was missing from the ACT. It was described as an issue related to mainly to software and access to technology. Perceptions of pharmacists varied greatly in this dimension and it could be simply be the result of lack of access to specific resources listed in the ACT rather than these resources being necessary to ensure their knowledge is used in patient care. For example, pharmacists indicated that they frequently use computers but the qualitative comments show that the software could be improved to reduce this as a barrier to knowledge use. Overall, this was not perceived as

a significant barrier to knowledge utilization. This was an expected result as Alberta

pharmacies are required to maintain a predetermined selection of resources (a pharmacy

library) and it is likely that many pharmacists have access to the Internet at their

workplace.

The components of the ACT termed 'organizational slack' contain three

dimensions: staffing, space and time. Each dimension is discussed separately below.

The staffing dimension on the ACT had two statements for participants to rate

(see Table 19 for results). The statement, "we have enough staff to get the necessary

work done" showed an overall neutral response but the SD showed that responses ranged

from disagree to agree. The statement, "we have enough staff to deliver the best possible

care' indicated overall disagreement, with the SD showing a range from strongly disagree

to neutral. Staffing was a prevalent theme in the qualitative responses; at 17.8%

frequency, it was the second most common answer as to the most important reason why

pharmacists perceived that they could not use their CE in patient care. When it came to

staffing, there were numerous comments about the lack of coverage and overlap of

pharmacists during the workday. Mitton et al. (2008) noted frequent staff turnover to be

an organizational barrier to KT but that aspect of staffing was not mentioned by

pharmacists participating in this study. Pronk et al. (2002) also found that pharmacists

felt that workspace, time, and staffing needed to be adequate in order to adopt something

new in the workplace. In nurses, Williamson et al. (2015) found staffing to a barrier to

evidence use in practice. Duffy, Culp, Sand-Jecklin, Stroupe and Lucke-Wold (2016)

found that nurses linked time and staffing together as barriers to evidence-based practice.

Related to staffing, the lack of regulated pharmacy technicians was purported to be a

significant barrier not addressed in the ACT survey, particularly the use of them in regards to their full scope of practice. Changes in the scope of practice for Alberta pharmacists have resulted in an increased demand on their time to provide expanded direct patient care and for some, they may not have regulated pharmacy technicians to support them by taking over dispensing duties that technicians are now regulated to perform. Consequently, pharmacists have an increased workload. Qualitative comments related to workload were similar in nature to those related to staffing and these two topics were often referred to concurrently. The combined elements of the ACT staffing dimension responses and themes in the qualitative responses showed that staffing is perceived to be an important barrier to pharmacists using their knowledge in patient care.

Results in the space dimension (see Table 20) indicate that it is likely that some pharmacists had adequate space for one (or two) of the items but not for the others. Pharmacists' perceptions were either neutral or in agreement that they had adequate space to provide patient care and occasionally used a private space for that care. This does not align with what Pronk et al. (2002) found as the pharmacists they studied felt that adequate workspace was necessary for new initiatives. In this study however, the dimension of space was seldom even mentioned in the qualitative responses. Patient counselling areas are a licensure requirement for Alberta pharmacies so it was expected that it would be unlikely to be perceived as a barrier.

Responses in the time dimension (results in Table 21) indicate that on average, pharmacists perceived that they occasionally have time for extras such as additional patient care, discussion, or time to look something up. Based on the SD, some pharmacists rarely had time, while others frequently had time for these extras.

Interestingly, the lowest mean was related to having time to do something extra for patients and the highest mean was regarding having time to look something up. This seems to indicate that pharmacists are trying to ensure that they have correct information but are unable to routinely provide more than the basics for their patients. Time was the most frequently mentioned reason as to why pharmacists perceived they cannot use their CE in patient care. When discussing time, it was viewed from the perspective of the pharmacist not having enough time to implement changes as well as the patient not having enough time to discuss potential changes. This was revealed in the qualitative comments, as noted in the results section. Time as a barrier was also endorsed by nurses in several studies (Duffy et al., 2016; Williamson et al., 2015; Fink, Thompson & Bonnes, 2005). A small study of frontline disability workers found that time, workload and competing priorities were barriers to implementing evidenced-based clinical practice (Plath, 2013). They assert that even putting the time and energy into understanding new information or research was an obstacle. While pharmacists in this study did not elaborate on these specific factors, they were adamant that time was perceived to be a specific barrier, much like the disability workers studied by Plath. Similar conclusions were reached by Pronk, et al., (2002) who found that adopting something new into clinical pharmacy practice required, among other resources, time. Just as shown in many health care worker populations noted above, it was expected that time would be perceived as a barrier for Alberta pharmacists as well. The increasing demands on pharmacists' time due to the changes in scope of practice appear to hamper their ability to provide care beyond the basics and they perceive that they do not have sufficient time to incorporate new knowledge into their practice.

The qualitative data also revealed other themes that perhaps were indirectly related to the ACT or were just not specifically addressed in the ACT. The first area, which is really an overarching theme that supports the ACT, was change and specifically, resistance to change. Resistance to change was noted in a number of ways. Most often it was mentioned as resistance by other health professionals and in some cases, the patients themselves. Others noted their leadership was not open to change. A minority noted that changing themselves was difficult. Brady and Lewin (2007) and Fink, Thompson and Bonnes (2005) also found resistance to be a factor in change in the nursing profession. This viewpoint was in alignment with the results Rappolt and Tassone (2002) found in rehabilitation therapists noting that this professional group felt interprofessional barriers contributed to lack integration of new knowledge into their practices. Mitton et al. (2007) also found that a negative attitude toward change was a barrier to KT. It is likely that the timing of this study had some influence on pharmacists' perceptions toward change as the scope of practice change was new and changes such as prescribing authority were not highly endorsed at that time (ACP, 2014).

Another area quite frequently mentioned as being perceived as a significant barrier was confidence of pharmacists at assessing the knowledge and applying it as noted in the qualitative results. Rosenthal, Austin and Tsuyuki (2010) and Frankel and Austin (2013) support these results with their contention that pharmacists lack confidence in their ability to change their practice despite possessing a substantial skill set. As noted by Cornelissen, Mitton and Sheps (2011), healthcare practitioners may find it hard to provide care unless they feel confident in the knowledge used to provide it.

The theme of system inefficiencies was the final area that was perceived to not be addressed in the ACT but was repeatedly mentioned in the qualitative responses. System inefficiencies referred to things such as processes and mechanisms that would support knowledge use in the workplace. The comments regarding the lack of system efficiencies again were not surprising due to the changing scope of practice. As such, the 'way things were always done' was changing and with that would come changes to procedures, putting a greater emphasis on the role of regulated pharmacy technicians, as well as more focused, patient-centred care.

Overall, it appears that pharmacists perceive that there are a number of organizational contextual factors that influence their perceived use and translation of knowledge garnered through CE to clinical practice. Many of the qualitative comments and likely ACT responses as well, speak to the changes in the scope of pharmacy practice within Alberta and this survey likely focused pharmacists' attention on the factors within their workplace that could impact their practice change as it relates to CE. One pharmacist summed it up by saying,

"I have been a pharmacist for more than 20 years, and have worked in hospital, industry and community. I have always felt valued in what I do, but seem to be made to feel that if I don't embrace the full breadth of new activities, then I am somehow trying to hold our profession back".

This comment reflects the tone of the perceptions of many of the qualitative comments in this study. As the average length of time in their current role for the pharmacists in this study was 12 years, many of the study respondents may have begun

their practice with a much narrower scope and the broader scope of practice may be perceived to be a significant change.

It appears that there was a variety of perceptions as to exactly which organizational factors are perceived influence the use of CE in patient care and the extent to which each of them does so. Additionally, there is variation in practice settings with can further influence perceptions. It is likely that the timing of this study influenced the responses. Qualitative themes such as confidence, resistance, and regulated technicians may not have been as prevalent or perhaps even present, had the study been administered prior to these major changes in scope of practice for pharmacists. A follow-up study would be required to confirm this.

Greenhalgh, Howick and Maskrey (2014) argue that in order to use new knowledge in clinical practice, it requires clinical judgement or professional expertise, fit within the context, and consideration of individual patient characteristics. These factors represent both individual and contextual considerations. This study was limited to examining pharmacists' perceptions of organizational contextual factors, however some of the qualitative responses touched upon individual factors. This is an area where further exploration is needed. The next section will examine the second research question.

Research Question 1A

The second research question was, "What components of organizational context are perceived to have the greatest influence on pharmacists' perceived use of research knowledge garnered through continuing education to improve or at least influence clinical practice?" It was anticipated that the dimensions of staffing and time would likely

present as having the greatest influence on pharmacists' KT. This assumption was supported by the study results.

The perceptions of the participating pharmacists indicated that there was an overall lack of formal interactions; they were perceived to rarely occur in a typical month. As well, CE held outside of the workplace was also perceived to rarely occur.

There was also a perception that feedback (evaluation) was deficient. Overall, pharmacists reported that evaluation did not occur in their organization (see results in Table 14). This dimension included all the items in the feedback subscale and explained the largest amount of variation (17.67%) in the exploratory factor analysis, indicating that the ACT questions accurately measured this conceptual content in these respondents. Qualitative responses did not mention feedback so while it was perceived by the survey responses to be deficient, it did not appear to be an area of significant concern for respondents when they answered the qualitative questions.

Both time and staffing were perceived to be deficient in both the ACT and in the qualitative responses. Overall, pharmacists disagreed that they had enough time or staff to get the work done or to deliver the best possible care. One respondent commented that, "We are so short-staffed that it is difficult to look up evidence-based information at point-of-care" which speaks to the essence of knowledge translation. Humphries, Stafinski, Mumtaz and Menon (2014) also found that human resource constraints was one of several barriers to evidence use in healthcare. Other main barriers they noted included time, organizational culture and type of evidence. Schommer and Gaither (2014) examined pharmacists' views on their roles and also found that pharmacists do not provide patient care beyond dispensing as they are hindered by time pressures. This

supports the results of this study as nearly half of respondent pharmacists' perceived time to be the most significant barrier to knowledge translation of CE.

On the other end of the scale, the influencers perceived to be present in pharmacist's workplaces from the ACT questionnaire were structural and electronic resources, social capital, space, and culture. Interestingly, Brady and Lewin (2007) described key organizational barriers to the use of evidence in clinical practice as "…lack of access to technology, excessive time demands for clinical work, lack of peer or administrative support, and, most importantly, an organizational culture that does not support inquiry" (p. 56). Many of these same elements in this study were not necessarily perceived as barriers, rather could be seen as facilitators. It may be that perceptions of these dimensions or concepts may vary or that elements of each concept are less strongly endorsed by the pharmacists in this study. For example, structural and electronic resources were perceived as occasionally used in a typical month, but 7.7% of respondent pharmacists' perceived technology as not adequately addressed in this questionnaire while still being important to KT.

The qualitative data indicated that pharmacists perceived, in order of frequency, the main barriers to use of CE in patient care as time, staffing, resistance (from other healthcare professionals or patients), leadership (within their organizations), workload and confidence (to use their knowledge appropriately). Other factors outside of the ACT that were perceived to be helpful in translating their knowledge to patient care in order of frequency were tailored CE, system workflow, communication or networking (discussions with other healthcare professionals), technology (software, etc.), collaboration, and regulated pharmacy technicians. These results may reflect the nuances

that may have been missing from the questionnaire. For example, the ACT questions

about informal interactions seem to indicate that this dimension is occasionally present

however qualitative responses suggest that 6 to 10 times per month is not sufficient

interaction and collaboration. More "interaction with other healthcare professionals" and

"inter professional collaborative teams" were cited as necessary. A large SD in this

dimension of the ACT shows a wide variation in responses, supporting the differing

results from the qualitative responses.

Overall, the majority of the dimensions of the ACT were perceived to be present

to some extent. Most of the concepts were endorsed in the neutral to agree range of the

ACT scale or present occasionally (used 6 to 10 times in a typical month). While there

were occasional qualitative statements that supported specific elements of the dimensions

of the ACT as facilitators of KT, it cannot be definitively concluded that the availability

or lack of availability of the concepts that promote the use of CE in patient care were in

fact facilitators. It appears that perceptions seemed to vary regarding specific elements of

each dimension and much like Rappolt and Tassone (2010) found, participants were

much more easily able to articulate barriers to use of CE than facilitators. As noted

earlier in the discussion section, similar barriers to evidence-based practice (that is, the

use of research knowledge in patient care) are endorsed by many other healthcare

workers. Again, perceptions of these barriers may be linked to the timing of significant

practice change for pharmacists that was occurring in Alberta during this study. The next

section addresses the third research question.

Research Question 1B

The final research question was, "Were there similarities or differences between the two main contexts in which pharmacists in Alberta work, hospital and community, in perceptions of organizational contextual factors influencing pharmacists' perceived knowledge translation to clinical practice?" It was anticipated that there might be some areas of difference between the two groups but many differences were revealed, with only two dimensions of the ACT being similar.

There were 323 community pharmacists (57.7%) and 237 hospital pharmacists (42.3%) included in the study. Demographically, they were similar in that they had worked in their current role for similar periods of time and had been working at their current location for a similar time period. Hospital pharmacists included a slightly younger workforce than community but both had a majority of staff pharmacist positions. Overall, these two components of the Alberta pharmacist population participating in this study were largely demographically similar, other than their type of pharmacy practice.

When examining the dimensions of the ACT in terms of each type of pharmacist (community and hospital), there was a significant mean difference of the ACT scores in all dimensions except for two - space and time (see Table 22). Organizational structures within hospital and community pharmacy in Alberta differ and based on that, these results indicating many significant differences between the two groups was not entirely unexpected, however the extent of the differences was somewhat surprising. Hospital pharmacies tend to have a more complex organizational structure than community pharmacies. Organizational structure and processes were identified as major barriers to evidence use by Humphries, Stafinski, Mumtaz and Menin (2014) and Greenhalgh et al.

(2004) remarked on differences in hierarchical structures within various healthcare professions, reinforcing the need for pharmacist specific investigation. Alberta Health Services, a provincial organization and the main employer of hospital pharmacists in Alberta, has standardized policies and procedures that are at a provincial level. Because of this, hospital pharmacists may have less autonomy in their decision making regarding some areas of patient care than community pharmacists who may be able to more independently decide how patient care is provided.

With regards to the dimensions that were not significantly different between the two groups, the qualitative responses from community pharmacists indicated that they felt the most significant factor that inhibited them from applying knowledge gained from CE activities to patient care was time, followed by staffing. Hospital pharmacists also mentioned time as being an important factor; however this was closely followed by references to the 'system' in general. This description of the 'system' included elements of leadership, teamwork, resistance, and other healthcare providers within the hospital organizational system. Both groups agreed that the opportunity to only occasionally have time to do something extra for patients, talk about care plans, look something up or talk to someone about new knowledge was present in their workplaces. Community pharmacists also mentioned time in the context of extra time needed for billing issues, checking technical work, and the patient's lack of time for counselling. Hospital pharmacists spoke of needing time to contact physicians and nurses, and clarify medical orders.

The other area not significantly different between the two groups was space. It was not surprising that space was not a concern for either group as the Alberta College of

Pharmacists has standards for physical environments of pharmacies (ACP, 2012), which includes having specific space for patient care.

Differences between the responses of the two groups need to be examined individually. With regards to leadership, AHS is a more hierarchical organization, with multiple layers compared to community pharmacy. One hospital pharmacist specifically mentioned the hierarchy in the qualitative comments and implied that doctors and nurses were higher than pharmacists in that hierarchy and inferred that it was a barrier to KT. The ACT results indicated that leadership attributes such as calmness, mentoring, and conflict resolution were more present in a community setting. One hospital pharmacist claimed that both leadership and vision were lacking within Alberta Health Services. Hospital pharmacists also made more comments related to management not being supportive than the community pharmacist respondents. Some qualitative comments by pharmacists reflected individual characteristics of the person they reported to, while other qualitative comments focused more on leadership within the entire system, rather than specific personal attributes of their leader. Some of these differences could relate back to the different organizational structures. Community pharmacists may have a greater opportunity to interact with their leaders compared to hospital pharmacists who may be members of a much larger team and may be remote from their direct supervisor. According to Rycroft-Malone (2004), the context piece of the PARHIS framework includes levels of power and authority; these study results suggest that this may be a KT barrier that has varying degrees of influence in both organizational settings. As noted earlier, interpretation of the questions on leadership may also help explain the differences between the two groups of pharmacists.

Variation in community pharmacy settings, such as solo practice environments, could influence the presence of characteristics of the culture dimension compared to a hospital pharmacy setting that may have a larger complement of pharmacy staff. According to Rosenthal, Austin and Tsuyuki (2010) there has been little research examining pharmacy culture so these perceived differences may not be delineated elsewhere. Much of the extant research, such as that by Rosenthal, Breault, Austin and Tsuyki (2011) and Al Hamarneh, Rosenthal, McElnay and Tsuyuki (2011), focused specifically on the pharmacy culture aspect of patient-centred care rather than broadly examining organizational pharmacy culture. Qualitative comments regarding CE focused on opportunity and resources to attend CE events being scarce. One hospital pharmacist stated that, "Micromanagement and budgets (at the expense of compassion and pharmacy professionalism) is the culture." A community pharmacist noted that the greatest barrier to KT was corporate culture saying that there was, "A[n] incongruence between corporate interests which are to satisfy shareholders, and the interests of a professional which are clinical and patient-oriented purposes." The comments suggest a common frustration in the perceived importance of money over patient care. Chiarillo (2014) examined professional contingencies on pharmacists and contended that "…pharmacists provide a prime case examining how financial and medical pressures shape decision making because they act as both medical and fiscal gatekeepers – providing patient care while ensuring organizational profitability – working in distinct institutional and organizational environments." (p. 521). This struggle between medical and fiscal elements of the profession seems to be reflected in some Alberta pharmacists' perceptions of their organizational culture. Again, these comments may have been different based on the

timing of the survey. Economic changes within Alberta (for example, falling oil prices) and changes to reimbursement of pharmacy services began shortly prior to this survey, thus comments regarding finances may have been due to organizational changes in the fiscal support of pharmacy practice resulting from external fiscal pressures.

Feedback monitoring and evaluation processes were not strongly endorsed as being present by either group, which was somewhat unexpected as I had anticipated that hospital pharmacists would perceive feedback to be present. Hospital pharmacy practice is influenced by other organizational factors such as patient safety and quality improvement, both of which are evaluative processes. Perhaps this lack of endorsement from hospital pharmacists indicates that for the average pharmacist, evaluation is not generally a function of their position. It may be that it is a specialized area of practice or one performed by non-pharmacists. Feedback was not mentioned in the qualitative comments other than one community pharmacist noting that if there were more specific measurements to evaluate their work, then they could be more consistent in their clinical practice. Access to feedback data may have increased for community pharmacists since this questionnaire was completed due to increased Netcare® availability for all pharmacists within Alberta. For community pharmacists, the information that Netcare® provides is generally the equivalent of a hospital patient's chart in terms of clinical test results (e.g. lab values, etc.).

Differences in perceptions of formal interactions were not surprising as the ACT questions related to things such as team meetings and patient rounds which are well established components of patient care within hospitals. Community pharmacists

generally indicated that they never participated in these components of patient care in a typical month.

Informal interactions were perceived to be much more present in both organizational settings. Things such as conversations with other healthcare professionals and 'hallway' talk were endorsed more strongly by hospital pharmacists however this was not unexpected as hospital pharmacists may have greater access to a variety of other healthcare professionals compared to community pharmacists who may work in solo practices. One community pharmacist stated that a facilitator to KT would be, "…more interaction with other health care professionals involved in patient care." Rappolt and Tassone (2002) also found that professional isolation (e.g. a solo practice environment) was a disadvantage to new knowledge gathering and use.

Connections among people was perceived to be present by both groups; but it was a smaller difference than with other ACT dimensions. Hospital pharmacists perceived a slightly greater presence of such things as group sharing and discussion than community pharmacists but again, this was not unanticipated as larger hospitals often have multiple pharmacists present at once compared to community setting. Additionally, hospitals often have formal group communication (for example, patient care conferences) as part of routine patient care. Community pharmacists may simply not have the same opportunity for group exchanges regarding patient care. Almost 8% of all respondents felt that communication and networking were important to using knowledge in patient care. Mitton et al. (2007) also noted communication issues to be a barrier to KT.

Community pharmacists perceived a slightly reduced frequency of use of structural and electronic resources compared to hospital pharmacists. One community

pharmacist commented that, "My pharmacy has a room for confidentiality. However, no internet connection in that room." This may indicate that easy access to resources is perceived as a barrier that is more prevalent in community pharmacists. Additionally, hospital pharmacists likely have access to a greater variety of resources (for example, a provincial health information library) than community pharmacists and that may account for increased use of these resources.

Staffing was the final area that differed. Community pharmacists' perceptions were neutral whereas hospital pharmacists disagreed regarding having enough staff to get the necessary work done and provide the best possible care for patients. Interestingly, the qualitative comments were reversed with more community pharmacists mentioning staff constraints as the most significant factor inhibiting them from using their CE in clinical practice than hospital pharmacists. Perhaps hospital pharmacists felt that other dimensions such as time were the most major issue, outweighing that of staffing levels, and this influenced their qualitative responses. Or, they may have interpreted that because they don't have enough staff, it doesn't leave them enough time, so time may be most integral to patient care. It could also be the community and hospital pharmacists differed in their interpretation of what constitutes 'necessary' work versus 'best possible care'. In community pharmacy, 'necessary' work may mean dispensing a drug to the patient whereas for a hospital pharmacist, it may involve educating a patient about their medication as dispensing is most often the responsibility of technical staff. As noted previously in the discussion section, many other health care workers endorse staffing as a barrier.

Correlation analysis and multiple regression was conducted to examine the relationship between hospital and community pharmacists, years in work role, and years at work site and the 10 dimensions of the ACT (see results in Appendix E). Preliminary correlation analysis of years worked in role and at employment site showed significant negative correlations on several ACT dimensions. Community and hospital practice also showed significance by employment status on several ACT dimensions. Beta (ß) values were examined for each dimension of the ACT to show how strongly each predictor (independent) variable influences the criterion (dependent) variables. Leadership was not strongly influenced by type of practice but employment status showed significance with casual employment as the reference group. The results indicate a negative relationship between full-and part-time employment and the leadership dimension. R^2 was low at 2.1%. For culture, employment status was not significant but community pharmacy showed significance. With the feedback dimension, employment status did not show significance but community pharmacy practice was significant, indicating a positive influence on that dimension. The formal interactions dimension showed ß significance for full-time employment and community pharmacy practice. This indicates a strong negative influence between community pharmacy practice and the formal interactions dimension. This result seems to be aligned with the finding of a large difference in means of hospital and community practice on this dimension of the ACT. Along with an R^2 of 21.5%, it indicates that this part of the model may be a predictor of the results for community practice on this dimension. Beta results for informal interactions were significant for full-time employment and community practice. This showed a strong positive influence of full-time employment and a strong negative influence of community

practice on this dimension. R^2 was 17.8% showing that employment status and type of practice may be predictive with this model. The influence of type of practice was aligned with ACT results showing a significant difference in means for hospital and community practice on this dimension. Social capital had no variables showing significance. Structural and electronic resources showed significance for full-time employment and community pharmacy practice indicating positive influence of full-time employment and a negative influence of community practice compared to hospital practice. For the 'organizational slack' dimensions of staff, space, and time, space and time showed significance but only for the variable, type of practice. Length in work role and employment length at site appeared to have no influence on the 10 ACT dimensions. Overall, the multiple regression model produced R^2 results ranging from 1% to 21.5%. When looking at the R^2 results, along with the ß results, it suggests that aspects of this model, type of practice and type of employment, may have some very limited predictive value, particularly when examining the dimensions of formal and informal interactions in the ACT.

Guided by the research questions that were drawn from the study's theoretical framework of knowledge translation, organizational context, and change theory, the quantitative and qualitative results of pharmacists' perceptions of organizational contextual elements influencing the use of CE in patient care were integrated in this chapter and framed using the research questions. Overall, there were numerous similarities between pharmacists who participated in this survey. They perceived many elements of the ACT dimension to be present in their workplace, although the degree to which they were perceived to be present varied between both hospital and community

sectors. Qualitative data indicated that pharmacists' perceived time and staffing to be the most significant barriers to knowledge translation but also felt that improvements in professional development and general system inefficiencies would improve KT. The following chapter outlines study findings and limitations, implications for practice and areas for future research.

CHAPTER VI - CONCLUSION

The central assumption of this research was that an understanding of organizational context for community and hospital pharmacists is fundamental to the understanding factors that may be altered in order to facilitate more effective use of continuing education in patient care. This group of practitioners has not been a focus of substantive research of this kind in the past and there is little evidence to suggest that research completed within other healthcare professional groups can easily be translated to pharmacists. Organizational contexts in which these professionals work is usually different than other health care professionals and many practitioners are isolated and remote from their pharmacist peers and may not have the same opportunities for informal knowledge translation in direct patient care.

The purposes of this study were twofold: 1) to determine what organizational components and the extent to which Alberta pharmacists' perceptions of organizational factors influence their use and translation of continuing education into patient care; and 2) to determine the similarities and differences between Alberta hospital and community pharmacists' perceptions of the organizational contextual factors. The purposes and corresponding research questions were answered through a review of the relevant literature, the administration of the Alberta Context Tool survey with additional qualitative questions, and analysis of data collected from 569 community and hospital pharmacists in Alberta. This study provides a foundation to understanding of organizational context and Alberta pharmacists' perceptions of its influence on utilization of professional development education in patient care. This chapter reviews the conclusions, the study's limitations and delimitations, generalizability, and the implications for future practice and research.

Findings

The results of this study showed that many of the dimensions of the ACT were perceived by Alberta pharmacists, but varied in the degree to which they were perceived to be present and important. There were significant differences between hospital and community pharmacists on the majority of the dimensions of the ACT. Overall, qualitative data supported these results but also suggested that there were other areas of perceived significance not included in the ACT questions such as continuing education and system inefficiencies that were perceived as important to pharmacists' KT. A factor analysis of the ACT showed similar results to other published results and endorsed its effectiveness in measuring most of the dimensions of the ACT. This indicates that it may be useful as a future research tool in the pharmacist population. Multiple regression showed that type of practice and employment status appeared to have some influence on the informal and formal interactions dimensions of the ACT.

Limitations and Delimitations

The limitations in a study are those factors that are not under control of the researcher, but that may have possible effects on the study's outcomes (Mauch & Park, 2003). The self-selection bias of subjects willing to complete the survey is a limitation. All of the members of the Alberta College of Pharmacists consenting to contact for the purpose of research, pharmacists who are members of the Alberta Pharmacists' Association and pharmacists employed by Alberta Health Services were invited to participate, but only a subset completed the survey. Respondents had to provide identifying information for the purpose of the incentive draw entry therefore, reluctance to disclose their identifying information may also have impacted participation rates. As in

all studies that contain a qualitative component, the bias, interest, and experience of the researcher, is also a limitation as it both informs and influences the coding and interpretation of qualitative data.

Delimitation refers to the boundaries that are placed on the scope of the study by the researcher (Mauch & Park, 2003). This study was confined to Alberta pharmacists with access to a computer with Internet capabilities, who were members of the Alberta College of Pharmacists and/or the Alberta Pharmacists' Association or were hospital pharmacists employed by Alberta Health Services. This study was also confined to practising community or hospital pharmacists only as these two areas of practice comprise the majority of clinical practice settings for Alberta pharmacists. This study did not empirically address whether or not learning occurred or specifically compared the various types of CE delivery systems, as previous literature has examined these issues (Johnson et al., 2000; Scarlett-Ferguson, 2004; Hannum, 2009). This study did not include the observation of KT in clinical practice.

This study was an attempted census. All members of the population had the opportunity to participate in the study, however many pharmacists chose not to participate. It may be that pharmacists did not have the time to complete the study or did not feel that the subject matter was relevant to them. As well, this cross-sectional study examined community and hospital pharmacists in Alberta during a time period when pharmacy practice in Alberta was changing in scope; however a longitudinal study may have allowed an examination of potential changes in pharmacists' perceptions over time. Pharmacists may have responded in ways they felt the researcher expected and there was not an opportunity to explore their perceptions more in depth in order to gain a deeper

understanding of the context of a very complex system. This study involved a self-selected sample of pharmacists, thus the results are not generalizable. On a theoretical level, the findings could be used to support the possibility that the environmental context of practice may play an important role in the use of CE in knowledge translation. Specific findings may be useful to the organizations at which participating pharmacists were employed.

Implications for further research

Areas for future research include a re-survey of Alberta hospital and community pharmacists once the changes in scope of practice for pharmacists are better established. During the time of the survey, pharmacist reimbursement for prescribing was in place for less than a year so fiscal incentives for this component of expanded practice were not well established. As well, changes to support staff (pharmacy technician) regulations were underway and demand for regulated technical support staff exceeded supply. Both of these factors may have contributed to pharmacists' qualitative perceptions expressed in the study. Additionally, changes and opportunities afforded by professional development education may alter how pharmacists think about KT and further exploration of that would be worthwhile. The value of further qualitative and especially ethnographic studies that address the same or similar research questions but provide an emic focus would complement the results of this research. Additionally, it would be interesting to be able to compare the results of pharmacists' responses to the ACT with a wider variety of allied healthcare professionals' responses to the ACT to determine similarities and differences between a broader population range, both within a hospital setting and in a community setting. Finally, context alone does not fully explain the best methods to fully integrate

CE into patient care so further research into other elements of the PARIHS framework would complement this study.

Other implications

According to Lang and Johnson (2012), KT should include an "appreciation of what may constitute unique barriers to evidence implementation and from that, selecting and developing strategies to address these" (p. 184). Despite the limited generalizability of the findings, some recommendations for practice, continuing education, and pre-service learning can be proposed based on these Alberta results. The focus of the ACT was to examine potentially modifiable barriers to KT (Estabrooks et al., 2009). Because of that, suggestions for implication for practice change and pre-service and continuing education contain potential strategies to assist with change. Pharmacists perceive that time and staffing are barriers to KT. While the magnitude of the barrier differs amongst hospital and community sectors, it is clear that increased resources such as staffing and time are necessary for pharmacists to provide what they perceive to be the best possible care for their patients. Findings suggest that pharmacists feel they provide good basic care but are unable to use their knowledge to provide enhanced care. The following are some potential strategies to assist with the perceived barriers related to time, staffing, leadership, and CE.

Implications for practice

- Examine work processes to potentially eliminate time-consuming duties.
- Maximize the use of technology for pharmacists' work processes, potentially creating more time for KT.

- Maximize the scope of practice of technical staff to support pharmacists and potentially increase time for KT.

- Employers could provide paid time away from work specifically for CE.

- Employers could consider providing 'overlap' time for pharmacists working shifts in order to allow potential collaboration and discussion regarding patient care.

- Organizations need to provide strong leadership that supports pharmacists during this time of practice change to enable pharmacists to maximize their skills.

Implications for continuing education

- Provide CE opportunities that are available 'on demand' when pharmacists have time available to participate.

- CE providers could look for ways to target specialty areas of pharmacists' practice that are of interest.

- CE providers should use techniques to maximize accessibility for rural and remote pharmacists.

- Provide pharmacists with accurate, relevant, research-based CE that negates the need for extra time searching for and appraising research in a topic area.

Implications for pre-service learning

- Emphasize the importance of life-long learning and the application of research in practice

- Incorporate interdisciplinary aspects to the curriculum to help remove perceived interprofessional barriers

Conclusion

This study provides the first known exploration of Alberta community and hospital pharmacists' perceptions of the use of CE in patient care and the perceived barriers and enhancers within their workplace context. The results of this study will be shared more broadly via communication with Alberta pharmacy organizations, publications, and presentations. Knowledge translation, "the effective and timely incorporation of evidence-based information into the practices of health professionals in such a way as to effect optimal health care outcomes and maximize the potential of the health system" as defined by Nisnik (2004) is key to improving both the system and direct patient care. While there are other concepts involved in knowledge translation, an understanding of pharmacists' workplace context can offer applied solutions that may ultimately improve the healthcare of Albertans.

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Appendix A

Qualitative Questions

1. Please describe in your own words the most significant factor(s) that inhibit(s) you from applying knowledge gained in professional development activities in your workplace.

2. Please outline any other factors not addressed in this questionnaire that would help you to use the knowledge gained through continuing education in caring for your patients.

Appendix B

Consent for Participation in this Research Study (posted on first page of online survey)

I appreciate you taking the time and thank you for participating in this study focused on exploring your perceptions of whether or not you use the information you have gained via continuing education for patient care. A random draw for two $100.00 VISA gift cards will be awarded to 2 participants who complete this online questionnaire and voluntarily agree to enter the draw.

I understand I will be completing an online questionnaire consisting of 70 questions that should take approximately 10 minutes to complete.

Title of study: Professional Development Education use by Pharmacists: Exploring Organizational Context in Research Knowledge Translation to Practice.

Purpose of this study: The purpose of this study is to gain a greater understanding of the key workplace contextual factors involved in translating professional development education to influence professional practice.

Risks and benefits: There are no known or anticipated risks if you participate in this study, no known benefits, no deception, and participation or non-participation will have no effect on your employment. You have the option of voluntary participation in a random draw s for the two $100.00 gift cards.

Right to refuse: Participation in this study is voluntary, you can withdraw from the questionnaire at any time.. You do not have to answer any questions that you do not want to answer; you can skip questions or exit the survey before clicking the "submit" button.

As the questionnaire is anonymous, once you click the "submit" button, your answers become part of the data and cannot be extracted.

Privacy, confidentiality, and anonymity: Participation in this research study is anonymous, confidential, and voluntary. If you voluntarily agree to the collection of your personal email address for purposes of the draw, your identifiable information (email address) is a separate question that links to an independent data collection page that is not linked to your survey responses. This data will be deleted immediately after the draw is made. To preserve you anonymity only summary results from this study will be included. All electronic data collected for this study is confidential and the researcher will keep it on a password protected USB memory device in a locked cabinet within a secure home office for a period of 7 years. The anonymized data from the questionnaire will be transferred to and archived by the survey tool owner, Dr. Carole Estabrooks, professor, University of Alberta and may be used in aggregate form to further assess the psychometric properties of the survey tool. No identifiable information will be transferred.

Results of the study: Upon request via email, participants will be provided a summary of the research results and the full report will be available online via Athabasca University Library's Dissertation and Theses site.

Contact information: If you have any questions or require clarification or addition information please contact either me at scarlettfergusonh@gmail.com or Dr. Terry Anderson, my Thesis Supervisor, at Athabasca University (terrya@athabascau.ca). This study has been reviewed by the Athabasca University Research Ethics Board on INSERT DATE. Should you have any comments or concerns regarding your treatment as a

participant in this study, please contact the Office of Research Ethics at 780-675-6718 or by e-mail to rebsec@athabascau.ca.

I have read and understand the information contained herein. I voluntarily agree to participate in this research study and understand that **after completing the online questionnaire and clicking the "Submit" button, I am giving my consent to participate in this study.**

If you do not wish to be contacted regarding this research study again, please reply to this email stating "no further contact".

Appendix C

Advertisement for Participation in the Research Study in Alberta Pharmacists'

Association e-newsletter

You are invited to participate in a research study. The purpose of this study is to gain a

greater understanding of the key workplace contextual factors involved in translating

professional development education to influence professional practice. The results of this

research may provide insights into what aspects of your workplace could be modified to

allow you greater use of research to improve patient care. The voluntary, anonymous,

online questionnaire takes about 10 minutes to complete. After completing the

questionnaire, you may also choose to enter a draw for one of two $100 VISA gift cards.

You can learn more about this research study and how you can participate here

[SURVEY LINK].

Appendix D

Athabasca University Research Ethics Board

DATE: January 20, 2014

TO: Ms. Heather Scarlett-Ferguson

COPY: Dr. Terry Anderson (Research Supervisor)
                        Alice Tieulié, Acting Secretary, Athabasca University Research
                        Ethics Board
                        Dr. Vive Kumar, Chair, Athabasca University Research Ethics
          Board

FROM: Dr. Marguerite Koole, Chair, CDE Research Ethics Review
Committee

SUBJECT: **Ethics Proposal #CDE-13-13: "Professional Development Education
               use by Pharmacists: Exploring Organizational Context in Research
               Knowledge Translation to Practice"**

Thank you for providing the revised application requested by the Centre for Distance
Education (CDE) Research Ethics Review Committee.

I am pleased to advise that this project has now been awarded **APPROVAL TO
PROCEED**. **You may begin your research immediately.**

This approval of your application will be reported to the Athabasca University Research
Ethics Board (REB) at their next monthly meeting. The REB retains the right to request
further information, or to revoke the interim approval, at any time.

**The approval for the study "as presented" is valid for a period of one year from the
date of this memo.** If required, an extension must be sought in writing prior to the
expiry of the existing approval. **A Final Report is to be submitted when the research
project is completed.** The reporting form can be found online at
http://www.athabascau.ca/research/ethics/ .

As implementation of the proposal progresses, if you need to make any significant
changes or modifications, please forward this information immediately to the CDE
Research Ethics Review Committee via rebsec@athabascau.ca for further review.

If you have any questions, please do not hesitate to contact the Committee Chair (above),
or the Research Ethics Administrator at rebsec@athabascau.ca .

Sincerely,
Dr. Marguerite Koole
Centre for Distance Education

Appendix E

Multiple Linear Regression Analysis between ACT Dimensions and Covariates

Outcome	Parameter	Beta	SE	t	Sig.	95% CI Lower	95% CI Upper	R^2
ACT Leadership	Intercept	3.981	.173	23.033	.000	3.641	4.320	0.021
	Employment status – Full time[1]	-.350	.165	-2.121	.034	-.675	-.026	
	Employment status – Part time	-.425	.174	-2.438	.015	-.767	-.083	
	Type of practice – Community Pharmacy[2]	.101	.074	1.369	.172	-.044	.247	
	Length at work role (years)	.004	.004	1.017	.309	-.004	.012	
	Employment length at site (years)	-.010	.006	-1.663	.097	-.021	.002	
ACT Culture	Intercept	3.605	.135	26.715	.000	3.339	3.870	0.032
	Employment status – Full time	.158	.129	1.227	.220	-.095	.412	
	Employment status – Part time	.083	.136	.609	.543	-.184	.350	
	Type of practice – Community Pharmacy	.179	.057	3.143	.002	.067	.290	
	Length at work role (years)	.003	.003	1.042	.298	-.003	.010	
	Employment length at site (years)	-.008	.005	-1.724	.085	-.017	.001	
ACT Feedback (Evaluation)	Intercept	2.796	.195	14.324	.000	2.413	3.180	0.026
	Employment status – Full time	.035	.186	.188	.851	-.331	.401	

[1] Reference group=Casual
[2] Reference group=Hospital Pharmacy

Outcome	Parameter	Beta	SE	t	Sig.	95% CI		R²
						Lower	Upper	
	Employment status – Part time	-.174	.196	-.888	.375	-.560	.211	
	Type of practice – Community Pharmacy	.213	.083	2.572	**.010**	.050	.376	
	Length at work role (years)	-.002	.005	-.526	.599	-.012	.007	
	Employment length at site (years)	.000	.007	-.066	.948	-.013	.013	
ACT Formal Interactions	Intercept	.921	.200	4.610	.000	.528	1.314	0.215
	Employment status – Full time	.472	.192	2.461	**.014**	.095	.848	
	Employment status – Part time	.358	.200	1.790	.074	-.035	.752	
	Type of practice – Community Pharmacy	-.889	.083	-10.727	**.000**	-1.052	-.726	
	Length at work role (years)	.002	.005	.348	.728	-.007	.011	
	Employment length at site (years)	.001	.007	.090	.928	-.012	.014	
ACT Informal Interactions	Intercept	3.880	.465	8.342	.000	2.966	4.794	0.178
	Employment status – Full time	1.104	.444	2.485	**.013**	.231	1.978	
	Employment status – Part time	.552	.467	1.181	.238	-.367	1.470	
	Type of practice – Community Pharmacy	-1.756	.194	-9.071	**.000**	-2.136	-1.376	
	Length at work role (years)	.001	.011	.073	.942	-.020	.022	
	Employment length at site (years)	-.021	.015	-1.397	.163	-.052	.009	

Outcome	Parameter	Beta	SE	t	Sig.	95% CI		R²
						Lower	Upper	
ACT Social Capital (Connections Among People)	Intercept	3.850	.142	27.100	.000	3.571	4.129	0.011
	Employment status – Full time	.114	.136	.842	.400	-.153	.381	
	Employment status – Part time	.013	.143	.093	.926	-.267	.294	
	Type of practice – Community Pharmacy	-.099	.059	-1.695	.091	-.214	.016	
	Length at work role (years)	.001	.003	.208	.836	-.006	.007	
	Employment length at site (years)	.003	.005	.580	.562	-.007	.012	
ACT SER	Intercept	4.607	.410	11.228	.000	3.801	5.413	0.060
	Employment status – Full time	.937	.392	2.388	**.017**	.166	1.708	
	Employment status – Part time	.471	.412	1.143	.254	-.339	1.281	
	Type of practice – Community Pharmacy	-.689	.171	-4.018	**.000**	-1.026	-.352	
	Length at work role (years)	-.002	.010	-.187	.852	-.022	.018	
	Employment length at site (years)	-.022	.014	-1.620	.106	-.049	.005	
ACT Staff	Intercept	3.113	.251	12.417	.000	2.621	3.606	0.016
	Employment status – Full time	-.205	.240	-.855	.393	-.676	.266	
	Employment status – Part time	-.201	.252	-.800	.424	-.696	.293	
	Type of practice – Community Pharmacy	.223	.103	2.167	**.031**	.021	.426	
	Length at work	-.002	.006	-.279	.780	-.013	.010	

Outcome	Parameter	Beta	SE	t	Sig.	95% CI		R²
						Lower	Upper	
	role (years)							
	Employment length at site (years)	-.008	.008	-.948	.343	-.024	.008	
ACT Space	Intercept	3.758	.150	25.131	.000	3.463	4.052	0.030
	Employment status – Full time	.165	.138	1.192	.234	-.107	.437	
	Employment status – Part time	.149	.147	1.011	.313	-.141	.439	
	Type of practice – Community Pharmacy	.121	.066	1.831	.068	-.009	.252	
	Length at work role (years)	-.006	.003	-1.769	.078	-.013	.001	
	Employment length at site (years)	-.001	.006	-.163	.871	-.012	.010	
ACT Time	Intercept	3.605	.135	26.715	.000	3.339	3.870	0.012
	Employment status – Full time	.158	.129	1.227	.220	-.095	.412	
	Employment status – Part time	.083	.136	.609	.543	-.184	.350	
	Type of practice – Community Pharmacy	.179	.057	3.143	**.002**	.067	.290	
	Length at work role (years)	.003	.003	1.042	.298	-.003	.010	
	Employment length at site (years)	-.008	.005	-1.724	.085	-.017	.001	

[1] Reference group=Casual
[2] Reference group=Hospital Pharmacy
 (p<.05)

Appendix F

Alberta Context Tool (ACT): Full Use Permission Agreement

Full Name: Heather Scarlett-Ferguson
Full Mailing Address

_____

Telephone _____   Fax

_____
Email
Address_____

_____

The following constitutes an agreement between Heather Scarlett-
Ferguson_____

_____
                                                                                    (Name, please print)
Of

_____

_____
                        (Name and mailing address of organization) hereinafter called Researcher
And
the Knowledge Utilization Studies Program of the University of Alberta, Edmonton,
AB, Canada hereinafter called KUSP

Conditions of use are located at the end of this document.

Permission is granted for the project described in this agreement only, as outlined
below:

Name of research project or thesis:
_____

_____

_____
Anticipated start and completion date of project:
_____

Projected size of research sample:
_____

Number of surveys to be administered:
_____

The undersigned agrees to abide by the terms of this agreement:

Signatures

Researcher   Date

Heather Scarlett-Ferguson_____

        _____

Student's Supervisor (if applicable)   Date

Dr. Terry Anderson_____   -
_____

KUSP   Date

Dr. Carole Estabrooks_____   -
_____

Researcher   Date

_____   -
_____

ACT survey to be sent:

Please indicate the survey version that you require:
        ☐ Acute Care (Adults)
        ☐ Acute Care (Pediatrics)
        ☐ Long-Term Care
        ☐ Home Care

Please indicate the survey form that you require:
        ☐ Nurses (RNs/LPNs)
        ☐ Physicians
        ☐ Managers
        ☐ Practice Specialists (e.g., Clinical Educator, Quality Improvement
Specialist)
        ☐ Allied Health Care Provider

Alberta Context Tool (ACT): Conditions of Use
The Knowledge Utilization Studies Program (KUSP) will provide the researcher with a copy of the Alberta Context Tool (ACT). The researcher is responsible for the reproduction of ACT, the distribution of the survey, and the collection of data.

The researcher will retain full rights to the data for publication. On completion of the study the researcher will forward a digital copy of the ACT and demographic data from their study. These data will be used to assess the psychometric properties of the ACT and to build the ACT's normative record on an ongoing basis. KUSP will retain rights to use these data within analyses of its larger ACT data set but will not publish analyses based on these data alone.

The data should be received within one year of project completion and submitted as follows:
   in Excel format
   with documentation (i.e., codebook)
   by secure courier on a DVD (DVD-R format) **OR** uploaded to the KUSP secure data site (by arrangement with the KUSP Data Manager)

The researcher will not distribute ACT to any other party. The text will not be copied in any publication, research reports, or theses arising from the research.

The researcher will not adapt or modify the ACT without permission.
Permission to use ACT is granted solely for the project described in the *Full Use Permission Agreement* between KUSP and the researcher and is not transferrable to other researchers or projects.

If the ACT will be distributed in a language other than English, professional translation and back translation from English to the second language is required. Consultation with Dr. Estabrooks during and following completion of the back translation must precede use of the tool. All costs associated with translation and back translation are the responsibility of the requesting researcher. The translated version of ACT will become the property of Dr Estabrooks who will provide it, where requested, to other researchers under the same conditions as have been outlined above.

All copies of ACT must include the following text: