Preparing Pharmacists for Practice Change – The RETAE Framework

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Department of Pharmaceutical Sciences
University of Toronto

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Preparing Pharmacists for an Expanded Scope of Practice:

The RETAE Framework

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Abstract

The profession of pharmacy in Canada is in a state of rapid evolution. Various jurisdictions, including Ontario, are preparing for an expanded scope of practice for pharmacists that will involve a paradigm shift from supplying drug products to providing clinical services. The objective of this thesis is to explore and evaluate models of Continuing Education (CE), Continuing Professional Development (CPD) and Knowledge Translation (KT) for their impact on pharmacists’ knowledge, confidence and skills in their expanded roles in patient care.

The thesis uses as learning examples, two studies of pharmacy education that have utilized some of the principles of CPD and KT that are described in the literature. The lessons learned from the literature reviews and the two studies described in this thesis have been used to inform the RETAE (Reflection, Education, Transformation, Application and Evaluation) model which is proposed as a framework for preparing pharmacists for an expanded scope of practice.

“Reflection” identifies evidence-care gaps in practice and learning needs. “Education” is foundational in building knowledge, skills and confidence to promote change. “Transformation” is necessary both personally and professionally. It challenges pharmacists to self-reflect, develop
new perspectives and explore new roles. “Application” represents implementation of change in the context of the social and political environment of the healthcare system. Finally, “Evaluation” encourages assessment of the impact of educational strategies on pharmacist satisfaction, application to practice and healthcare outcomes. The RETAE model can be used in the design and evaluation of continuing professional development programs for practicing pharmacists. This model has application not only in pharmacy but also in other professions preparing for micro, meso and macro-level change, that is, change at the level of the practitioner, the practice environment and the profession.
Acknowledgments

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Chapter 1 - Introduction

This thesis is focused on three papers and is organized into an introduction, interconnecting chapters (Chapters 2, 4, 6), the 3 papers (Chapters 3, 5, 7), and is summarized into a concluding chapter (Chapter 8). The work summarized in this thesis utilizes models of continuing education (CE), continuing professional development (CPD) and knowledge translation (KT) to explore changes in practice using the example of the profession of pharmacy. This work was inspired by an interest in the continuing competence of pharmacists in light of the expanded scope of practice for pharmacists across Canada. The evidence-care gaps in healthcare and the need for improved patient outcomes through use of available evidence inspired the exploration of the field of KT. The clinical practice area used to describe CPD for pharmacists and KT centers on the management of thrombosis.

1 Introduction

1.1 Overview of Thesis

The general focus of this thesis is the exploration of models of learning to help pharmacists prepare for an expanded scope of practice. The objective of this work is to explore and evaluate models of CE, CPD and KT for their impact on pharmacists’ knowledge, confidence and skills in their expanded roles in patient care. The thesis focuses on the individual pharmacist and their experiences with CPD as well as their involvement in KT as means of exploring how these models can be used to lead to changes in practice and also to changes in patient and healthcare outcomes.

The thesis uses as learning examples, two studies of pharmacy education that have utilized some of the principles of CPD and KT that are described in the literature. The lessons learned from
the literature reviews and the two studies described in this thesis were used to develop the RETAE (Reflection, Education, Transformation, Application and Evaluation) model which is proposed as a framework for preparing pharmacists for an expanded scope of practice. The RETAE model is proposed as a tool for educators working in the area of continuing professional development for pharmacists. Finally, suggestions are made for areas of future research.

1.2 Organization of the thesis

Chapter 2 provides background information on continuing competence in pharmacy and the educational principles that can be used to inform continuing education (CE) and continuing professional development (CPD). The chapter focuses on understanding how adults learn and explores how an appreciation for adult learning theory and the motivation to learn can inform the design of CE. The chapter then evolves into an exploration of CPD to understand the process by which professionals continue to maintain competence. Learning theories including constructivism and transformative learning are explored to better understand how CPD can foster practice change. The chapter concludes with a description of a framework for course design that was used to design and evaluate the CPD course in Thrombosis Management for Pharmacists described in Chapter 3, the first paper of this thesis.

Chapter 3 presents the first learning example, a study of the development and assessment of a CPD course in Thrombosis Management for Pharmacists. The chapter describes the development of this course through the principles of adult learning and transformative learning described in Chapter 2. The CPD course ran over a 3 day period and involved didactic sessions incorporating active learning, case-based discussions and the opportunity to network with colleagues. The course was evaluated using a course feedback form, pre- and post-session quizzes and semi-structured interviews. The study demonstrated that this course improved
pharmacist knowledge and skills and increased their confidence and ability to incorporate what they learned into practice. Pharmacists valued the case-based discussions and the practice tips shared by the expert teachers and facilitators. They also highly valued the opportunity to network with others and learn from experts and colleagues. This paper will be submitted for publication to a journal that focuses on continuing professional development, such as “The Journal of Continuing Education in the Health Professions”.

With an understanding of how pharmacists acquired knowledge, the focus of the thesis then shifts to the exploration of Knowledge Translation (KT). Chapter 4 begins with a concise review of the importance of KT in healthcare and a brief comparison of KT to CPD. The chapter then focuses on a KT framework, the Knowledge-to-Action (KTA) cycle, as an example of a framework that can be used in practice to apply the theories of KT to a specific evidence-care gap. The components of the KTA cycle are reviewed with the example of Venous Thromboembolism (VTE) prophylaxis to set the stage for the exploration of KT and thromboprophylaxis.

Chapter 5 of the thesis presents the second learning example and second paper of the thesis, a KT study in thromboprophylaxis, the Toronto ThromboProphylaxis Patient Safety (TOPPS) study. This study used a cluster randomized trial design to determine if a multi-component KT intervention could increase the use of appropriate thromboprophylaxis for hospitalized patients at risk for VTE. The study demonstrated that the multicomponent intervention, which involved senior hospital leadership support, use of order sets, audit and feedback, active pharmacy involvement, reminders, and education, can be effective in improving the use of thromboprophylaxis. Lessons learned included the importance of key stakeholder involvement, the need for local acceptance and adaptation of the evidence and the importance of incorporating
evidence into the process of patient care through the use of order sets. It was also learned that changes in practice can take longer than anticipated given the multiple barriers to incorporating change into routine practice. Appendix D summarizes how TOPPS demonstrated the application of the KT theories and KTA cycle described in Chapter 4. The TOPPS study will be submitted for publication in a journal that highlights work in healthcare improvement and knowledge translation such as “BMJ Quality & Safety”.

The thesis then reflects on the lessons learned from the studies of CPD and KT and explores how these lessons can help in preparing the profession of pharmacy for practice change. The study of the CPD course presented lessons on how pharmacists prefer to learn and how the educational design impacts on learning. The KT study, TOPPS, provided lessons on how to incorporate knowledge use into practice and on strategies to help improve healthcare outcomes through the use of evidence-based medicine. A reflection on these studies, as well as the theories of change management, leads to a better understanding of how to prepare the profession of pharmacy for practice change.

Chapter 6 begins with a summary of the evolution of the role of the pharmacist and an introduction to the changing scope of pharmacy practice. The chapter provides a review of the relevant literature in the areas of change management looking at change from the lens of the individual to the lens of the organization and then to culture change in healthcare. The review of the literature suggests that the fields of study of CE, CPD, KT, and change management have tended to work in silos. It highlights the need to unify their principles to provide continuing educators with a model to support and prepare pharmacists for practice change.
Chapter 7 of the thesis describes the RETAE model (composed of Reflection, Education, Transformation, Application, and Evaluation) as a tool for continuing educators to prepare pharmacists for the expanded scope of practice. The RETAE model was developed from the literature reviews presented in chapters 2, 4 and 6 of the thesis along with the lesson learned through the learning examples of studies of CPD and KT presented in Chapters 3 and 5. This research and the findings of these studies made it clear that the models of CE, CPD, KT or change management that have been proposed within other professions or contexts are unable to capture the unique needs of pharmacists at this point in evolution of the profession. As a result, there was a need for a customized framework to capture the unique and specific needs for personal and professional development of pharmacists preparing for the expanded scope of practice.

The RETAE model fills this need and provides a model that can be used in the design and evaluation of continuing professional development programs for practicing pharmacists. This model has application not only in pharmacy but also in other professions preparing for micro, meso and macro-level change, that is, change at the level of the practitioner, the practice environment and the profession. The paper on the RETAE model will be submitted for publication to “The Journal of Continuing Education in the Health Professions”.

In the final chapter of the thesis, Chapter 8, a summary of the preceding chapters is presented with a discussion of the strengths and limitations of this thesis. The thesis concludes with a discussion of how this work adds to the existing literature and suggestions for future research in this area.
Chapter 2 – Continuing Professional Development in Pharmacy: A Review of the Literature

The material reviewed in this chapter summarizes the literature used to help design and evaluate a Continuing Professional Development (CPD) course for pharmacists described in Chapter 3.

This chapter reviews the themes and theories important for the design and evaluation of the CPD course. The first section summarizes key adult learning principles and theories that helped inform the design of the CPD course and is divided into the following sections:

1. Continuing competence in pharmacy
2. Principles of adult learning – focusing on the work of Freire, Knowles and Mezirow
3. Motivation for learning
4. Continuing professional development – defining and understanding the process of CPD

Reflecting on the themes and theories discussed in the chapter thus far, the remainder of the chapter demonstrates how these learning theories and principles of CPD are applied to the design and assessment of a CPD course. The Kern’s Model for Curriculum Design was selected to provide an outline for the process undertaken to design the course described in Chapter 3.

2 Continuing Competence in Pharmacy

Continuing competence and the development of new skills to meet expanded competencies are fundamental in ensuring that pharmacists are able to utilize their knowledge and skills most effectively over the course of their careers. To develop a greater understanding of practice change in pharmacy and to help in preparing pharmacists for change, it is important to first
explore how individual pharmacists maintain competence as well as to review the regulations surrounding continuing competence in pharmacy practice.

In 1991, the Ministry of Health in Ontario revised the *Regulated Health Professions Act* to include a requirement of a Quality Assurance (QA) Program for each of the self-regulating health colleges. Along with other colleges, the Ontario College of Pharmacists (OCP) revised its regulations to meet the new requirements. The OCP moved toward a model of “lifelong learning” including continual evaluation of competence. This program came to be described as the OCP Quality Assurance Program and consists of:

- Development of a professional profile and learning portfolio
- A self-assessment survey (to help pharmacists identify learning needs and help develop a learning plan)
- Peer review (clinical knowledge and practice-based assessment in the form of multiple-choice exams and standardized patient interviews)

Prior to the QA program, the OCP specified the number of Continuing Education (CE) units members had to collect in order to demonstrate they were maintaining competence. The use of CE and its role in Continuing Professional Development (CPD) is important to consider in preparing educational programs for pharmacists and in preparing them for an expanded scope of practice. To introduce the field of CPD in pharmacy, a review of learning theories provides the theoretical framework for adult learning while a review of course design and evaluation helps inform the development and assessment of continuing professional development programs.
2.1 Designing Learning for Pharmacists – Learning Theories

2.1.1 Adult Learning

A number of theorists, including Freire, Knowles and Mezirow have helped shape the main principles of adult learning\(^3\textsuperscript{-6}\). While each of these writers explored adult learning in a different context, their theories have been used by adult education researchers for more than three decades.

Four basic assumptions about adult learners discussed in this literature are\(^3\textsuperscript{-5,7\text{-}9}\):

1. Adults desire and implement a tendency toward self-directedness as they mature; they become responsible for their own learning.

2. The personal experiences of adult learners constitute a rich learning resource. They learn more effectively through experiential activities such as problem-solving than through passive learning such as didactic lectures.

3. Adults have an awareness of their specific learning needs generated by their everyday personal and professional lives.

4. Adults are highly pragmatic, competency-based learners with the desire to apply knowledge to immediate circumstances.

Consistent with these assumptions, adult learners are purposeful, voluntary participants in their learning experience; in need of learning that has meaning and relevance to their lives and experiences; in need of clear goals and objectives; and, wanting to have active involvement in learning.
A number of adult learning theories have been proposed. This thesis focuses on three of these theories that are relevant to continuing education – constructivism, transformative learning and motivation for learning.

2.1.2 Constructivism

When planning CE, it is helpful to consider how knowledge is constructed. This learning theory is known as constructivism and is based on the notion that knowledge is actively constructed by the learner who reflects on what they already know and incorporates new knowledge within this context\(^{10}\). Knowledge is also constructed through the learner’s interactions with peers and the environment\(^ {10}\). For this reason, continuing education activities need to ensure that learning is active and that learning is situated in relevant environments. They must allow individuals to interact with peers to construct new knowledge as well as apply their learning to practice. To make this optimal, the educator must know their audience in advance of the learning activity and should attempt to link the experiences of the learners to the educational activity\(^ {11}\).

2.1.3 Transformative Learning

Another learning theory that is foundational in an exploration of how continuing professional development can foster practice change is transformative learning. Transformative learning can be defined as a practice of education “predicated on the idea that students are seriously challenged to assess their value system and worldview and are subsequently changed by the experience”\(^ {12}\). Transformative learning distinguishes between instrumental and communicative learning. In instrumental learning, learners empirically test their beliefs whereas in communicative learning, learners validate or justify their beliefs through discourse – critical reflection and thinking to come to a best tentative judgment. Embracing a new scope of practice may require pharmacists to challenge existing beliefs or engage in critical reflection to prepare
for a new practice. In order to participate in discourse, pharmacist learners need to have accurate information and they need to be open to alternative viewpoints\textsuperscript{13}. Pharmacists need to have learning opportunities in which they are supported to challenge their assumptions, explore new roles and create a plan to improve the skills and knowledge needed for a change in practice.

2.2 Motivation to learn

Adult motivation to learn has been shown to mediate learning and, at the same time, is a consequence of learning\textsuperscript{14}. According to Lieb\textsuperscript{15}, some of the conditions or situations which motivate adults to learn are:

- To enhance social relationships and make new connections and social interactions
- To meet external expectations, for example, the expectation from a professional organization to continue learning
- To promote social welfare - for the good of society or to be better able to participate in community work
- For personal advancement - for a better job, better pay, etc.
- For cognitive rewards - to learn for the sake of learning and to advance the mind

Condry and others have reported that extrinsically motivated learners appear to work harder but intrinsically motivated learners show higher quality performance\textsuperscript{16 17 18}.

One of the main contemporary theorists promoting motivational theory with respect to adult learning is Raymond Wlodkowski\textsuperscript{14}. Wlodkowski’s work is highly relevant to continuing education. His general assumptions about adult motivation are that\textsuperscript{14}:

- people are always motivated
- people are responsible for their own motivation
• if anything is to be learned, it can be learned in a motivating manner
• there is no one best way to teach
• every instructional plan needs a motivation plan

The interplay between motivation, personal skill of the learner and the quality of the instruction is important for learning to occur.

2.2.1 Motivational Learning Design – ARCS Model

The application of motivation to learning design has been explored by Keller who proposed the ARCS model which describes motivational design as composed of – Attention, Relevance, Confidence, and Satisfaction\(^{19}\). Keller’s model suggests that, in order for adults to be motivated, their values and motives fall into two categories – “Attention” (in tandem with interest in learning) and “Relevance” (instruction related to the learner’s personal or career needs or goals)\(^{19}\). “Confidence” refers to the student’s perceived likelihood of achieving success and “Satisfaction” refers to the positive rewards needed to reinforce the material\(^{19}\).

2.3 Summary of conditions for adult learning and considerations for CE

Adult learning can be undertaken individually or in a group; it can be formal or informal; and it is described as self-directed or independent. The adult learner looks for choice in the material that he or she will learn, the flexibility in the way the new knowledge can be acquired with respect to time, place and pace of learning\(^{20}\). Barriers to continuing education for adults often relate to lack of time, lack of interest, lack of confidence, overconfidence, lack of information about opportunities to learn, and competing family and life commitments. Research within groups of pharmacists has found that enablers of CE include reinforcement strategies and
supportive management while barriers include competing demands on their time and a perceived lack of relevance of the CE event to practice\textsuperscript{21}.

In his discussions of adult learning, Malcolm Knowles identified adult learners as self-directed learners and described self-directed learning as “that process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing learning strategies, and evaluating learning outcomes”\textsuperscript{5}. Self-directed learning allows the learner to take responsibility for the education process that is required for their overall growth and development\textsuperscript{22}.

The literature relating to adult learning summarized thus far sets the stage for continuing professional development and the responsibility of each professional to direct their learning and continuing competence. In a self-regulated profession such as pharmacy, this is an important principle to espouse.

2.4 Defining Continuing Professional Development (CPD)

CPD looks at learning through the lens of a lifelong process and encourages individuals to undertake various educational activities “to maintain, develop and enhance the skills, professional performance, and relationships they use to provide care for patients, the public and profession”\textsuperscript{23}. In essence, CPD is a cyclical process whereby pharmacists reflect on their practice, assess their knowledge and skills, identify specific learning needs, create a personal learning plan, implement the plan, and evaluate the effectiveness of the plan related to their practice\textsuperscript{24,25}. 
Traditional CE has focused on improving knowledge and skills but has been less influential in producing changes in practice\textsuperscript{26}. In an extension from traditional CE, CPD focuses on development of knowledge and other competencies such as communication skills, professionalism and collaboration. Therefore, CPD shifts the focus from content (primarily knowledge) to the career development of practitioners. CPD encourages self-reflection and encompasses the motivational theories of learning. In contrast, traditional CE is commonly externally accredited and often assigned CE units or credits that are applied toward maintaining a professional license or for continued certification. In this way, selection of CE activities may be based on accumulating the necessary CE credits rather than driven by individual learning needs and internal motivation. This is contradictory to the theories related to adult learning and motivation which suggest that adults are willing participants in their own learning.

Looking at CPD in the context of pharmacy, Rouse et al\textsuperscript{24,27} suggested:

- CPD is a systematic, ongoing, cyclical process of self-directed learning
- CPD includes everything practitioners learn that enables them to be more effective as professionals (including traditional CE and other forms of professional development)
- CPD encompasses the entire scope of the pharmacist’s practice
- CPD is a partnership between the pharmacist and their organization and should meet the needs of both

The educational needs of pharmacists also include the skills to identify learning needs. In essence, pharmacists need to be educated on the CPD process and how to undertake it\textsuperscript{28}. In addition, there is a need to design CE that moves from traditional didactic learning to a format that focuses on continuing competence in all the core competencies required by pharmacists.
including patient-centred care, work in interdisciplinary teams, use of evidence-based practice, informatics, and quality improvement\textsuperscript{29}.

2.5 A framework for course design

One of the conceptual frameworks used in learning design in CPD is that proposed by Kern\textsuperscript{30}. Kern’s curriculum design model builds on the theories of adult education discussed above and provides a framework for approaching lifelong learning and involves:

1. Problem Identification and General Needs Assessment (health care problem, current approach, ideal approach)
2. Targeted Needs Assessment (learners, learning environment)
3. Goals and Objectives (broad goals, specific measurable objectives)
4. Educational Strategies (content, method)
5. Implementation (obtaining political support, securing resources, addressing barriers, introducing the curriculum, administering the curriculum)
6. Evaluation and Feedback (individual learners, program)

This framework provides the elements to be considered in course design. Although it involves multiple numbered steps, it is a dynamic process that can be multi-directional and does not have to be followed sequentially. The various components that comprise Kern’s framework will be further explored in relationship to course design.

2.5.1 Needs assessment

The first two steps of Kern’s model reflect the identification of gaps in knowledge and/or practice behaviours and an assessment of learning needs. Incorporating learning needs assessment into program design helps to ensure that learning is relevant and gives adults the
opportunity to contribute to their learning. Conducting a needs assessment identifies learning needs that are perceived (“I know what I need to know”), unperceived (“I don’t know what I don’t know”) or misperceived (“I think I know something I actually don’t”)\textsuperscript{31-34}. Learning needs can be identified through requests, observations, questionnaires, surveys, interviews, focus groups diaries or log books\textsuperscript{31-33 35}.

The ability of professionals to accurately self-assess their learning needs has been questioned \textsuperscript{34}. For this reason, additional strategies to identify unperceived and misperceived needs are proposed\textsuperscript{31-34}. Identifying unperceived needs can involve the use of:

- practice audits (chart/case-study audits)
- standardized assessments of knowledge and skills (case-based interviews, standardized patients, etc.)
- literature reviews to identify gaps in learning that have been reported
- population health data to identify where best practices are not being used
- data obtained through professional colleges
- opinions of experts in the field
- peer review of practice / observations of practice performance

In the design of educational events, a combination of needs assessment methods is more effective in ensuring that the learning event will lead to the best results.

2.5.2 Educational Design

The design of CE in pharmacy has been largely based on that used in Continuing Medical Education (CME). Effective learning design must ensure that learning is relevant, active and interactive in order to allow for new knowledge to be constructed by the learner.
It is also important to orient the learner to the educational event and set expectations for learning. This can be done through the use of objectives for the learning experience. Developing goals and objectives for an educational program helps to target the learning to a specific audience and communicate with the learners what they can expect to learn. Objectives also help to design the educational strategies that will be used and define the criteria used to assess the degree to which learning objectives have been met. Objectives can also form the criteria for assessment. A detailed review of writing objectives is not the intent of this chapter. However, of relevance, is a discussion on the classification system for learning objectives as they allow us to consider how to ensure that application of the material to practice is possible. The higher cognitive processes along with the attitudes, values and beliefs of the learner will be instrumental in facilitating practice change.

The most commonly used classification system of educational objectives is known as Bloom’s Taxonomy. It was originally proposed by Benjamin Bloom in 1956 and revised by Anderson and Krathwohl to reflect more recent research on cognitive processes. The revised Bloom’s Taxonomy proposes the following levels of educational objectives ranging from simple to complex. Sample verbs for writing objectives are provided in parentheses:

1. Remember (recognize, identify, describe)
2. Understand (explain, outline, summarize)
3. Apply (practice, demonstrate, use)
4. Analyze (compare and contrast, modify, distinguish)
5. Evaluate (critique, assess, appraise)
6. Create (envision, develop or design)
In order to capture processes that go beyond the cognitive domain in the design of learning objectives, a separate category of “influence attitudes, values and beliefs” has been proposed. This includes objectives that encourage learners to challenge current thinking, to debate or dispute a theory, justify or resolve a relevant issue. These objectives encourage transformative learning. Most objectives are set prior to the educational activity. However, transformative learning can also be encouraged through the development of expressive outcomes. These are learning objectives that emerge as a result of an intentionally planned activity but are not predetermined. They are constructed as the learner engages in learning.

2.5.3 Interactivity in learning

Design of learning can either be passive or active. Passive learning describes activities in which learners either listen or read information without interacting with the material. Active learning encourages the learner to participate in the activity and to interact with the material and with other participants. Active learning and interactivity have been demonstrated to keep learners motivated, engaged and better able to apply learning to practice. Interactivity of learning sessions can be increased through the use of a variety of techniques including:

- Questioning the audience
  - Survey of the audience
  - Audience response systems
  - Brainstorming
  - Use of rhetorical questions

- Breaking large groups into small groups for discussion
  - Use of think-pair share – reflect on a concept individually, share the reflection with another group member, then share it with the larger group
- Buzz groups – allow audience members to engage in discussion with neighbouring audience members about a problem (e.g. case discussion, practice challenge, etc.)
- Pyramid games – building from pairs of participants to groups of 4-6 and then involving the whole audience
  - Breaking up the learning
  - Allowing for questions throughout the session
  - Using videos, live interviews (including standardized patients) or other media
  - Case-based vignettes for application of knowledge

Introducing interactivity into the educational event increases the probability that the activities are learner-centred rather than teacher-centred and also helps with retention of attention. Interactivity creates an environment in which the learner is viewed as a valuable resource and encourages learning from peers supporting the social context of learning.

### 2.5.4 Evaluation and Feedback

The evaluation and feedback component of curriculum design is essential in helping to determine whether the educational event met the needs of the audience and also the objectives of the program. Evaluation of educational programs often makes reference to Kirkpatrick’s framework, originally proposed in 1967, which includes four levels of outcomes for educational interventions – reaction (satisfaction), learning (knowledge and skills), behavior, and impact on society. Over the years, a number of variations of the Kirkpatrick framework have been proposed. For the purposes of the first paper of this thesis (Chapter 3), the expanded CME framework proposed by Moore and colleagues will be used to explore assessment in CE. This framework builds on the Kirkpatrick framework and expands to involve 7 levels of outcomes as...
outlined in Table 2-1. Moore’s framework takes Kirkpatrick’s domain of learning and expands it to distinguish between declarative knowledge (participants are able to state what they should know) and procedural knowledge (participants are able to state how to do what they should do). In addition, Moore’s framework focuses on the impact that knowledge acquisition has on practice (e.g. application to practice, changes in practice and their impact on patient and community health outcomes). This approach to evaluation can be used to evaluate the impact of CPD activities on both the pharmacist’s practice and potentially the impact on patient and community health.

The following chapter demonstrates how this review of the literature informed the design and evaluation of a CPD course for pharmacists.
Table 2-1: Expanded CME Framework (adapted from Moore\textsuperscript{25})

<table>
<thead>
<tr>
<th>Level of Outcome</th>
<th>Source of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: Participation</td>
<td>Attendance records</td>
</tr>
<tr>
<td>(no. of participants)</td>
<td></td>
</tr>
<tr>
<td>Level 2: Satisfaction</td>
<td>Questionnaires completed by participants after the</td>
</tr>
<tr>
<td>(expectations were met)</td>
<td>activity</td>
</tr>
<tr>
<td>Level 3A: Declarative Knowledge</td>
<td>Objective: Pre- and posttests of knowledge</td>
</tr>
<tr>
<td>(participants are able to state what they</td>
<td>Subjective: Self-report of knowledge gain</td>
</tr>
<tr>
<td>should know)</td>
<td></td>
</tr>
<tr>
<td>Level 3B: Procedural Knowledge</td>
<td>Objective: Pre- and posttests of knowledge</td>
</tr>
<tr>
<td>(participants are able to state how to do what</td>
<td>Subjective: Self-report of knowledge gain</td>
</tr>
<tr>
<td>they should do)</td>
<td></td>
</tr>
<tr>
<td>Level 4: Competence</td>
<td>Objective: Observation in educational setting</td>
</tr>
<tr>
<td>(Participants are able to show how to do what</td>
<td>Subjective: Self-report of competence; intention to</td>
</tr>
<tr>
<td>they should do in an educational setting)</td>
<td>change</td>
</tr>
<tr>
<td>Level 5: Performance</td>
<td>Objective: Observation of performance in patient</td>
</tr>
<tr>
<td>(Participants actually do what was intended in</td>
<td>care setting; patient charts; administrative</td>
</tr>
<tr>
<td>practice)</td>
<td>databases</td>
</tr>
<tr>
<td>Level 6: Patient Health</td>
<td>Subjective: Self-report of performance</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>(Health status of patients improves due to the change in practice behavior)</td>
<td>Objective: Health status measures recorded in patient charts or administrative databases</td>
</tr>
<tr>
<td></td>
<td>Subjective: Patient self-report of health status</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 7: Community Health</th>
<th>Subjective: Community self-report</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Health status of a community changes due to changes in practice behavior of participants)</td>
<td>Objective: Epidemiological data and reports</td>
</tr>
</tbody>
</table>
Chapter 3

3  Development and Evaluation of a Continuing Professional Development Program for Pharmacists in Thrombosis Management

3.1 Abstract

Introduction:

A course related to thrombosis management for pharmacists was developed through the Office of Continuing Professional Development (CPD) at the University of Toronto to address pharmacists’ needs for the knowledge and skills to provide care to patients receiving anticoagulants. The purpose of this study was to describe the development of the course and to assess its impact on pharmacists’ knowledge, attitudes and changes in practice.

Methods:

A 3-day course was developed. Outcomes were evaluated using a feedback questionnaire, pre- and post-session quizzes and semi-structured interviews conducted 6 months after course completion. Participant satisfaction, knowledge acquisition and perceived change in knowledge, skills and practice were evaluated.

Results:

Thirty-seven pharmacists enrolled in the program, 21 of whom participated in a semi-structured interview. More than 90% reported that the program exceeded their expectations. Pharmacists’ knowledge in thrombosis care improved significantly after each day of the course. Participants felt the greatest benefits of the program were increases in knowledge and confidence and the opportunity to network. The case-based discussions and practical tips gained from experts and
peers were highly ranked. Participants strongly agreed that they were applying what they learned in the course to clinical practice and they provided numerous examples of how their practice changed as a result of the program.

**Discussion:**

This study suggests that a CPD course on thrombosis improves pharmacist knowledge, confidence and ability to incorporate what was learned into practice. This experience reinforces that pharmacists learn best when learning is relevant, applicable to clinical practice and encourages networking. This course design and evaluation can serve as a model for other CPD courses for pharmacists and other health professionals.

### 3.2 Introduction

Pharmacists, as other health professionals, are expected to maintain competence in order to retain licensure within their professional body. It is acknowledged that learning is a continuum and that maintaining competence requires a commitment to self-reflection and a plan for continuing professional development (CPD). The Accreditation Council for Pharmacy Education (ACPE) defines CPD as “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.Individual pharmacists should identify their learning needs, create an action plan to meet these needs and document and evaluate the outcomes of their plan. This is a lifelong process and involves both formal and informal learning.

Among the resources available to pharmacists to meet their learning needs, most will choose formal education programs to improve knowledge and skills. Since 2006, the Office of
Continuing Professional Development of the Leslie Dan Faculty of Pharmacy at the University of Toronto (U of T) has developed diverse CPD programs including a number of advanced training programs for pharmacists.

A Thrombosis Management course for pharmacists was developed through consultation with local thrombosis experts including a sub-specialty physician and three pharmacists. These clinicians have experience both in managing patients taking an anticoagulant and in educating trainees and colleagues. The focus for the course was on management of patients receiving anticoagulants. The Institute for Safe Medication Practices (ISMP) classifies anticoagulants as “High Alert” medications defined as “drugs that bear a heightened risk of harm when they are used in error.” Thrombosis management has repeatedly been identified as an area of practice in which pharmacists can have a significant positive impact on patient safety and patient outcomes. Several CE programs in anticoagulation are available for pharmacists in Canada but each has a narrower focus on management of patients taking oral anticoagulants only. The “Thrombosis Management for Pharmacists” course was designed to provide an overview of thrombosis management from inpatient to outpatient care and from diagnosis to treatment. The course offered both in-class and experiential educational components. The purpose of this study was to design a CE course in thrombosis management and assess its impact on pharmacists’ satisfaction, knowledge and application to practice.

3.3 Methods:

3.3.1 Course Design

The course content was developed in consultation with clinician experts in the field of thrombosis from both medicine and pharmacy. The course design included many of the
principles associated with enhanced learning in CE\textsuperscript{11}. Adult learning principles were considered in the course design through development of learning objectives, active learning (participation) and making learning relevant. Speakers were provided with suggestions to increase the interactivity of their sessions (e.g. incorporation of case vignettes, use of an audience response system, etc.)\textsuperscript{11} and they were encouraged to incorporate clinical pearls and practical tips in their discussions.

The course involved over 15 hours of learning delivered over a 3-day period. Day 1 reviewed the basic pharmacology necessary for managing antithrombotic therapy. Day 2 explored indications and use of antithrombotic medications in patient care and day 3 focused on the management of patients receiving anticoagulants and case discussions to apply the material discussed throughout the course (Appendix A). A session was also held to introduce participants to the practices of pharmacists specializing in thrombosis. Time was set aside at the end of each day to debrief and summarize the key lessons learned. At the end of the program, a distribution list was circulated allowing participants to stay connected with colleagues via e-mail.

An optional 1-week experiential component was also offered to pharmacists. This allowed the opportunity to shadow a clinical thrombosis service at an academic health science center in Toronto to gain a better appreciation of how the knowledge acquired in the course applies to patient care.

3.3.2 Outcomes

Evaluation of the program assessed whether pharmacists’ learning needs were met and if the course helped them broaden their knowledge, skills and attitudes. Outcomes measured were based on Moore’s framework for assessment of Continuing Medical Education (CME)\textsuperscript{25}.  

25
Moore’s framework involves assessment of: participation (no. of participants), learner satisfaction (meeting expectations), knowledge acquisition (declarative and procedural knowledge), competence and performance.

3.4 Data Collection

Data collection (use of pre- and post-session quizzes, formal course evaluation questionnaire and semi-structured interviews) was approved by the Ethics Board of the University of Toronto.

On each day of the course, participants completed a pre-session quiz consisting of 2-3 multiple choice questions per topic to be covered that day. They were then given the same quiz at the end of the day after participating in the day’s sessions.

The results of the pre and post-session quizzes were evaluated using a paired-sample t-test to determine whether short-term knowledge was acquired as a result of participating in the program. P-values less than 0.05 were considered statistically significant.

At the end of the program, participants completed an anonymous feedback questionnaire to provide overall feedback on the program and for each session and speaker. Questions used a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

All pharmacists who completed the course were invited to participate in a one-on-one semi-structured interview 6 months after completion of the program (Appendix B). The interviews were conducted to gain a better understanding of participants’ impressions of the course and also its impact on their knowledge, skills and application to clinical practice (for sample questions, see Appendix C). The interviews were scheduled six months after course completion to allow participants an opportunity to apply the material to their practice. Interviews were conducted by
the researcher either in-person or by telephone. With consent, the interviews were recorded and transcribed. Transcripts were analyzed using an inductive approach and coded by the researcher to identify emerging themes. A second reviewer analyzed the data to limit the potential for bias by the researcher who was also the course coordinator.

3.5 Results

3.5.1 Participation

The first offering of the “Thrombosis Management for Pharmacists” course attracted 43 participants and is the basis for this study. Among the course participants, 37 were pharmacists and 6 were sales representatives for anticoagulant medications. The course feedback questionnaire was completed by 40 participants. All 37 pharmacists were invited to participate in the interviews and 22 consented. One participant who provided consent could not be reached after multiple attempts. The characteristics of the 21 participants who agreed to be interviewed are summarized in Table 3-1. The majority of interviewees were female (76%) and almost all were working in a hospital setting. This sample was representative of the group of pharmacists who participated in the program.

3.5.2 Motivation to Participate

Most of the interviewees stated that their motivation to participate in the course was internal - to learn and improve their skills. For some participants, the course had been recommended by their manager in preparation for an expanded role or a new program for warfarin management. The majority of the pharmacists received support to attend from their employer but, for some, it was self-funded. Most pharmacists were drawn to the course by a desire to increase their knowledge and improve their confidence when providing patient care. For some participants, the fact that
the course was offered through the university was attractive as it provided increased credibility. Post-course feedback is summarized in Table 3-2 while examples of the comments made by the pharmacists can be seen in Table 3-3.

### 3.5.3 Satisfaction

Overall, 90% of respondents indicated that they “Agree” or “Strongly Agree” that the educational program exceeded their expectations and 93% would recommend the course to others (Table 3-2).

### 3.5.4 Knowledge Acquisition

As can be seen in Figure 3-1, on each of the 3 days of the program, there were significant improvements in test scores obtained by the participants after the learning sessions. Overall, the post-session mean score was significantly higher than the pre-session score, 78.4% ± 7.3 compared with 53.4% ± 7.7, p<0.0001, reflecting an improvement of 25%.

Eighty-five percent of participants agreed that the quizzes were a useful assessment tool (Table 3-1). In addition, many participants related that the quizzes provided important feedback about knowledge acquired. One participant stated: “The quizzes kept me on my toes. I knew that I needed to pay attention and make sure I understood what the presenters were explaining because, at the end of the day, those same questions were coming back at me and I needed to see my score change.” Another participant stated that the quizzes “showed me that I really didn’t know as much about the topics as I thought I did”.

### 3.5.5 Benefits of Participation

The interviews revealed general themes associated with the benefits of participation in the program: increased knowledge, increased confidence and opportunities for networking.
Participants felt the speakers were experts in their field and they appreciated learning from clinicians conducting thrombosis research. They found the course to be a comprehensive overview with many practical examples of implementation. The participants enjoyed the group discussion and the opportunity to network with experts and peers. They expressed feeling more confident that their practice was consistent with what others in the field were doing. They enjoyed the opportunity to apply their knowledge in the case discussions and would have liked even more such opportunities.

3.5.6 Suggested Improvements

Many of the suggestions that were made by participants have been incorporated into subsequent offerings of the program. Among these were:

- Pre-readings
- Incorporating more case discussions and earlier in the program
- Discussion of the quiz questions and answers after completion

Other recommendations, which have not yet been implemented, include the suggestion that more sites be made available for the experiential learning component. This has been logistically difficult to achieve. Several participants suggested a desire to collaborate in research and it was hoped that this type of collaboration could grow from the online learning community.

3.5.7 Application to practice

All participants agreed or strongly agreed that they would be able to apply the knowledge gained in their workplace (Table 3-1). The actual application to practice was not directly assessed but relied on self-report in the interviews (Table 3-3). No patient or community health outcomes were assessed. Participants felt that they were able to apply what they learned in the course to
their current role. Some participants described implementing specific changes in their approach to patient care as a result of what they learned in the course. Other participants described using their new knowledge to teach peers or students. Participants felt that applying what they learned made them more confident, more effective and a better resource to other members of the healthcare team.

3.5.8 Experiential Component

Four of the participants completed the 1-week experiential component. Each of these pharmacists was working in a hospital setting and already had a thrombosis focus in their practice. They enjoyed the opportunity to apply their learning to real patient cases and to learn from clinician experts working the field. Reasons why others did not participate in the experiential component were not formally assessed although some participants expressed that they were interested but could not take time off work or away from their home life and other responsibilities.

3.6 Discussion

This study suggests that a 3-day CPD course in “Thrombosis Management” was effective in improving pharmacists’ short-term knowledge, confidence and ability to incorporate what they learned into practice. Overall, participants expressed satisfaction with the program and indicated that it met their needs and expectations. Participants were impressed with the caliber of the speakers and also expressed that they enjoyed the discussion periods and the opportunity to network with colleagues and experts and gain new perspectives and ideas.

The value of “unstructured” time during formal CE events has been demonstrated elsewhere in the CE literature57. This allows participants time to learn from colleagues, integrate the
information reviewed in the formal learning and address the questions that they see as relevant to practice. These opportunities also allow participants to form a social network to validate their understanding of the knowledge during the course and for future interactions. This experience is supported by the theory that professionals learn in communities of practice where they have access to colleagues\textsuperscript{40, 58} and that changes in practice are often driven by consultation with colleagues\textsuperscript{59, 60}. Participants valued the e-mail distribution list to maintain contact with colleagues. Similar findings emerged in the work of Austin and colleagues who conducted focus groups with pharmacists to understand their attitudes, skills and preferences towards. They concluded that peer interaction is important and necessary for CPD\textsuperscript{61}.

The results of this study are consistent with evaluations of other CE programs developed for pharmacists. Bungard and colleagues evaluated a multi-stage professional development course for pharmacists in anticoagulation management and also found an increase in knowledge and confidence along with a positive impact on practice\textsuperscript{54}. However, they also showed that the increase in knowledge scores seen just after the education intervention declined by the 4-6 month reassessment point\textsuperscript{54}. Our study did not evaluate this delayed outcome. Other CE programs developed for pharmacists have been able to show similar increases in knowledge and confidence as well as application of learning to practice\textsuperscript{62-64}.

3.6.1 Strengths and Limitations

A main strength of this study is that it assessed multiple outcomes including participation, satisfaction, knowledge acquisition, competence, and performance. Outcomes were assessed using a feedback survey, pre- and post- learning quizzes as well as qualitative data from interviews conducted six months after course completion.
However, there was no direct assessment of patient and community health outcomes and application to practice (competence, performance) was self-reported rather than directly assessed.

A limitation of this study is that the statements in the feedback questionnaire were worded in a positive manner and may have influenced participants’ perspective although the verbal feedback from the interviews was consistent with these findings. Knowledge acquisition was only assessed immediately after the learning and no assessment of sustained increase in knowledge was conducted. In addition, the study was designed as a before and after study and lacked a control group. As a result, it is difficult to conclusively state whether changes in knowledge were related to course participation or if they were due to secular changes in knowledge. For this course, participants were self-selected and likely reflected those most motivated to learn or most likely to report positive experiences. The interviews were conducted by the course coordinator and therefore, potential for bias in the responses could exist. An attempt was made to minimize this bias by having a second reviewer analyze the interview transcripts.

### 3.7 Conclusion

The Thrombosis Management for Pharmacists course was well-received by participants. There was a high level of same-day knowledge acquisition and self-reported application to practice. Pharmacists described a positive impact on their knowledge and confidence and provided specific examples of the impact the course had on their practice. The design and evaluation of this CPD program can serve as a model for other programs. Future evaluations to directly assess the impact on practice and patient level outcomes will further enhance the evaluation of these programs.
Table 3-1: Characteristics of Interview Participants (n=21)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5 (24%)</td>
</tr>
<tr>
<td>Female</td>
<td>16 (76%)</td>
</tr>
<tr>
<td><strong>Years in practice</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 5</td>
<td>7 (33%)</td>
</tr>
<tr>
<td>5-10</td>
<td>4 (19%)</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>10 (48%)</td>
</tr>
<tr>
<td><strong>Practice setting</strong></td>
<td></td>
</tr>
<tr>
<td>Inpatient acute care</td>
<td>8 (38%)</td>
</tr>
<tr>
<td>Ambulatory care</td>
<td>4 (19%)</td>
</tr>
<tr>
<td>Community pharmacy</td>
<td>3 (14%)</td>
</tr>
<tr>
<td>Rehab hospital</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Long-term care</td>
<td>4 (19%)</td>
</tr>
<tr>
<td><strong>Time in current role</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 years</td>
<td>12 (57%)</td>
</tr>
<tr>
<td>2-5 years</td>
<td>5 (24%)</td>
</tr>
<tr>
<td>5-10 years</td>
<td>3 (14%)</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Question</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Overall, this educational program exceeded my expectations</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>I would recommend this course to others</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td>I am pleased with how much I learned</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td>I will be able to apply this knowledge in my workplace</td>
<td></td>
</tr>
<tr>
<td>This was an intellectually rewarding experience for me</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>The topics were delivered in an interesting manner</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td>The 'before' and 'after' quizzes were a useful assessment tool</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td>The class atmosphere was conducive to learning</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td>The program provided good coverage of relevant topics</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td>Overall, the caliber of instruction was excellent</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td>The online registration was convenient</td>
<td>5 (37.5%)</td>
</tr>
<tr>
<td>Refreshments and meals were of good quality</td>
<td></td>
</tr>
<tr>
<td>The handout materials will be helpful to me</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td>There was sufficient time for my questions to be addressed</td>
<td></td>
</tr>
</tbody>
</table>

1- Strongly Disagree; 2-; 3- Neutral; 4-Agree; 5-Strongly Agree
Table 3-3: Excerpts from participants’ responses in the interviews by theme

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sample Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation to participate /</td>
<td>• “We wanted to formalize that process (of pharmacist management of warfarin) and we thought that taking this course would provide those who we were asking permission from with certainty that we were qualified”</td>
</tr>
<tr>
<td>Expectations</td>
<td>• “We had an initiative here started by manager of pharmacy. He wanted to improve patient safety in the coagulation area……so we started sending pharmacists to some of the thrombosis management courses”</td>
</tr>
<tr>
<td></td>
<td>• “My patients are all at high risk for DVT…and I’m interested in learning more about it, updating my knowledge, and just feeling more comfortable with my own knowledge about it”</td>
</tr>
<tr>
<td></td>
<td>• “Coming from community, this is an area I really was quite weak in. I needed to understand a little bit better”</td>
</tr>
<tr>
<td></td>
<td>• “An opportunity to keep up in an area that, at the hospital, the physicians were looking to me to be up to date in anticoagulation”</td>
</tr>
<tr>
<td></td>
<td>• “To further develop my knowledge and my skills in thrombosis because I thought it was an area that the pharmacist could really be of use. I’m involved in the anticoagulation implementation so I thought those skills would be very handy in implementing the service here”</td>
</tr>
<tr>
<td></td>
<td>• “It would serve as an update at what we knew….we thought we’d get value from the expertise of the speakers”</td>
</tr>
<tr>
<td></td>
<td>• “More confidence in assessing patients’ therapies”</td>
</tr>
<tr>
<td>Benefits of attending</td>
<td>• “I appreciated the insights that I received from the speakers. I appreciated meeting the speakers and developing that network. I appreciated meeting the other people in the course and developing that network”</td>
</tr>
<tr>
<td></td>
<td>• “……a sense of confidence”</td>
</tr>
<tr>
<td></td>
<td>• “It’s fun to get out and meet the people that are doing a similar job, because there’s nobody in my health region that I could really talk with”</td>
</tr>
<tr>
<td></td>
<td>• “Networking as well both with the presenters and the participants”</td>
</tr>
<tr>
<td></td>
<td>• “Having had the course they’ll [employers] feel more comfortable and to be able to say that I’ve taken a recent course at the University of Toronto, I mean that’s, you know, comforting I guess for them”</td>
</tr>
<tr>
<td></td>
<td>• “You know, this course is set at U of T and I think that’s a bonus”</td>
</tr>
<tr>
<td></td>
<td>• “Continued contact with other people in the group….I haven’t used it”</td>
</tr>
</tbody>
</table>
much but the fact that there’s somebody out there who might be able is very useful and very reassuring especially in outlying areas”

- “The opinions of leaders in the field. If their feeling and opinion is X might not be a good thing to do, well, okay, I’m going to look a little more closely at it”
- “Overall it was a good review”
- “We do a lot of, warfarin dosing….so I thought a course to teach me anything new on the horizon might be….to add to my skills would be great”
- “I think I gained a sense of worth”
- “Hearing from leaders, also some physician leaders, where we know we can use that with our own physicians who may not be as supportive”
- “You feel like you can actually ask someone because you met someone…not just send out an email”
- “It just gives me more confidence in my decisions. In other cases, I did something different than I would have done”

<table>
<thead>
<tr>
<th>Suggestions for Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “I think there should be some interactivity in each of the components”</td>
</tr>
<tr>
<td>• “The only thing I was disappointed with was, there wasn’t a lot of pre-readings”</td>
</tr>
<tr>
<td>• “More cases in each section and you’d be able to get the responses alongside with them”</td>
</tr>
<tr>
<td>• “I wish we could make it a certification, like a proper certification, like a degree type certification….anticoagulation manager person”</td>
</tr>
</tbody>
</table>
Application to Practice

- “We have used some of the concepts around bridging in our practice”
- “We have implemented some changes around holding warfarin pre-dental appointments that we were doing differently before”
- “I can apply the knowledge that I learned in directing physicians. You know, suggesting other ways of going about it” (in reference to dosing of anticoagulants)
- “We use it [knowledge gained] every day”
- “Now I know my recommendation is going to be solid as opposed to, mmm, this is kind of speculation but theoretically it should work”
- “I took a lot of that material that I got from the course, and I tried to use that for my students”
- “I think I gained the ability to teach, I guess, other people”
- “Relay information onto the other staff pharmacists”
- “The first thing that I noticed afterwards was that I was so much more comfortable answering questions…..I thought about anticoagulation a bit differently”
- “Able to be a resource to other healthcare professionals”
- “Our life has changed a lot after the course……I’m going to see all the patients on my units here and do some suggesting to the doctors”
- “I just feel more comfortable in my role and more effective”
- “It’s complementary to the role that I’ve been undertaking”
- “I feel our management, like of patients, improved going to the course”
Figure 3-1: Pre- and Post- Test Results

![Bar chart showing pre- and post-test results for different days and overall.](image)
Chapter 4 – Knowledge Translation

The preceding two chapters explore CE and CPD and studying the impact of a CPD program on knowledge, skills and confidence. It was then felt to be of interest to explore how knowledge is used in practice to influence outcomes. This prompted further exploration of the area of Knowledge Translation (KT).

4 Need for Knowledge Translation

There are multiple examples in the literature and in health care environments that suggest major gaps between best-available evidence and current practice. Gaps exist with respect to both overuse and underuse of available evidence. Examples of such gaps can be seen in the evidence of underdiagnosis of depression in primary care\textsuperscript{65} as well as overuse of antibiotics\textsuperscript{66,67}. In fact, it has been estimated that up to 30\%-40\% of patients do not receive care that is consistent with current evidence and approximately 20\%-25\% of patients receive care that is unnecessary and possibly harmful\textsuperscript{68,69}. In summaries of evidence-care gaps, approximately one-third of patients do not get treatments of proven effectiveness and one quarter of patients get treatments that are not needed or are potentially harmful\textsuperscript{70,71}. In the field of thrombosis, multiple examples suggest that underuse of anticoagulants for patients in whom they are indicated is common; for example, the underuse of anticoagulants for stroke prevention in patients with atrial fibrillation\textsuperscript{72,73}.

The field of KT requires an understanding of therapeutics, critical appraisal skills as well as an appreciation for the practice setting and the social, economic and political influences on patient care. The science of understanding how evidence is applied in practice has been described by a variety of terms including: knowledge dissemination and diffusion, knowledge sharing, implementation science, knowledge transfer and uptake, and research utilization and knowledge
In this thesis, the term **Knowledge Translation** will be used to describe the use of evidence to make informed decisions in health care.

### 4.1 Defining Knowledge Translation

Knowledge Translation (KT) has been defined as “the effective and timely incorporation of evidence-based information into the practices of health professionals in such a way as to effect optimal health outcomes and maximize the potential of the health system”\(^75\). The definition of KT encompasses a range of activities including: knowledge dissemination, technology transfer, knowledge management, knowledge utilization, the two-way exchange between researchers and those who apply knowledge, implementation research, technology assessment, communications, and the synthesis of evidence including the development of guidelines\(^75\).

KT overlaps with CPD (discussed in Chapter 2) in that their common aim is to improve healthcare outcomes. The means by which they aim to achieve this improvement differ slightly. CPD is defined as “the principal means by which health professionals maintain, improve and broaden their knowledge and skills”\(^76\). The focus of CPD is on individual practice improvement and the principal means to achieve this improvement is education. It has been described that “CPD is thus central to improving health care practices and not just a tool for implementing KT but an important KT strategy to promote the uptake of evidence by healthcare professionals”\(^23\).

The focus of KT is not specifically on professional development but on helping individuals apply evidence to improve practice and explores barriers and facilitators to knowledge use. Taking this perspective, KT involves strategies that are outside of traditional education and incorporates multiple means to facilitate evidence-based practice only one of which is education. These strategies include interventions that promote awareness and facilitate the application of
knowledge, such as reminders; strategies that highlight the evidence-care gap, such as audit and feedback; and strategies that focus on social influences for practice change, such as use of opinion leaders. The path for practice change in KT has been “through interventions which more directly promote behavior change”\textsuperscript{23}. The path for practice change in CPD has been through knowledge acquisition and application with the hope that improved knowledge will be applied to practice. In this way, KT differs from CPD in the process approach to improving healthcare outcomes\textsuperscript{23}. In addition, CPD focuses primarily on the knowledge of the individual. KT frequently assumes that professionals have the knowledge but are unable to use it to improve healthcare outcomes because of barriers in practice. KT activities focus on identifying and overcoming these barriers only one of which may be lack of knowledge\textsuperscript{23}.

Pharmacists in current healthcare settings have a role that includes the promotion of the effective use of medication for optimal health outcomes. Given the expanding role of the pharmacist and their participation in multidisciplinary teams, KT is of great importance to pharmacists. The field of KT gives pharmacists the tools to help them appraise and apply evidence to patient care and to evaluate the impact of pharmacotherapeutic interventions, services and programs on patient outcomes and on the healthcare system.

4.2 Utilizing a KT Framework – Knowledge to Action (KTA) Cycle

Of the many models that have been proposed for the implementation of KT, one of the most comprehensive is the “Knowledge-to-Action” cycle proposed by Graham and colleagues\textsuperscript{77}. The cycle is based on both “Knowledge Creation” as well as the application of knowledge, referred to as the “Action Cycle” (Figure 4-1). The model takes the theoretical underpinnings of KT (planned action theory) and presents them in a step-wise approach for applying knowledge to practice. This model has been adopted by the Canadian Institutes of Health Research (CIHR) as
a framework for the KT process. Knowledge-to-Action is a dynamic process acknowledging the complexity of the creation of knowledge and its application and involving the interaction between those creating knowledge and those involved in its application. For pharmacists, this framework is useful to enhance the understanding of KT.

In this thesis, implementation of evidence-based Venous Thromboembolism (VTE) prophylaxis guidelines will be used as an example to which the Knowledge-to-Action cycle will be applied. Existing “Knowledge” in VTE prophylaxis will be briefly summarized to serve as the foundation for the “Action Cycle”. The various steps of the action cycle will then be discussed.

4.2.1 Knowledge Creation

“Knowledge creation” sits at the core of the Knowledge-to-Action cycle and reflects where basic research and research synthesis fit into the KT process. A review of available research and interpretation of this evidence then leads to a decision of whether it should be applied in practice. Knowledge tools can be large clinical trials, meta-analyses or patient tools which are then put into “action”. Critical appraisal skills and clinical experience are therefore essential for pharmacists to identify the knowledge they feel should be put into action.

4.2.2 Knowledge Creation in VTE Prophylaxis

Venous Thromboembolism (VTE), which is comprised of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE), is a serious and often preventable complication of hospital stay. It is estimated that approximately two-thirds of all VTE events are hospital-acquired making prevention of this complication an important consideration for patient care in hospital.

With respect to “knowledge creation” in this area, more than 400 randomized controlled trials and more than 30 international guidelines have established the effectiveness and cost-
effectiveness of VTE prophylaxis\textsuperscript{82}. Considering the synthesis of current knowledge, not only is there a strong evidence base to support VTE prophylaxis, but there is also an abundance of tools in the multiple published guidelines on the topic. Among the most recognized and respected of these guidelines are those produced by the American College of Chest Physicians (ACCP), also commonly referred to as the CHEST guidelines, most recently updated in 2012\textsuperscript{83-85}.

The use of appropriate VTE prophylaxis has been associated with improved outcomes and lower direct medical costs\textsuperscript{86,87}. In this area of clinical practice, a sufficient body of evidence exists to consider putting this evidence into “action” and knowledge translation tools\textsuperscript{83-85} are available for clinicians.

4.2.3 The Action Cycle

4.2.3.1 Identifying the Knowledge-to-Action or Evidence-Care Gap in VTE Prophylaxis

An assessment of the evidence-care gap helps identify how well evidence is applied in practice and the need for knowledge translation. There are various methods that can be used for identifying evidence-care gaps. The choice of method will depend on the level at which the problem is being identified (e.g. the individual practitioner, practice site, health system level) as well as the purpose of conducting the assessment and the resources available to help identify gaps\textsuperscript{88}. Examples of ways to identify the evidence-care gap are shown in Table 4-1 and a summary of examples specific to VTE prophylaxis are summarized in Table 4-2.
Table 4-1: Ways to Identify the Evidence-Care Gap

<table>
<thead>
<tr>
<th>Level at which evidence is gathered</th>
<th>Type of data measured</th>
<th>Advantages</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population level</td>
<td>• Database studies</td>
<td>• Determines the extent of the problem at the population level</td>
<td>• Provides no specific information about why it is a problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Does not provide personalized feedback for clinicians; easy to dismiss data as not relevant to their practice or setting</td>
</tr>
<tr>
<td>Institutional level or Healthcare team level</td>
<td>• Chart audits</td>
<td>• Can potentially identify barriers at a systems level</td>
<td>• May allow individual clinicians to dissociate themselves from the data (perception they are not contributing to the problem)</td>
</tr>
<tr>
<td></td>
<td>• Drug use evaluation reports</td>
<td></td>
<td>• Selective samples may not be representative</td>
</tr>
<tr>
<td></td>
<td>• Benchmarking</td>
<td></td>
<td>• Bias can exist in data selection and interpretation</td>
</tr>
<tr>
<td>Practitioner level</td>
<td>• Chart reviews</td>
<td>• May identify barriers at the practitioner level</td>
<td>• Does not identify barriers at a systems level</td>
</tr>
<tr>
<td></td>
<td>• Practice audits</td>
<td>• Allows for personalized data</td>
<td></td>
</tr>
<tr>
<td>Level at which evidence is gathered</td>
<td>Type of data measured</td>
<td>Advantages</td>
<td>Limitations</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Patient level</strong></td>
<td>• Review of patient care (diagnostics, treatment, clinical outcomes)</td>
<td>• May identify gaps in care for the individual patient</td>
<td>• Does not identify whether these gaps exist for all patients and does not identify barriers applicable to all settings</td>
</tr>
</tbody>
</table>
| **Population level**              | • Database studies (e.g. population level VTE rates or VTE prophylaxis database registries) | • Allows for tracking of VTE event rates or possibly VTE prophylaxis rates  
• Can identify regional or temporal trends in VTE event rates in the overall population | • Provides no specific information about whether these events were preventable (for VTE rates) or whether thromboprophylaxis was appropriate (registry studies)  
• Does not provide personalized feedback for clinicians  
• Easy to dismiss data as caused by those who do not use thromboprophylaxis |
| **Institutional level or Healthcare team level** | • Chart audits  
• Drug use evaluation reports  
• Benchmarking | • Can identify barriers to using VTE prophylaxis at the systems level  
• Can allow for comparison | • Samples may be selective (best or worst units or patient groups)  
• Depending on method used, data may be insufficient |
across similar healthcare teams or systems (e.g. compare general surgery thromboprophylaxis rates at one site to others across the region or to other units in the same hospital) to identify appropriateness of thromboprophylaxis

<table>
<thead>
<tr>
<th>Practitioner level</th>
<th>Chart reviews</th>
<th>Provides data for an individual practitioner</th>
<th>Will not identify barriers embedded in the process of care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Practice audits</td>
<td>Allows for personalized data</td>
<td>Assumes that thromboprophylaxis should be an individual practitioner’s responsibility</td>
</tr>
<tr>
<td>Patient level</td>
<td>Review of patient care (risk assessment, thromboprophylaxis order, administration etc.)</td>
<td>May identify gaps in care for the individual patient</td>
<td>Does not identify whether these gaps exist for all patients and does not identify barriers applicable to all settings</td>
</tr>
<tr>
<td></td>
<td>Feedback on an individual patient’s care and whether they received thromboprophylaxis</td>
<td>Will provide information on why that patient did not receive prophylaxis</td>
<td>Suggests that VTE prophylaxis should be prescribed on an individual patient basis</td>
</tr>
</tbody>
</table>
In the field of VTE prophylaxis, a large number of studies have assessed prophylaxis use and compliance with thromboprophylaxis guidelines\(^{80, 83, 86, 89, 90}\). Most of these studies have measured the gap in prescribing VTE prophylaxis using chart audits done at the level of a patient care unit, the hospital level or across multiple sites. Several studies from the United States have suggested that compliance with thromboprophylaxis in surgical patients varies from 32% to 94% depending on the type of surgical procedure\(^{80, 91-94}\). In one study, a statewide audit evaluated prophylaxis use in 90 acute care hospitals in Massachusetts by randomly selecting 1397 patients\(^{94}\). Thromboprophylaxis use was higher following hip replacement (85-98%) and colectomy (57-93%) than after hysterectomy (35-71%)\(^{94}\). Use of thromboprophylaxis was higher in larger hospitals and teaching hospitals. In the ENDORSE study, which included 30,827 surgical patients globally, only 59% of those assessed as being at risk for VTE received ACCP-recommended prophylaxis\(^{95}\).

Even when thromboprophylaxis is used, it is often not in accordance with the practice guidelines. This was the finding of a retrospective chart audit done to assess compliance with the ACCP guidelines in 68,278 patients at risk for VTE\(^{96}\). The study included 68,278 patients at risk for VTE. Of these patients, 63.2% received some type of thromboprophylaxis but only 12.9% received guideline-recommended prophylaxis. The main reason for failure to meet ACCP criteria was that no thromboprophylaxis was used at all (in 36.8% of at risk patients)\(^{96}\). In a random chart review of 10 U.S. hospitals, prophylaxis consistent with ACCP Grade A recommendations ranged from 45 to 84%\(^{92}\). In a study of medical patients in Canada, only 16% of those in whom VTE prophylaxis was indicated received appropriate prophylaxis\(^{90}\).

Population database studies have also identified consistent gaps in practice. An international registry of medical patients found that, among patients at risk for VTE, only 37% received any
thromboprophylaxis\textsuperscript{97}. Amin et al conducted a database review of more than 390,000 patients determined to be at risk for VTE and with no contraindications for thromboprophylaxis. They found that only 12.7\% of medical and 16.4\% of surgical patients received appropriate thromboprophylaxis\textsuperscript{89}.

### 4.2.3.2 Adapting knowledge to a local context

Knowledge tools, such as clinical practice guidelines, are created based on the best available evidence and in consultation with experts in the field. However, guideline recommendations are often not utilized by clinicians for a variety of reasons. In order to ensure that knowledge translation occurs, it is vital for pharmacists to understand the importance of the local context in which evidence will be used. This does not mean that the creation and/or affirmation of evidence must be duplicated at each practice site but rather that existing knowledge must consider and sometimes adapt to the needs, resources available and acceptance by clinicians and patients at a specific site. This can be done using a formal, step by step process, such as ADAPTE\textsuperscript{98} (a structured process designed for guideline adaptation) or in a less structured manner by ensuring that all key stakeholders reach consensus on how the evidence will be utilized at their local site\textsuperscript{99}.

Consensus-building is one strategy for improving knowledge use. It allows stakeholders to accept the evidence and adapt it to their practice. This has been demonstrated in the work of Maynard and colleagues where VTE prophylaxis rates were shown to increase from a baseline of approximately 50\% to 70\% as a result of consensus-building that led to a local policy and guideline\textsuperscript{100}. The implementation of a hospital-wide policy (through use of order sets, audit and feedback, etc.) was associated with higher rates of VTE prophylaxis in both medical patients (25\% vs. 42\%, \textit{p}=0.0075) and surgical patients (64\% vs. 97\%, \textit{p}=0.004)\textsuperscript{100}. Furthermore, the
investigators reported a significant decrease in hospital-acquired VTE in the 2 years after implementation (adjusted OR 0.68, 95% CI, 0.62 to 0.75)\textsuperscript{100}.

4.2.3.3 Assessing Barriers and Facilitators to Knowledge Use

Understanding KT requires an understanding of the theoretical underpinnings of changing prescriber behaviour and producing organizational change. It is important to appreciate that the healthcare team cannot be considered outside of the setting in which it functions. Therefore, environmental, organizational, financial, and social setting factors need to be considered as potential barriers to implementation of evidence. These are summarized in Table 4-3.

Table 4-3: Examples of Barriers to Knowledge Use\textsuperscript{76}

<table>
<thead>
<tr>
<th>Category of Barrier</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence (or guideline) characteristics</td>
<td>• Lack of awareness of the existence of the guidelines</td>
</tr>
<tr>
<td></td>
<td>• Lack of agreement with guidelines in general (e.g. too rigid; biased)</td>
</tr>
<tr>
<td></td>
<td>• Lack of agreement with the specific guideline (e.g. recommendations may not apply to their patients or be cost-effective)</td>
</tr>
<tr>
<td></td>
<td>• Disagreement between two or more sets of guidelines for a specific clinical problem</td>
</tr>
<tr>
<td></td>
<td>• Guidelines that are cumbersome or difficult to use</td>
</tr>
<tr>
<td></td>
<td>• Lack of resources to make the necessary changes</td>
</tr>
<tr>
<td>Physician (or provider) characteristics</td>
<td>• Lack of awareness of evidence (time restrictions, inability to access latest resources)</td>
</tr>
<tr>
<td></td>
<td>• Lack of agreement with evidence that was used to develop the guidelines</td>
</tr>
<tr>
<td></td>
<td>• Lack of self-efficacy (lack of belief/confidence in one’s own ability to perform a behaviour, e.g. cannot)</td>
</tr>
</tbody>
</table>
| Environmental or social setting factors | • Lack of resources (e.g. human resources, equipment or facilities) needed for new practice  
• Proposed new practice leads to increased liability (or may involve regulatory or legal issues)  
• Time constraints  
• Lack of “buy in” from social network (peers/colleagues are not convinced that the evidence or new practice should be applied) |
| perform a new procedure)  
• Inertia / Lack of motivation  
• Low expectancy of favourable outcomes  
• Perception of negative outcomes associated with new practice |

Specific to VTE prophylaxis, some additional barriers to thromboprophylaxis use include:\[101:\]

- Perception that VTE is not a problem for the clinician’s patient group (e.g. surgeons may believe their patients are at low risk for VTE because they may not be aware when their patients return to hospital with a DVT or PE)
- Concern about negative outcomes for the patient should thromboprophylaxis be ordered (e.g. bleeding risks, infection resulting from wound hematomas)
- Difficulty of use of oral anticoagulants (e.g. warfarin)
- Costs

For many years, the gap between evidence and practice in VTE prophylaxis was not measured and there was little emphasis placed on this important aspect of patient care. For this reason, the under-prescribing of VTE prophylaxis was accepted by many physicians.
4.2.3.4 Selecting KT Interventions

Selecting KT interventions involves assessing the available resources, identifying the target audience and the existing barriers, and designing one or more tailored interventions to achieve the prespecified objectives.

With respect to guideline implementation, categories of interventions that have been proposed include\textsuperscript{102} \textsuperscript{103}:

- Professional interventions (e.g. education, reminders, feedback)
- Patient-directed interventions (e.g. patient decision aids)
- Organizational interventions (e.g. revision of professional roles)
- Financial interventions (e.g. incentive programs)

One framework that has been proposed for understanding KT interventions is the Pathman-PRECEED model which classifies interventions as \textit{predisposing}, \textit{enabling} or \textit{reinforcing}\textsuperscript{104}. This model considers whether the intervention helps increase \textit{awareness of}, \textit{agreement to}, \textit{adoption of} or \textit{adherence to} evidence by the target group\textsuperscript{104}.

Formal education is often discredited as having no impact on changing practice\textsuperscript{105}. The ability to change clinician behaviour through formal CE is certainly limited\textsuperscript{105}. However, active learning can increase the effectiveness of continuing education and plays a key role in \textit{predisposing} the clinician to change\textsuperscript{40}. For this reason, educational interventions comprise important but only one component of a KT intervention. Large group didactic education is less effective than one-on-one education or small group education conducted by a key opinion leader. In fact, academic detailing or educational outreach visits have been found to be consistently effective strategies for guideline dissemination\textsuperscript{106} and have demonstrated positive outcomes including reduction in test
ordering, adherence to guidelines and reduction in cost\textsuperscript{106,107}. Examples of interventions that have been used to improve VTE prophylaxis are categorized in Table 4-4.

**Table 4-4: KT Strategies in VTE as per Pathman-PRECEDE Classification\textsuperscript{104}**

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Predisposing   | • Traditional CE (didactic lectures, conferences, etc.)  
• Dissemination of VTE prophylaxis guidelines |
| Enabling       | • National strategies and incentive programs  
• Use of order sets or computerized prescriber order entry (CPOE) which include VTE prophylaxis  
• Clinical decision support tools  
• Reminders – in the form of computer alerts or human alerts (e.g. pharmacists) |
| Reinforcing    | • Audit and feedback – retrospective or real-time; at the individual, patient care unit or hospital level |

The quality of the evidence for specific KT interventions remains limited but this area of investigation is growing. Effect sizes of interventions are modest, however, the absolute degree of change is often less significant than the clinical impact that even a small change in the process of patient care\textsuperscript{119}.

The vast majority of interventions used to improve VTE prophylaxis target healthcare professionals. There have been four recent systematic reviews\textsuperscript{108-111} that have discussed the interventions utilized to improve VTE prophylaxis. The subsequent section of this chapter highlights some of these interventions.
Strategies to improve VTE prophylaxis have been proposed at national and local levels. A number of countries have implemented national strategies, incentives and, in some cases, legislation to improve thromboprophylaxis. These include the U.K. (National Institute for Health and Clinical Excellence), the U.S. (The Joint Commission/National Quality Forum) and Canada (Accreditation Canada). These examples of regulatory interventions or financial rewards or penalties serve as external motivation for change and may lead to increased administrative support for the intervention.

*Local strategies* involve those relevant to a healthcare organization, patient care unit or group of prescribers. At the local level, interventions include education, reminders and audit and feedback. Education has included passive dissemination of VTE prophylaxis guidelines and has been shown to be insufficient to change practice to a level where most patients at risk are protected. Evidence does suggest, however, that active dissemination of guidelines (dissemination actively targeted to clinicians rather than simply providing them with the expectation that clinicians will find the guidelines on their own) and education that is longitudinal can lead to improvements in rates of VTE prophylaxis. The limited value of dissemination of guidelines is to *increase awareness* and to *predispose* clinicians to change.

Active strategies used in VTE prophylaxis have focused on the use of reminders and decision support (enabling strategies) that bring the evidence to the point of care. Most of the work done in this area has employed computer-based alerts with the result of increased rates of prophylaxis to adherence in the 90-100% range. These strategies can either be in the form of computerized provider order entry reminders or as computerized clinical decision-support systems or alerts to individual clinicians that their specific patient is at risk. The limitation of these types of alerts,
however, is that their impact is not sustained and the impact is diminished when the alert is no
longer present\textsuperscript{108 109 112}.

Some studies have evaluated the use of paper-based order sets and have demonstrated
improvement in prophylaxis rates in a range from 44\% to 89\%\textsuperscript{110}. With paper pre-printed order
sets, it is important to ensure that the form is being completed and, if possible, to create a default
policy where a clinician must choose an evidence-based approach for their patient at risk unless
they actively opt-out\textsuperscript{82}. The value of eliminating the optional completion of order sets has been
shown in the work of Lesselroth and colleagues who demonstrated that use of the order set
increased from 20\% to 80\% after switching from optional to mandatory completion although
100\% compliance was still not achieved\textsuperscript{113}.

An additional professional intervention that is a useful reinforcing strategy is audit and feedback.
Audits can be used to increase awareness of local knowledge-care gaps. Audit results can be
provided to and discussed with individual clinicians, patient care areas or at the level of the
organization. Audits can be done retrospectively or in real-time and feedback provided to the
clinical team and/or other relevant stakeholders. Real time audits (providing feedback on
patients currently in the clinician’s care) have been shown to be most effective as they allow
clinicians to change practice at the point of care\textsuperscript{100 114 115}.

A number of studies evaluating VTE prophylaxis have utilized multiple interventions to improve
prescribing to patients at risk. Multi-component interventions have included education along
with two or three other interventions. Multicomponent interventions have been able to show
significant improvements in the rates of VTE prophylaxis\textsuperscript{109-111 115 116}. The studies with the
greatest impact combine interventions that are *predisposing* (education), *enabling* (reminders, computer-based clinical-decision support) and *reinforcing* (audit and feedback)\(^{100} 108 109 117\).

4.2.3.5 Monitoring and Evaluating Knowledge Use

Pharmacists should be encouraged to evaluate the impact of KT interventions with the same principles they use in critically appraising clinical research. The first step is to consider the outcome - what type of knowledge will be measured. Various methods to categorize knowledge use have been proposed. One of the most relevant to the work of KT categorizes knowledge use into three areas\(^{77} 118\):

- Conceptual (describes changes in levels of knowledge, understanding, attitudes)
- Instrumental (changes in behaviour or practice)
- Strategic (“research as ammunition” for specific power or profit)

Conceptual knowledge is similar to the outcomes described in Chapter 2 as educational outcomes of CE/CPD. Although conceptual knowledge use is important to set the stage for knowledge translation, the use of evidence is best measured as instrumental knowledge use to measure changes in process of care or patient level outcomes.

Most of the studies in VTE prophylaxis have used an outcome related to the process of care - prescribing of VTE prophylaxis, based on the large body of evidence supporting the impact of VTE prophylaxis on improving patient outcomes. Some studies have also included balancing measures, the possible negative consequences of increased use of VTE prophylaxis, such as bleeding\(^{100} 117\). These outcomes are useful to dispel misconceptions relating to increased use of the VTE prophylaxis guidelines that may be acting as barriers to practice change.
Measures of knowledge use can be both quantitative and qualitative. Examples of quantitative measures include the proportion of patients for whom a surgical checklist is completed prior to surgery or the proportion of patients at risk for VTE who received appropriate thromboprophylaxis. Qualitative measures may include a survey of nursing personnel to explore their knowledge and their use of this knowledge or interviews to explore barriers to knowledge use. Knowledge use can be measured at the level of the:

1) Patient: quantitative measures such patient outcomes and also qualitative measures such as patient satisfaction

2) Healthcare provider: knowledge acquisition, changes in attitude or behaviour, health care provider satisfaction

3) Organization: process of care

As KT interventions are planned, the evaluation of KT should be designed using the most rigorous trial design possible and the resources available to conduct the evaluation. Some methods that have been used in KT have included:

- Randomized trials (including cluster randomized trials)
- Time interrupted series
- Observational study
- Before-and-after study
- Questionnaires and surveys

In choosing the method of evaluation, it is important to consider whether the impact of the intervention will be used at the local level or if it is expected to have broader impact and dissemination. At the local level, it may be sufficient to use a before-and-after study design to
ensure that the strategies work in the local setting. However, a KT trial that is designed to measure the impact of an intervention in a variety of settings may be better designed as a cluster randomized trial to increase the rigor and improve generalizability to other settings. Consideration must also be given to the feasibility of using various trial designs. Patient level outcomes may lend themselves to a randomized controlled trial whereas outcomes related to the process of care may be better evaluated using a cluster-randomized trial or a before-and-after study.

4.2.3.6 Sustaining Knowledge Use

The most challenging stage of the KTA cycle is sustaining knowledge use, ensuring that the interventions or processes that have been put in place make a sustained positive change to patient outcomes or the processes of care. Most of the available VTE prophylaxis studies have looked at short-term improvements in the process of care with little information on the sustainability of the results achieved.

The ability of a KT intervention to have a sustained effect is dependent on the ability of people and organizations to change. A list of barriers and facilitators for sustained knowledge use has been proposed that is useful to consider when planning for KT. These include\textsuperscript{120}:

- Relevance of the topic – includes how well the topic aligns with institutional priorities
- Benefits – the anticipated outcomes of knowledge implementation
- Attitudes – of all stakeholders
- Networks – capitalizing on teams or groups that can facilitate sustained knowledge use
- Leadership – actions taken by leaders and managers to ensure sustained knowledge use
- Policy articulation and integration – how the knowledge is integrated into policies
• Financial – the cost-effectiveness of the intervention
• Political – stakeholders and their power and support

Some of the longer term studies that have shown sustained improvement\textsuperscript{100} have taken these factors into account in planning the interventions and continue to provide feedback on performance to sustain improvements in care.

4.3 Conclusion – Knowledge Translation in VTE Prophylaxis

With respect to VTE prophylaxis, improvement in knowledge use can only be sustained if the interventions put in place address the factors identified above. This includes developing a VTE prophylaxis policy that is institution-specific and approved by relevant stakeholders and made available for all practitioners. The policy must be integrated into the process of care either through the use of order sets with embedded VTE prophylaxis recommendations or through Clinical Decision Support tools, Computerized Provider Order Entry (CPOE) or computerized alerts that help clinicians identify patients at risk and recommend appropriate VTE prophylaxis.

Ensuring that patients are provided with VTE prophylaxis should be the responsibility of all members of the multidisciplinary team (including nurses and pharmacists, not only physicians). Support must be available from administration and VTE prophylaxis should be a priority for the hospital. Clinicians should be convinced of the effectiveness and cost-effectiveness of VTE prophylaxis and provided with feedback on adherence with the recommendations. Evaluating hospital-acquired VTE and bleeding is helpful. Finally, the interventions should be dynamic and adaptable to new evidence as it becomes available. As a learning example, a KT study in VTE prophylaxis is described in Chapter 5.
Figure 4.1 is used with permission: Lost in knowledge translation: Time for a map? Graham, I.D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., and Robinson, N. Journal of Continuing Education in the Health Professions, 26(1). Copyright ©2006. The society for Academic Continuing Medical Educations, and The Association for Hospital Medical Education.
Chapter 5

5 The TOronto ThromboProphylaxis Patient Safety Initiative (TOPPS): a cluster randomized trial

5.1 Abstract:

Background:

Venous thromboembolism (VTE) is one of the most common but also one of the most preventable complications of hospital stay. A review of the literature establishes that a large gap exists between the well-established evidence for VTE prevention and actual practice. Studies to improve VTE prophylaxis have suggested that multi-component interventions show the greatest benefit; however, none of these studies have used a randomized design. The objective of this study was to determine if a multi-component knowledge translation (KT) strategy could increase the use of appropriate thromboprophylaxis for patients hospitalized for hip fracture surgery (HFS), major general surgery (MGS) or acute medical illness (AMI).

Methods:

The Toronto Thromboprophylaxis Patient Safety Initiative (TOPPS) involved eight hospitals in the Toronto area in Ontario, Canada. The study utilized a cluster randomized trial design in three phases. After the baseline data collection phase, one of the three patient groups at each participating site was allocated to receive the targeted intervention while the other two patient groups continued to serve as controls. In the third phase, an additional patient group was targeted to receive the intervention while the third group remained a control. Standardized chart audits were conducted at baseline and after each of the intervention periods to assess the rates of appropriate thromboprophylaxis use for patients at risk in each of the three groups.
The KT intervention included:

1. Involvement of hospital senior leadership, key stakeholders and leadership by the department of pharmacy
2. Use of order sets that included VTE prophylaxis
3. Audit and feedback
4. Education of hospital staff

Results:

At baseline, the rates of appropriate thromboprophylaxis were 79% in HFS, 43% in MGS and 31% in AMI. Improvement was greater in the intervention groups than in the groups that served as controls for all three patient groups (85% vs. 76% in HFS; 67% vs. 54% in MGS; 64% vs. 62% in AMI) and this difference reached significance in the MGS group (p=0.048). By the end of phase 3, 89% of HFS, 65% of MGS and 70% of AMI patients were receiving appropriate prophylaxis. These improvements were all statistically significant.

Interpretation:

Use of a multi-component intervention, including the support of hospital leadership, use of order sets, audit and feedback, and active pharmacy involvement can be effective in improving the appropriate use of thromboprophylaxis. As with many KT interventions, the desired changes in practice took substantially longer than anticipated. Long-term sustainability of the improvements was not assessed in this study.

5.2 Introduction

Venous thromboembolism (VTE), which includes deep vein thrombosis (DVT) and pulmonary embolism (PE), is one of the most common and preventable complications of hospital stay\textsuperscript{78}. 

\textsuperscript{78}
VTE has been found to be the 2nd most common cause of excess length of hospital stay, and the 3rd most common cause of excess mortality and excess hospital charges. Massive PE is the cause of death in approximately 10% of deaths in hospital making PE the most common preventable cause of hospital death. Several hundred randomized trials of various thromboprophylactic regimens demonstrate that thromboprophylaxis reduces asymptomatic DVT, symptomatic VTE, fatal PE, and all-cause mortality, while, at the same time, reducing health care costs. In addition, numerous evidence-based consensus guidelines recommend the routine use of thromboprophylaxis in hospitalized patients at risk. Among more than 75 safety interventions, the provision of thromboprophylaxis has been ranked the number one patient safety strategy for hospitalized patients. Despite the abundant evidence supporting the use of thromboprophylaxis, audits of patient care consistently find major gaps in the provision of this key patient safety intervention. In most studies, fewer than 50% of patients at risk received thromboprophylaxis. Reviews of the literature on implementation strategies for VTE prophylaxis suggest that passive strategies, such as education alone or dissemination of guidelines, are relatively ineffective. Interventions should be multi-faceted, should address local barriers and should include a reminder mechanism or alert for physicians to prescribe appropriate thromboprophylaxis. To date, studies designed to address implementation of evidence-based thromboprophylaxis have been either observational or before-after studies from single sites. A recent Cochrane review of interventions for implementation of thromboprophylaxis in hospitalized patients at risk for VTE included only 8 RCTs and 47 non-randomized trials. In most of these studies, the primary outcome was the use of any thromboprophylaxis rather than the use of appropriate thromboprophylaxis.
The Toronto ThromboProphylaxis Patient Safety Initiative (TOPPS) was a multi-centre, cluster randomized trial designed to assess the impact of a multi-component intervention on rates of appropriate thromboprophylaxis. The aim of the study was to assess whether the rates of appropriate thromboprophylaxis could be improved across 8 hospitals and in three patient groups: acute medical illness (AMI), major general surgery (MGS) and hip fracture surgery (HFS).

5.3 Methods:

5.3.1 Design:
The chief executive officers (CEO) at eight Toronto area hospitals in Ontario, Canada, including one academic health sciences centre and seven community hospitals, were invited to participate (Figure 5-1). If the CEO signed the participation agreement, a meeting was coordinated through the director of pharmacy and involved multidisciplinary stakeholders to confirm the commitment of the local quality improvement team and to discuss known or potential barriers to full participation. TOPPS was designed as a three-phase, cluster randomized trial with the unit of randomization being the specific patient groups in each of the hospitals rather than individual patients. This design was chosen to allow teams to focus on one patient group at a time and to allow for assessment of whether the intervention affected adherence with thromboprophylaxis. Research ethics approval was obtained at each of the participating hospitals.

5.3.2 Participants:
The three patient groups at each site were selected to represent patients that would be commonly cared for at all general hospitals and that represent groups with known high (HFS), moderate (MGS) and lower (AMI) risks of VTE without prophylaxis. Inclusion criteria were: age at
least 18 years, hospital admission for more than 48 hours and at risk for VTE based on the American College of Chest Physicians (ACCP) thromboprophylaxis guidelines available at the time. The only exclusion was the use of therapeutic anticoagulation. If patients at risk for VTE had a contraindication to anticoagulant prophylaxis, mechanical prophylaxis was considered appropriate.

5.3.3 Interventions:

The study had three phases - a baseline phase and two subsequent intervention phases. Appropriate thromboprophylaxis use at baseline was assessed by a chart review of approximately 50 consecutive eligible patients in each of the three groups at each centre (in some centres, patient volume required lowering of the target number of patients at baseline). All chart audits in each phase were completed by two expert data abstractors (AD, TP) using formal definitions of eligible patients and appropriate thromboprophylaxis based on the ACCP guidelines. This standardized patient selection and data abstraction process was selected to reduce variability in case selection and outcome assessment compared with using multiple local abstractors. Any discrepancies or uncertainties were reviewed with a clinician expert (WG).

After baseline data collection (phase 1), local teams worked to implement the KT strategies in the patient group randomized to the active intervention while the other two patient groups at that centre continued with usual care (control) (Table 5-1). The components of the intervention, summarized in Figure 5-1, included use of pre-printed orders with VTE prophylaxis, use of the pharmacist as a “human alert”, audit and feedback as well as education of care providers.

Randomization occurred at the level of the cluster (Table 5-1). The intervention impacted the process of care and therefore individual patient randomization would be inappropriate because of contamination. This process occurred over two phases with data collection at the end of each
phase. Each centre had one patient group assigned to the active intervention and two groups as controls (usual care) in phase 2. In phase 3, two groups at each centre received the active intervention (the active group in phase 2 plus a randomly selected second group) while the third group remained as control. Interventions were implemented by the local teams with the support of the research team (AD, WG) who provided sample order sets and other materials, addressed issues as teams adapted the guidelines to their local setting, helped guide teams with implementation, and provided some of the education.

5.3.4 Outcomes:
The primary outcome was the rate of prescribing appropriate thromboprophylaxis defined as: ordered within 24 hours of admission to hospital or after the end-of-surgery time, guideline-recommended (anticoagulant or mechanical) at the appropriate dose and continued for an appropriate duration (until discharge for AMI and MGS and for at least 10 days after surgery for the HFS group)\textsuperscript{134}. If a patient was in hospital for greater than 10 days after HFS, appropriate duration was defined as until discharge. A secondary outcome was the impact of order sets (irrespective of randomization to intervention) on the prescribing of appropriate thromboprophylaxis. For patients who did not receive appropriate thromboprophylaxis, the reasons for non-adherence were assessed.

Sample Size: Based on the rate of adherence of 55% in the 1175 patients from all three groups at baseline and an intraclass coefficient of 0.24, it was calculated that a sample size of 432 patients would be needed for the intervention phases of the study to detect an improvement of 20% in the rate of prophylaxis (which would be an expected modest effect based on the literature)\textsuperscript{116,135-139} with power of 80% at \(\alpha=0.05\). A study sample of 720 patients was selected in order to capture the minimum of 432 patients identified by the sample size calculation but also to
provide a cluster size that was feasible and would provide meaningful feedback to the teams. This resulted in cluster sizes of 15 patients in each of 24 clusters (8 hospitals with 3 groups at each site) in the post-intervention phases (15 patients x 3 groups x 8 hospitals x 2 years). The sample size calculation was carried out using PASS Version 8.0.8\textsuperscript{140}.

5.3.5 Timelines:
Baseline data was collected in 2006 and represented a retrospective review of consecutive charts for patients admitted in early 2006. Each active phase of the study was 1 year in length. The patient charts reviewed for each phase reflected patients admitted in approximately the same part of the year. The follow-up audits were conducted in 2008 and 2009.

5.3.6 Analysis:
Descriptive statistics were carried out using counts and proportions to capture the rates of appropriate VTE prophylaxis and reasons for non-adherence by treatment group and over time. A logistic regression model (i.e. Generalized Estimating Equation Model) was used to compare rates of appropriate VTE prophylaxis between groups adjusted for clustering (correlation among observations taken at the same hospital). A similar model was used to compare the intervention phase to control phase within groups and over time. The models showed the relationship between adherence and time, and adherence and treatment. No other variables of interest were measured in this study. The model estimates were displayed as odds ratios with their associated 95% confidence intervals. All analyses were carried out using SAS Version 9.1\textsuperscript{141}.

5.4 Results:
Each of the eight hospitals that were invited agreed to participate and completed all three phases of the study. At baseline, appropriate thromboprophylaxis rates were assessed in 1,175 patients
(mean of 49 patients per group in each hospital). The average baseline rates of appropriate thromboprophylaxis across the 8 sites were: 79% in HFS (range: 21-95%), 43% in MGS (range 15-84%) and 31% in AMI (range: 13-65%) (Figure 5-2). The results by hospital in each group across the study period are presented in Table 5-2. The overall rate of appropriate thromboprophylaxis at baseline was 49% (range: 20-65%) indicating that only half of all patients with an indication for thromboprophylaxis received appropriate prophylaxis. The main reasons for non-adherence differed among patient groups (Table 5-3). For HFS, thromboprophylaxis was ordered in 304 of 341 (89%) patients but of those, it was not continued for an appropriate duration in 34 (11%). Among patients admitted for MGS, 197 of 416 (47%) did not have any prophylaxis ordered or had prophylaxis ordered but at an inappropriate dose (e.g. heparin 5000 units subcutaneously twice daily rather than three times daily in cancer surgery). For patients admitted for an AMI, the main reason for non-adherence with appropriate prophylaxis was that no prophylaxis was ordered (in 58% of all at-risk medical patients).

The rates of appropriate prophylaxis increased in all patient groups at all sites over the study period (Table 5-2, Table 5-4, Figure 5-3). The overall rate of prophylaxis for all study patients increased an average of 53% from 49% to 75% (Figure 5-3). The improvements in adherence at the end of phase 2 compared to baseline were significant in each of the three patient groups (Table 5-4). The improvement was greatest in the AMI patients, the group with the greatest room for improvement. The odds ratio for appropriate thromboprophylaxis use from baseline to Phase 2 was 2.2 for HFS (p=0.017), 2.4 for MGS (p<0.001) and 5.2 for AMI (p<0.0001).

The rates of appropriate thromboprophylaxis in the active intervention groups were compared to those in the control groups. This analysis was done comparing control to intervention at end of phase 2 and at end of phase 3 as well as comparing the combined results from these two phases.
to baseline. Combining the two phases allows for more meaningful interpretation of the results as the intervention would have been in place for a longer period of time, in some case 2 years.

The overall prophylaxis rates in HFS were 76% in control vs 85% in intervention; in MGS, 54% in control vs 67% in intervention; and in AMI, 62% in control and 64% in intervention (Figure 5-4). The improvement rates were higher in the intervention groups than in the control groups for each of the patient subsets: 7% improvement in prophylaxis use in the intervention groups for HFS compared to a 4% decrease in the control HFS groups, 55% vs. 24% improvement in MGS and 106% vs. 99% improvement in AMI. The adherence rates by study allocation are seen in Table 5-5.

The use of pre-printed order sets was captured independent of the randomization of intervention vs. control in phase 2 and 3. This was done recognizing that some sites already had order sets with VTE prophylaxis in place prior to the initiation of the study. The use of pre-printed order sets was associated with prescribing of appropriate thromboprophylaxis in 74% of patients vs. 64% in those without a pre-printed order (OR 1.6, CI=1.12-2.16, p=0.009) across all clusters.

5.5 Discussion:

5.5.1 Summary:

We believe that TOPPS is the first multicentre cluster randomized trial to evaluate a KT intervention for VTE prophylaxis. This study provides evidence that a multi-component, pharmacy-led intervention utilizing senior leadership support, pre-printed orders, pharmacists as human alerts, audit and feedback, and education can substantially improve the rates of appropriate thromboprophylaxis in patients at risk for VTE. The baseline thromboprophylaxis rates were similar to those reported in other studies, 79% for HFS, 43% for MGS and 31% for
In our study, patients in each of the groups were selected such that the appropriate rate of thromboprophylaxis, based on evidence-based guidelines, should be 100%. Overall, the majority of patients who did not meet the criteria of appropriateness did not have any order for thromboprophylaxis. In addition, it was clear that not all hospitals had a process in place to ensure post-discharge thromboprophylaxis for HFS patients which resulted in inadequate duration of thromboprophylaxis. The rates of appropriate thromboprophylaxis increased across all centres and all groups over the study period. The increase in rates was greatest in AMI where the largest gap existed at baseline (31% at baseline vs. 70% at end of phase 3), moderate in MGS (43% vs. 65%) and smallest in HFS (79% vs. 89%). The rates of appropriate thromboprophylaxis were greater in intervention compared with control. The changes observed in this project are likely attributable to the study interventions as the rates at baseline were consistent with the literature and no additional strategies were implemented at the hospitals during the study period. Furthermore, the improvements were seen in each of the hospitals. This study was performed before a national VTE prophylaxis accreditation standard was launched in Canada.

Numerous strategies have been assessed to increase the use of thromboprophylaxis in hospitalized patients, including education alone, personal or electronic reminders and combinations of these interventions. These strategies have generally been studied in single sites and have involved small numbers of patients and short durations between the intervention and outcome assessment. Dissemination of guidelines, even when coupled with education, has not shown improvements in VTE prophylaxis rates. When guidelines have been adapted to the local context, the impact appears to be modest. Audit and feedback is a proven quality improvement strategy that has been shown to improve prescribing of
thromboprophylaxis\textsuperscript{108 133 148}. Reminders or alerts are one of the most commonly utilized interventions both as computerized alerts\textsuperscript{108 128 133} and as human alerts\textsuperscript{114 116}. Alerts have led to at least transient increases in thromboprophylaxis use; however, when alerts are no longer present, the use of thromboprophylaxis returns to pre-intervention levels\textsuperscript{149}.

Multicomponent interventions have been shown to increase prescribing of VTE prophylaxis\textsuperscript{100 116 117 135-138 150-157}. A number of pharmacy-led, multicomponent interventions have recently shown a positive effect on thromboprophylaxis as well as on rates of DVT\textsuperscript{116 139 150 153 154 158}. These studies have mainly been single-site studies and have commonly focused on a single patient group within the hospital. Sustained improvement in thromboprophylaxis depends on an intervention that combines an organizational commitment to change (support of senior leadership and a team to lead the change), a strategy that enables change in the process of care (e.g. use of order sets or Computerized Provider Order Entry (CPOE) with embedded VTE prophylaxis options) and a strategy that reinforces change (e.g. use of audit and feedback). TOPPS was a pharmacy-led, multi-component KT initiative that involved active interventions and that incorporated these key elements. The absolute increases in rates of VTE prophylaxis in the intervention groups at the end of the TOPPS study compared with baseline were 6% (HFS), 24% (MGS) and 33% (AMI). This represents rates of improvement of 13%, 34% and 56%, respectively.

5.5.2 Strengths and Limitations:

5.5.2.1 Strengths:

- Cluster randomized trial design to assess the impact of the KT intervention
- Multicomponent intervention implemented at multiple sites using local multidisciplinary teams to lead the change
• Assessment of the use of *appropriate* thromboprophylaxis rather than *any* thromboprophylaxis

• Outcome assessment by the same assessors across all hospitals and phases using standardized a priori criteria to reduce sampling and interpretive variability

5.5.2.2 Limitations

• Improvement was seen in all patient groups over time reducing the difference between control and intervention groups

• Not possible to determine which component(s) of the intervention contributed to the improvement

• Time required to implement the intervention and to observe maximal impact was longer than anticipated

• Long-term sustainability of the intervention was not assessed

To the best of our knowledge, the TOPPS study is the first cluster randomized trial to assess a multicomponent intervention to improve VTE prophylaxis across multiple centres. Furthermore, TOPPS principally assessed adherence with thromboprophylaxis in community hospitals where resources for this type of KT work may be more limited. This trial design along with the multicentre focus allows for a rigorous assessment of the impact of a KT intervention in VTE prophylaxis. It is also the first study of its kind to evaluate the use of appropriate thromboprophylaxis defined as use of guideline-recommended options, correct dose, timing, and duration rather than use of any thromboprophylaxis for optimal patient safety. This study was conducted over a period of three years and assessed both the uptake of a KT intervention and the sustainability of improvement in the intermediate term. Interventions were designed to increase the knowledge of healthcare providers and, more importantly, to ensure that evidence was
integrated into the process of care by providing clinicians with the tools to support the initiative’s goals at the point of admission and/or postoperative medication ordering. Local representation is vital in understanding and addressing hospital-specific barriers to implementation, allowing local teams the opportunity for buy-in, and supporting local leaders to champion change.

These results must be interpreted in the context of the limitations of a multi-centre, knowledge translation initiative. The time required for the development, approval and implementation of pre-printed order sets with embedded VTE prophylaxis, in some cases, was longer than the anticipated 1 year period. The post-intervention audits were obtained before full implementation had occurred in some centres. The multi-component nature of the intervention made it impossible to determine the degree to which each component of the intervention contributed to the observed improvements. However, based on formal feedback from the participants, the use of order sets appeared to have the greatest impact.

The nature of the interventions required local buy-in and leadership for implementation. The sites were not blinded to the randomization and, therefore, were aware of which patient group was assigned to the active intervention in each phase. At one site, the Internal Medicine group was ready to develop order sets for their patients even though that centre was randomized to the Phase 2 intervention in major general surgery. At another site, the use of pre-printed orders was already in place prior to the start of the study. At baseline, this team received feedback that they were doing well in comparison to the other 7 hospitals and the local team described less motivation to making additional changes to implement the intervention. At some sites, the members of the implementation team provided service to more than one patient group. Their involvement in the intervention group may have influenced the care they provided in the control groups leading to contamination of the results. The unit of randomization in this study was the
cluster, the patient care group at each hospital, as randomization at the individual patient level would likely be associated with even greater risk of contamination. Since each hospital was in the intervention for one group during phase 2 and 2 groups for phase 3, there was no pure control group in the study. The combined effect of these factors may help to explain why rates also improved in the control group and why even greater improvement was not seen in the intervention groups as compared to control.

Another limitation of this study is that we did not address the impact of VTE prophylaxis on hospital-acquired VTE or bleeding rates. However, the impact of prescribing VTE prophylaxis has demonstrated its effectiveness and safety in other studies\textsuperscript{100, 145, 157}. Despite evidence to suggest that electronic alerts and reminders are effective\textsuperscript{108, 133}, the sites involved in this study did not have CPOE and, therefore, these interventions were not included. Finally, this study had a limited duration of follow up. Long-term sustainability with the reinforcing strategy of audit and feedback was not assessed.

5.6 Conclusion:

This is the first study to assess the impact of a multicomponent, multi-centre, pharmacy-led intervention to improve VTE prophylaxis using a cluster randomized trial design. VTE is increasingly becoming recognized as an important patient safety intervention. In the U.S., a number of agencies including Joint Commission, National Quality Forum, Centers for Medicare and Medicaid, and Agency for Healthcare Research and Quality, have produced target quality indicators as well as system drivers, including “pay for performance” and public reporting of thromboprophylaxis rates\textsuperscript{159}. In Canada, VTE prevention became an Accreditation Canada Required Organizational Practice (ROP) in January 2011, implying that all hospitals are expected to have formal strategies in place to provide evidence-based thromboprophylaxis to
patients at risk of VTE. The methods and results of our study may help hospitals in their quality improvement work in this area by providing evidence of the impact of interventions to improve VTE prophylaxis. Embarking on a multi-faceted intervention involving the support and involvement of key stakeholders, the use of pre-printed orders including VTE prophylaxis, audit and feedback, and education help ensure that hospitals achieve their local and national goals. Further research is needed to assess the sustainability of improvements in VTE prophylaxis. Studies comparing the impact of various interventions would also add to this body of knowledge. The evidence for the effectiveness and cost-effectiveness of VTE prophylaxis is strong. An equally strong body of evidence for the implementation of VTE prophylaxis guidelines is encouraged to help guide and support clinicians and administrators in putting evidence into practice to improve outcomes for hospitalized patients.

5.7 Funding:
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Figure 5-1: Study Design

- Invitation letter to CEO and Director of Pharmacy at each potential site
- Meet with Key Stakeholders at each site
- Phase 1: Baseline Audit and Feedback
- Phase 2: Audit and Feedback
- Phase 3: Audit and Feedback
- Formal agreement to Participate
- Cluster Randomization
- Implement interventions in one patient group
- Second Randomization
- Implement interventions in a second patient group

Components of the Intervention:

1. Involvement of key stakeholders (and leadership by department of pharmacy)
2. Use of pre-printed order sets with embedded VTE prophylaxis recommendations – it was suggested that an “opt-out” design be used for ordering VTE prophylaxis
3. Involvement of the pharmacists as “human alerts” or reminders (pharmacists were encouraged to review their patients, identify those not receiving appropriate prophylaxis, and remind physicians to assess these patients and consider thromboprophylaxis, if appropriate)
4. Audit and Feedback
   a. Baseline and end-of-phase chart audits of appropriate thromboprophylaxis use
   b. Feedback was provided in the form of a summary letter to the local team at each site and to local senior administrators. A formal feedback session was held at each site to discuss the findings
5. Education
   a. Grand Rounds presentations
   b. Small group education
   c. Dissemination of ACCP guidelines
Figure 5-2: Appropriate VTE Prophylaxis Use at Baseline - all sites combined

Abbreviations: HFS = Hip Fracture Surgery; MGS = Major General Surgery; AMI = Acute Medical Illness
Figure 5-3: Rates of Appropriate VTE Prophylaxis over the study period – all sites combined

Abbreviations: HFS=Hip Fracture Surgery; MGS=Major General Surgery; AMI=Acute Medical Illness
Figure 5-4: VTE Prophylaxis Use in the Control and Active Intervention Groups

![Bar chart showing VTE prophylaxis use in the control and active intervention groups.](chart)

- **HFS**: 76% (Control) vs. 85% (Intervention)
- **MGS**: 54% (Control) vs. 67% (Intervention)
- **AMI**: 62% (Control) vs. 64% (Intervention)
Table 5-1 – Randomization of Clusters to Active Intervention and Control Groups

<table>
<thead>
<tr>
<th>Site</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active intervention group</td>
<td>Control groups</td>
</tr>
<tr>
<td>A</td>
<td>AMI</td>
<td>MGS + HFS</td>
</tr>
<tr>
<td>B</td>
<td>MGS</td>
<td>AMI + HFS</td>
</tr>
<tr>
<td>C</td>
<td>HFS</td>
<td>AMI + MGS</td>
</tr>
<tr>
<td>D</td>
<td>MGS</td>
<td>AMI + HFS</td>
</tr>
<tr>
<td>E</td>
<td>HFS</td>
<td>AMI + MGS</td>
</tr>
<tr>
<td>F</td>
<td>MGS</td>
<td>AMI + HFS</td>
</tr>
<tr>
<td>G</td>
<td>AMI</td>
<td>MGS + HFS</td>
</tr>
<tr>
<td>H</td>
<td>AMI</td>
<td>MGS + HFS</td>
</tr>
</tbody>
</table>

Abbreviations: AMI = Acute Medical Illness; HFS = Hip Fracture Surgery; MGS = Major General Surgery
### Table 5-2 – Rates of Appropriate VTE Prophylaxis over the study period by site

<table>
<thead>
<tr>
<th>Site</th>
<th>Patient Group</th>
<th>Appropriate VTE Prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Baseline (n at baseline)(^1)</td>
</tr>
<tr>
<td>A</td>
<td>HFS</td>
<td>83 % (47)</td>
</tr>
<tr>
<td></td>
<td>MGS</td>
<td>84 % (49)</td>
</tr>
<tr>
<td></td>
<td>AMI</td>
<td>21 % (61)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>59 % (157)</td>
</tr>
<tr>
<td>B</td>
<td>HFS</td>
<td>84 % (31)</td>
</tr>
<tr>
<td></td>
<td>MGS</td>
<td>59 % (59)</td>
</tr>
<tr>
<td></td>
<td>AMI</td>
<td>35 % (51)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>56 % (141)</td>
</tr>
<tr>
<td>C</td>
<td>HFS</td>
<td>76 % (46)</td>
</tr>
<tr>
<td></td>
<td>MGS</td>
<td>46 % (50)</td>
</tr>
<tr>
<td></td>
<td>AMI</td>
<td>21 % (57)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>46 % (153)</td>
</tr>
<tr>
<td>D</td>
<td>HFS</td>
<td>94 % (48)</td>
</tr>
<tr>
<td></td>
<td>MGS</td>
<td>37 % (52)</td>
</tr>
<tr>
<td></td>
<td>AMI</td>
<td>65 % (55)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>65 % (155)</td>
</tr>
</tbody>
</table>
### Table 1: Outcome Rates by Intervention Group and Phase

<table>
<thead>
<tr>
<th>Phase</th>
<th>HFS</th>
<th>MGS</th>
<th>AMI</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>70% (47)</td>
<td>67% (15)</td>
<td>93% (15)</td>
<td>45% (147)</td>
</tr>
<tr>
<td></td>
<td>55% (49)</td>
<td>27% (15)</td>
<td>60% (15)</td>
<td>45% (128)</td>
</tr>
<tr>
<td>F</td>
<td>95% (38)</td>
<td>100% (15)</td>
<td>100% (15)</td>
<td>45% (128)</td>
</tr>
<tr>
<td></td>
<td>15% (46)</td>
<td>73% (15)</td>
<td>67% (15)</td>
<td>45% (128)</td>
</tr>
<tr>
<td>G</td>
<td>21% (29)</td>
<td>0% (15)</td>
<td>93% (15)</td>
<td>20% (137)</td>
</tr>
<tr>
<td></td>
<td>20% (59)</td>
<td>47% (15)</td>
<td>47% (15)</td>
<td>20% (137)</td>
</tr>
<tr>
<td>H</td>
<td>91% (55)</td>
<td>100% (15)</td>
<td>93% (15)</td>
<td>55% (157)</td>
</tr>
<tr>
<td></td>
<td>31% (52)</td>
<td>60% (15)</td>
<td>53% (15)</td>
<td>55% (157)</td>
</tr>
</tbody>
</table>

1. At baseline, due to low patient volumes at some hospitals (e.g. in hip fracture surgery), some centres did not have 50 patient cases in each group in the 6 month review period.

2. In phases 1 and 2, n=15 for all groups at all sites.

3. Shaded cells represent the intervention groups in each phase.
Table 5-3 – Reasons for non-adherence with prescribing of appropriate VTE prophylaxis at baseline (across all sites)

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Hip Fracture Surgery (n=341)</th>
<th>Major General Surgery (n=416)</th>
<th>Acute Medical Illness (n=418)</th>
</tr>
</thead>
<tbody>
<tr>
<td># of non-adherent cases (%)</td>
<td>71 (21%)</td>
<td>236 (57%)</td>
<td>288 (69%)</td>
</tr>
<tr>
<td>Reasons for non-adherence*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No prophylaxis ordered</td>
<td>9</td>
<td>130</td>
<td>242</td>
</tr>
<tr>
<td>No pre-op prophylaxis ordered when indicated</td>
<td>9</td>
<td>18</td>
<td>----</td>
</tr>
<tr>
<td>Prophylaxis order delayed longer than 24 hours after admission or end-of-surgery</td>
<td>13</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>Inappropriate method of VTE prophylaxis ordered</td>
<td>2</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Inappropriate dose ordered</td>
<td>6</td>
<td>67</td>
<td>0</td>
</tr>
<tr>
<td>Inappropriate duration</td>
<td>34</td>
<td>14</td>
<td>20</td>
</tr>
</tbody>
</table>

*Cases may have been coded as non-adherent for more than one reason
Table 5-4 – Rates of Prescribing Appropriate VTE Prophylaxis over the study period (all sites combined)

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>HFS</th>
<th>MGS</th>
<th>AMI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>OR (95% CI)*</td>
<td>%</td>
</tr>
<tr>
<td>Phase 1 (baseline)</td>
<td>79</td>
<td>43</td>
<td>31</td>
</tr>
<tr>
<td>Phase 2</td>
<td>71</td>
<td>0.64 (0.40-1.02)</td>
<td>56</td>
</tr>
<tr>
<td>Phase 3</td>
<td>89</td>
<td>2.16 (1.15-4.07)</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=0.017</td>
<td></td>
</tr>
</tbody>
</table>

*Odds Ratio Estimates are provided comparing the results at each Phase to baseline

Table 5-5 – Rates of Prescribing Appropriate VTE Prophylaxis by Patient Group and Study Allocation all sites combined

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Baseline</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 2 &amp; 3 combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>C</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>HFS</td>
<td>79%</td>
<td>73%</td>
<td>70%</td>
<td>89%</td>
</tr>
<tr>
<td>MGS</td>
<td>43%</td>
<td>60%</td>
<td>53%</td>
<td>71%</td>
</tr>
<tr>
<td>AMI</td>
<td>31%</td>
<td>60%</td>
<td>53%</td>
<td>66%</td>
</tr>
</tbody>
</table>

I=Intervention, C=Control
Chapter 6 – Practice Change in Pharmacy

6 Practice Change

6.1 Introduction

Reflecting on the work presented thus far, and considering the recent regulatory changes in the expanded scope of practice for pharmacists, it would seem that CE, CPD and KT provide useful lessons for preparing pharmacists to apply evidence to practice and maintain competence. However, it is also important to explore concepts in change management in order to understand how pharmacy practice can change. For this reason, a review of the literature in change management and applications for pharmacy practice form the basis for this chapter. By understanding barriers and facilitators to change, continuing educators will be better prepared to design educational opportunities that assist practicing pharmacists for their expanded scope of practice.

This chapter begins with a summary of the evolution of the role of the pharmacist and current changes in the profession with the expanded scope of practice. Change management is reviewed both at the level of the individual and within an organizational context. The importance of this literature is summarized throughout with examples from a pharmacy context are used to illustrate the theories.

Preparing a profession for an expanded scope of practice requires an understanding of how an individual prepares for and embraces change as well as an appreciation for the social, organizational and external (e.g. political) influences on change.
6.2 The profession of pharmacy – Evolution of the role of the pharmacist

The profession of pharmacy, along with a number of other healthcare professions, is in a state of evolution in Canada and worldwide. The role of the pharmacist has evolved dramatically over the past century. Pharmacists were traditionally responsible for the manufacturing or compounding of drug products with a primary focus on the quality of the drug product. With the advent of commercial manufacturing of medications, the role of the pharmacist as chemist evolved to a role primarily focused on dispensing drug products. The focus became one of quality assurance to ensure accuracy in the dispensed product. With the evolution of automation in the dispensing process and the greater involvement of pharmacy assistants and technicians in the dispensing function, pharmacists then became more involved in patient interactions. In the 1990s, a greater focus was placed on pharmaceutical care defined as “the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life”\(^{160}\). Within the pharmaceutical care framework, pharmacists became responsible for identifying, resolving and preventing drug-related problems\(^{160}\). This was a significant paradigm shift in pharmacy from a focus on product stability and quality to one of provision of care and contribution to the health of the patient. At the same time, uptake of the model of pharmaceutical care has been variable among pharmacists and evidence suggests there appears to be resistance to practice change\(^{161-164}\).

6.2.1 Why is there a need for practice change?

The need for pharmacists to take on a greater role in patient care continues to increase. As the healthcare needs of society change, there is also a need for pharmacy organizations to plan for the future and identify how they can further support patient care needs. For example, it is
estimated that, by 2036, seniors will account for 25% of the Canadian population, a proportion
double that in 2009\textsuperscript{165}. In addition, the number of patients with chronic diseases is increasing
and it is common that those with chronic diseases have a greater need for medications as well as
greater difficulty accessing healthcare\textsuperscript{166}.

Another important impetus for greater pharmacist involvement in patient care is the increasing
complexity of medication therapy. With a greater number of medications per patient, there is an
increased risk of adverse drug events. A number of published studies have shown that this has a
negative impact on patient outcomes and a greater economic burden of adverse events\textsuperscript{167-170}. It
has been estimated that the costs of misuse, underuse and overuse of medications in Canada
range from $2 billion to $9 billion per year\textsuperscript{167}. Pharmacists can play an important role in
reducing the risks and costs associated with inappropriate medication use.

Reflecting on the future of healthcare in Canada, the Romanow Commission proposed that
“….pharmacists can play an increasingly important role as part of the primary health care team,
working with patients to ensure that they are using medications appropriately and providing
information to both physicians and patients about the effectiveness and appropriateness of certain
drugs for certain conditions”\textsuperscript{169}. This expanded role would allow and encourage pharmacists to
assess patients, consult with physicians, monitor patients’ use of drugs, and provide better
information on prescription drugs. In the future, there will likely also be a role for pharmacists
to prescribe certain drugs under specific, limited conditions\textsuperscript{167}.
6.2.2 How is the expanded scope of practice envisioned?

6.2.2.1 Blueprint for Pharmacy – Vision for Pharmacy

The Blueprint for Pharmacy is an initiative led by the Canadian Pharmacists Association designed to develop a strategic plan for the profession of pharmacy in Canada\textsuperscript{171}. The \textit{Vision for Pharmacy} is to achieve: "Optimal drug therapy outcomes for Canadians through patient-centred care"\textsuperscript{171}. The Blueprint for Pharmacy is designed to catalyze, coordinate and facilitate the changes required to align pharmacy practice with the health care needs of Canadians.

It proposes a greater involvement of pharmacy technicians in the dispensing role, freeing pharmacists for a greater patient-centered role. To realize this vision, the Blueprint for Pharmacy addresses five “Key Strategic Actions”\textsuperscript{171}:

1. Pharmacy human resources
2. Education and continuing professional development
3. Information and communication technology
4. Financial viability and sustainability
5. Legislation, regulation and liability

This thesis focuses mainly on Strategic Action 2 and specifically on education and continuing professional development as a means to promote and facilitate practice change. Some of the key elements of the other strategic initiatives will also be discussed for their support in promoting and supporting change in practice.

6.2.2.2 Changing Scope of Practice

Canada’s healthcare system is responding to the changing needs of society by placing a greater focus on health promotion, preventative medicine and chronic disease management\textsuperscript{169}. Along
with this focus, there is an increased emphasis on interprofessional teams as well as an interest in ensuring healthcare professionals, such as pharmacists, apply their knowledge and skills in the most effective manner possible consistent with the changing priorities of healthcare\textsuperscript{171}.

The profession of pharmacy is responding to this challenge in a number of ways including major changes in the scope of practice. Supporting these changes is the creation of a regulation process for pharmacy technicians so that they also take on expanded roles as part of the pharmacy care team and greater responsibility with respect to dispensing functions. Some specific details of the scope of practice for pharmacists as well as provincial differences are shown in Figure 6-1\textsuperscript{171}. 
Figure 6-1: Scope of practice for pharmacists in Canada

**Pharmacists’ Expanded Scope of Practice in Canada**

<table>
<thead>
<tr>
<th>Expanded Scope</th>
<th>Province/Territory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide emergency prescription refills</td>
<td>BC</td>
</tr>
<tr>
<td>Renew/extend prescriptions</td>
<td>✔</td>
</tr>
<tr>
<td>Change drug dosage/formulation</td>
<td>✔</td>
</tr>
<tr>
<td>Make therapeutic substitution</td>
<td>✔</td>
</tr>
<tr>
<td>Prescribe for minor ailments/conditions</td>
<td>X</td>
</tr>
<tr>
<td>Initiate prescription drug therapy</td>
<td>X</td>
</tr>
<tr>
<td>Order and interpret lab tests</td>
<td>X</td>
</tr>
<tr>
<td>Administer a drug by injection</td>
<td>✔</td>
</tr>
</tbody>
</table>

**Regulated Pharmacy Technicians**

- BC: pharmacists in Alberta who have “additional prescribing authority” can prescribe a Schedule F drug (prescription-only), including those for the treatment of minor ailments.
- SK, NS & PEI: only as part of assessment and prescribing for minor ailments.
- NB & NL: as Continued Care Prescriptions under section 122 of the Regulations to the Pharmaceutical Act.
- ON: restricted to prescribing specified drug products for the purpose of smoking cessation.
- QC: administration of influenza vaccination to patients five years of age and older; administration of all other injections and inhalations for demonstration and educational purposes.
- QC: pending Orders in Council; (activity enabled by passage of Bill 41); an Act to amend the Pharmacy Act, December 8, 2010; regulation for this activity was planned for September 3, 2013, however it was postponed by Orders in Council on August 22, 2013.
- QC: when authorized by a physician by means of a “collective prescription” (i.e., collaborative practice agreement).
- QC: for demonstration purposes only.
- QC: pending pharmacists education and the development of standards of practice.
- QC: pending pharmacists education and the development of standards of practice.
- QC: pending pharmacists education and the development of standards of practice.

©2014, Canadian Pharmacists Association.
Despite changes in the professional role of the pharmacist over time and more recently to an expanded scope including prescribing authorization in some jurisdictions, evidence suggests that many pharmacists have been slow to adopt new practice models and many have not availed themselves of the expanded scope opportunities.

To further understand barriers and facilitators to practice change in pharmacy, the relevant change management literature will be explored by looking at characteristics of the individual pharmacist, characteristics of the pharmacy work system and changes within the organization and the profession.

### 6.3 Change Management

#### 6.3.1 Individual Change Theories

There are a number of theories about stages-of-change that offer assumptions about how and why individuals and teams are motivated to work toward change. These theories explore why individuals engage in change and the importance of persuasion, the influence of a social network and, where appropriate, strong leadership to lead the change and effective teamwork to ensure successful implementation.

A synthesis of these principles is presented in the Rogers Diffusion of Innovation theory. Rogers proposed 4 elements that influence the uptake and spread of a new idea or new information: the innovation, communication channels, time, and the social system.

Related to the innovation (e.g. a clinical behaviour), Rogers proposed that there are five elements that will play a part in determining whether an individual adopts an innovation and if diffusion will occur. These elements are outlined in Table 6-1.
Table 6-1: Rogers’ Five Elements of an Innovation

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative advantage</td>
<td>• Degree to which the innovation (new evidence or practice) is seen as better than the previous practice</td>
</tr>
<tr>
<td>Compatibility</td>
<td>• Degree to which an innovation is perceived as being compatible with existing values, past experiences, and the needs of the potential adopters (e.g. consistent with medical beliefs)</td>
</tr>
<tr>
<td>Complexity</td>
<td>• Degree to which the innovation is perceived as difficult to understand or use</td>
</tr>
<tr>
<td>Trialability</td>
<td>• Degree to which the innovation may be trialled and modified (if it is logistically possible to perform)</td>
</tr>
<tr>
<td>Observability</td>
<td>• Degree to which the results of the innovation are visible to others (adoption is more likely if key opinion leaders argue for the innovation and demonstrate the applicability)</td>
</tr>
</tbody>
</table>

The Diffusion of Innovation theory suggests that individuals will make decisions about whether to adopt a change based on the innovation itself, how they find out about it, and how their peers and colleagues perceive the change.

Rogers’ theory of diffusion also integrates the individual’s progression through 5 stages. An individual first becomes aware of an innovation (knowledge/awareness). They are then
interested and seek additional information (*persuasion*) and make a *decision* about whether to adopt it. The individual goes through *implementation* of the innovation and then makes a final decision on sustainability (*confirmation*).

Rogers categorized individuals as innovators, early adopters, early majority, late majority, and laggards\(^{175}\). Innovators are the first individuals to adopt an innovation\(^{175}\). Sometimes described as “risk takers”, they usually have the financial resources to absorb failure of implementation. Early adopters are the second fastest group to adopt the innovation; they are often leaders or opinion leaders\(^{175}\). The early and late majority adopt the innovation after a period of time and the laggards are those that are the last to adopt the innovation\(^{175}\).

Application of Rogers’ theory to pharmacy can be seen in the work of Nimmo and Holland\(^{176}\). They have proposed that there are four motivational stages that pharmacy staff will move through in their readiness for practice change. These are\(^{176}\):

1. Finding out about it (Knowledge and Persuasion in the Rogers model)

2. Testing the water (Decision)

3. Gaining commitment (Implementation)

4. Making sure it sticks (Confirmation).

**Importance to continuing educators:**

The theories of change at the level of the individual highlight the importance of increasing awareness about the innovation, allowing for application and practice and using the social system to disseminate change. At the level of the individual, it is also useful to consider the
characteristics of the pharmacist and their motivation to change. These will be important to recognize as potential barriers or facilitators when planning educational activities.

6.3.2 Characteristics of the pharmacist

Certain characteristics of pharmacists have been found to be both as barriers and facilitators to practice change.

Rosenthal and colleagues considered the culture of pharmacy with a viewpoint that pharmacists may be the ultimate barrier to change\(^{177}\). The authors argued that certain qualities inherent in some pharmacists will act as barriers to the expanded scope of practice. These include:

- Lack of confidence
- Fear of new responsibilities
- Paralysis in the face of ambiguity
- Need for approval
- Risk aversion

For example, the argument is made that taking on prescribing authority would represent “a risk to the status quo of pharmacy practice” in that it would require pharmacists to take responsibility for patient outcomes\(^{177}\). This challenges the existing culture of pharmacists who are used to reviewing all the evidence, weighing pros and cons and providing recommendations to prescribers without making the final decision\(^{177}\). This viewpoint has also been expressed by other authors who have suggested that embracing KT will require that pharmacists are comfortable with the risks and benefits associated with making intervention decisions\(^{178}\). Conversely, some facilitators that have been suggested as supporting an expanded scope of practice include\(^{161}\): pharmacist competence, education and training for pharmacists and
pharmacy assistants, communication skills, motivation, leadership skills, professional knowledge and attitudes, and confidence in the ability to provide cognitive services.

6.3.2.1 What motivates pharmacists to change?

Nimmo and Holland\textsuperscript{179} explored pharmacists’ motivation during transitions in practice and proposed that two major factors influence their inherent receptiveness to a change in practice: their personality and their current state of professional socialization. The studies reviewed by these authors looked at personality traits among pharmacists and suggested that pharmacists are characterized by a strong sense of responsibility, conscientiousness, practicality, logic, and in about one in five practitioners, a fear of interpersonal communication\textsuperscript{179}. However, this literature review predates the introduction of pharmaceutical care and may explain self-selection for a profession that focused mainly on drug distribution and provision of drug information. One hypothesis is that newer pharmacy graduates may be selecting the profession of pharmacy for the practice it promises to be and will welcome a change from traditional roles. This is supported by the results of a survey conducted in 2006 that found that 72\% of new practitioners were not satisfied with their current practice and expressed interest in working in an environment that placed greater emphasis on spending time with patients\textsuperscript{180}.

Resistance to new models of clinical pharmacy practice may be explained by the mismatch between the personality of pharmacists and the new proposed practice model. Those pharmacists who were drawn to the profession because of the pharmaceutical science, dispensing and quality product orientation, may be less interested in increased patient interactions and involvement in interdisciplinary care. Reflecting on the work of Nimmo and Holland, it may be hypothesized that resistance to change is more likely to occur in pharmacists who were drawn to the profession
at a time of greater emphasis on accuracy of drug product and less emphasis on patient interactions.

The second major contributor to receptiveness to change in practice proposed by Nimmo and Holland is professional socialization\textsuperscript{179}. They suggest that, while the acquisition of new knowledge and skills is essential, socialization leads one to acquire the values that shape the notion of professional self\textsuperscript{181}. Nimmo and Holland propose that professional resocialization could be guided through the use of Krathwohl’s taxonomy of affective learning\textsuperscript{179}. This involves the following stages of accepting a new practice and preparing for change:

1. Receiving – the pharmacist becomes aware of a new practice and is willing to discuss or explore the new practice
2. Responding – the pharmacist is willing to respond and enjoys the new practice
3. Valuing – the pharmacist accepts the value of the new practice, shows preference for it and a commitment to the change
4. Organization – the pharmacist relates the new practice to all the other things they do and organizes work and time commitment to the new practice
5. Characterization by a value or value complex – the new practice becomes a part of who the pharmacist is and what they do

6.3.2.2 Importance for continuing educators:

Knowledge of the barriers and possible facilitators to practice change helps continuing educators incorporate the knowledge that pharmacists will need to acquire into learning activities. Continuing educators also need to recognize that resistance to change will affect the individuals’ openness to learning and their acceptance of the material. Educational activities that challenge pharmacists to think critically about their values and beliefs and work to overcoming them as
barriers will be helpful in moving toward change. Education through opinion leaders, local champions or through sharing of stories of successful implementation may also be valuable to motivate individuals and prepare them for change. Provision of opportunities for pharmacists to trial a new role (e.g. providing smoking cessation counseling, communicating a pharmaceutical opinion to a physician) in a learning environment can increase their confidence in taking greater responsibility for patient care and can be important in helping them move toward practice change.

6.3.3 Organizational Change – Kotter's 8 step process for change

One of the most influential theorists of organizational change is Dr. John Kotter who proposed an 8-step process for change\textsuperscript{182}. These steps will be used to summarize practice change in pharmacy.

6.3.3.1 Establishing a sense of urgency

Change must occur for a reason and change is more likely to occur when there is urgency, a compelling reason for it to occur. In pharmacy, this involves identifying important problems in healthcare and opportunities for pharmacists to make important contributions toward reducing them. A recent report by the Canadian Institute for Health Information (CIHI) suggests that most seniors in Canada are taking 5 or more drugs\textsuperscript{183}. This important issue provides opportunities for greater pharmacist involvement to help meet the medication management demands of this population.

In Ontario, Bill 179, the \textit{Regulated Health Professions Statute Law Amendment Act, 2009} was approved unanimously by the Ontario legislature\textsuperscript{184}. Among other proposed changes for healthcare, Bill 179 aimed to “increase access to care for Ontarians by allowing nurse
practitioners, pharmacists, physiotherapists, dietitians, midwives and medical radiation technologists to deliver more services than they are now qualified to provide.”184.

On October 9th, 2012, new expanded scope of practice regulations came into effect for pharmacists in Ontario. These changes were approved and announced by the provincial government and include the following expanded activities171 185 186:

- Prescribe specified drug products to assist with smoking cessation;
- Renew and adapt (alter dose, dosage form, regimen, or route of administration) prescriptions;
- Perform a procedure on tissue below the dermis to support patient self-care and chronic disease monitoring;
- Administer, by injection or inhalation, substances listed in the regulation for the purpose of education and demonstration; and
- Administer influenza vaccine to patients five years of age and older in accordance with Ontario’s Universal Influenza Immunization Program.

These changes in the scope of practice create a compelling reason to re-evaluate the practice of pharmacists and an urgency to fully utilize their knowledge and skills for improved patient outcomes.

6.3.3.2 Forming a powerful guiding coalition

Kotter’s process suggests assembling a team and encouraging them to work together to lead the change. In the province of Ontario, an example of an advocacy group to lead the change is the Ontario Pharmacists Association.
6.3.3.3 Creating a vision

A vision is important to ensure that the intended effects of change are achieved. This involves:

i. A vision to direct the change effort, e.g. the Blueprint for Pharmacy reviewed earlier in the chapter, and

ii. Strategies to achieve that vision - continuing educators can be involved in creating practice tools, education, etc. that help to achieve the vision

6.3.3.4 Communicating the vision

Without clear communication of the vision, it is difficult for pharmacists to feel compelled to make changes or to understand how the changes they make impact on the organization or profession. Communication through multiple channels may be necessary and should involve not only pharmacists but also other healthcare providers as well as patients. Education should include examples of successful implementation.

Education of the public and of pharmacists on the expanded scope of practice is being provided by the Ontario College of Pharmacists (OCP), the provincial licensing body, and by the Ontario Pharmacists Association (OPA), a professional advocacy group for Ontario pharmacists. Both the OCP and OPA have designed educational resources to promote awareness of the expanded scope of practice and provide tools for implementation.

6.3.3.5 Empowering others to act on the vision

In order for the vision to advance, it is important to identify the barriers to change and remove them. There are many barriers to change that have been identified in the pharmacy literature. Those relating to the individual pharmacist have been summarized above. In addition, barriers can also exist within the practice setting or organization. Roberts and colleagues in Australia
have assessed the implementation of cognitive services in community pharmacy\textsuperscript{187}. Through a review of the literature, they identified a number of organizational facilitators for change:

- Physical environment, equipment and technology
- Culture of the pharmacy
- Remuneration
- Support from management and professional organizations/government
- Patient demand/expectations
- Attitude/perceptions of doctors and patients
- Examples from leading practitioners

Many of the facilitators for practice change proposed in the literature and in the models discussed in this chapter lie outside of the individual practitioner and outside of the practice setting. Legislative changes and the remuneration for services proposed in the expanded scope of practice are influenced and implemented at the level of policy changes, government and therefore, the profession as a whole.

Regulatory changes are essential in supporting change and ensuring that the services provided by pharmacists are utilized to their full potential. Furthermore, the OPA together with the provincial government have focused on remuneration for clinical services in order to facilitate the delivery of these additional services while maintaining profitability in the setting of the community pharmacy. This is designed as a facilitator for continued delivery of these services and as an external influence on sustained practice change. In Ontario, there has been some success at the level of the profession in obtaining remuneration for pharmacy services, including:

- Universal Influenza Immunization Program (UIIP)
• **Medscheck program**\(^{188}\):
  
  o involves comprehensive medication review to help patients better understand their medications and to ensure that the medications are taken as prescribed in order to derive the desired benefit

• **Pharmaceutical Opinion Program**\(^{189}\):
  
  o Identification of concerns with new or refill prescriptions resulting in a consultation with the prescriber and refusal, fill or modification of a prescription.
  
  o Follow-up consultations with the patient to check that the medication is being tolerated and is working.
  
  o Medication compliance verification with the patient to confirm compliance when records suggest otherwise (e.g. late refill).

• **Smoking cessation program**\(^{190}\)

Continuing educators must keep updated on these types of changes as well as the work of provincial and national bodies in order to develop the content of educational programs and to identify facilitators for change.

### 6.3.3.6 Planning for and creating short-term wins

Recognizing that practice change can take years, it is important to plan wins, achieve them and then reward employees involved in the improvements. If positive experiences with change are seen, others will feel encouraged to try the new practice as well. Some of these short-term “wins” can be used as examples by continuing educators to motivate practitioners to accept and implement change.
6.3.3.7 Consolidating improvements and producing still more change

Similar to the concept of sustaining knowledge use in KT, consolidating improvements requires a sustained change in practice. This involves ensuring that the necessary supports remain in place to make it possible for pharmacists to continue with the change. New projects, change agents, themes can be initiated and small changes can be used to launch larger changes. It is also important to reward those that implement the change to ensure that positive change is reinforced.

6.3.3.8 Institutionalizing new approaches

The final step in Kotter’s process for change is to institutionalize change by embedding it into the culture of practice. This involves making explicit the connections between new practices and success of the organization. Changing the culture of practice will involve ensuring that the values, norms and practices associated with the expanded scope of practice become a part of the culture of the profession across all practice settings and through both pharmacy training and continuing professional development.

Culture change in healthcare has been explored by Scott and colleagues through a literature review\textsuperscript{191}. Health care cultures that promote group affiliation, teamwork and coordination have been shown to achieve greater implementation of quality improvement practices while those that emphasize formal structures, regulations and reporting relationships appear negatively associated with quality improvement\textsuperscript{191}.

Scott’s review identifies a number of barriers to change including\textsuperscript{191}:

- Lack of ownership – reflecting back to Kotter’s process and the importance of buy-in from individuals
• Complexity – organizational culture is complex and it is unrealistic to expect change on all fronts simultaneously; rather, culture change requires time
• External influence – external factors can motivate change and also may impede reform
• Lack of appropriate leadership
• Cultural diversity – healthcare organizations are made up of multiple subgroups each with their own subculture. Consideration of how to approach this diversity is important for change.
• Dysfunctional consequences – there may be unintended consequences of placing priority in one area of practice to the detriment of others. This is commonly seen in healthcare organizations where numerous patient safety and quality improvement projects all strive to achieve institutional priority

Importance for continuing educators

Many of the factors described in the summary above, specifically those related to readiness for change, directly impact on pharmacist education. In addition, practice environment and legislative changes influence pharmacy practice. Continuing educators must be aware of the motivation and readiness of individuals to engage in collaborative care and engage in change. Nimmo and Holland have proposed that practice change in pharmacy could be likened to a three-ring circus where the three rings, practice environment, learning resources and motivational strategies, all must be functioning at the same time to effect practice change. The description of these elements, collectively referred to as the “Holland-Nimmo practice change model” reflects many of the principles discussed in the theories of change management reviewed above. For continuing educators, the area of greatest interest is “learning resources”; however, change management principles help to inform education and training relevant to the two other circles.
6.3.4  Quality Improvement

A discussion of change would not be complete without consideration of the role of Continuous Quality Improvement (CQI). The Agency for Healthcare Research and Quality (AHRQ) defines CQI as “A management approach to the continuous study and improvement of the processes of providing health care services to meet the needs of patients and other persons. CQI focuses on making an entire system’s outcomes better by constantly adjusting and improving the system itself instead of searching out and getting rid of persons or processes whose practices or results are outside of established norms”\(^\text{193}\). CQI builds on traditional quality assurance methods by emphasizing the organization and systems. It focuses on the "process" rather than the individual, recognizes both internal and external "customers" and promotes the need for objective data to analyze and improve processes.

Within the framework of CQI, the “Model for Improvement”\(^\text{194}\) (Figure 6.2) developed by the Associates in Process Improvement is designed to help accelerate change.
The Model for Improvement is comprised of two parts:\(^{194}\):

1. Three fundamental questions, which can be addressed in any order.
   a. What are we trying to accomplish?
   b. How will we know that a change is an improvement?
   c. What changes can we make that will result in improvement?

2. The Plan-Do-Act-Study (PDSA) cycle to test and implement changes in work
settings. The PDSA cycle guides the test of a change to determine if the change is successful. It is comprised of four components that come together in a cycle (Figure 5.1).

- **“Plan”** emphasizes the importance of setting goals for improvement and planning to change how something works as well as measuring outcomes,
- **“Do”** involves carrying out the plan on a small scale,
- **“Study”** involves measuring outcomes and analysing the results to determine whether the plan worked,
- **“Act”** involves refining the change and preparing to plan the next test change cycle.

The PDSA cycle offers the opportunity to test change on a small scale, evaluate its impact and refine the change before expanding it to a larger scale.

The steps involved in the PDSA cycle and in CQI are quite similar to the steps describe in the KTA cycle described in Chapter 4. The “Plan” phase of the PDSA has a similar focus to the first three steps of the KTA cycle involving identifying a problem, adapting knowledge to local context and assessing barriers to knowledge use. The “Do” phase is similar to KTA’s step of selecting, tailoring and implementing interventions. “Study” relates to the steps of monitoring knowledge use and evaluating outcomes while “Act” relates to sustaining knowledge use.

There are a few main differences between the two approaches. Traditionally, CQI has had a great emphasis on the process of care rather than on the application of evidence to practice. In addition, the CQI process has a greater emphasis on the team, the context and the system in which activities occur. This is important and addressed in KT, however, in KT there remains a
greater focus on the individual practitioner to apply knowledge to practice and improve healthcare outcomes. As the focus in this thesis is on practice change in pharmacy practice, the model of KT was chosen to describe practice change at the macro level (the level of the profession).
Chapter 7 – The RETAE Framework for Practice Change in Pharmacy

Preparing a rapidly evolving profession for an expanded scope of practice: Implications for continuing educators in pharmacy

7.1 Abstract:

The profession of pharmacy across the globe is in a state of rapid evolution. Various jurisdictions, including Canada, are preparing for an expanded scope of practice for pharmacists that will involve a paradigm shift from supplying drug products to providing clinical services. Preparing for this evolution in practice will have different implications for different pharmacists depending on their level of knowledge, skills, confidence, and readiness for change. Continuing educators must adapt to these new realities in their design of educational activities. This article synthesizes the contributions of three overlapping models that are useful for continuing educators in preparing pharmacists and the profession for change: Continuing Education (CE), Continuing Professional Development (CPD) and Knowledge Translation (KT). The principles drawn from these models along with principles from change management are used to propose a new conceptual framework for practice change, RETAE (Reflection, Education, Transformation, Application, and Evaluation). “Reflection” identifies evidence-care gaps in practice and learning needs. “Education” is foundational in building knowledge, skills and confidence to promote change. “Transformation” is necessary both personally and professionally, and challenges pharmacists to self-reflect, develop new perspectives and explore new roles. “Application” represents implementation of change in the context of the social and political environment of the healthcare system. Finally, “Evaluation” encourages assessment of the
impact of educational strategies on pharmacist satisfaction, application to practice and healthcare outcomes. The RETAE model can be used by continuing educators as a framework for conducting needs assessment, designing the content and delivery of educational activities and for ensuring that best evidence is applied to practice. Finally, the RETAE model encourages continuing educators to evaluate outcomes as they work toward supporting and preparing pharmacists for effective practice change.

7.2 Introduction

The profession of pharmacy is in a state of rapid evolution around the world. Over the past century, there have been significant changes in the role of the pharmacist along a continuum from manufacturing and compounding of drug products to a dispensing role and, more recently, involvement in pharmaceutical care and provision of cognitive services. As the profession continues to evolve, jurisdictions across the globe, including Canada, are preparing for an expanded scope of practice in pharmacy. The overall goal of the Canadian Pharmacists Association ‘Vision for Pharmacy’ is “optimal drug therapy outcomes for Canadians through patient-centred care”\(^{185}\). This represents a paradigm shift for the profession from the supply of goods to the provision of services and from an outcome of supplying quality products to one of improved patient outcomes. This expanded scope of practice seeks to allow pharmacists to renew or adjust medications, initiate prescription drug therapy, administer drugs by injection, and order and interpret laboratory tests all with the aim of improving healthcare outcomes for Canadians\(^{185}\). Among the proposed changes, a key component is prescribing authorization which is a source of enthusiasm as well as apprehension for many pharmacists.
The Canadian experience with the expanded role of prescribing authority for pharmacists has been led by the province of Alberta. Since 2007, pharmacists in Alberta have been able to apply for additional prescribing authorization (APA)\textsuperscript{162}. This allows for independent prescribing of all prescription drugs with the exception of narcotics, benzodiazepines, barbiturates, anabolic steroids and other drugs regulated by the \textit{Controlled Drugs and Substances Act}. Reflections on the Alberta program suggest that pharmacists’ motivation and confidence in their knowledge, skills and abilities would be the ultimate drivers of successful uptake of the program\textsuperscript{162}.

Although this change in legislation represents a potential opportunity for pharmacists, very few of those eligible have availed themselves of this opportunity\textsuperscript{195}. The slow adoption of APA has been studied in a survey of Alberta hospital pharmacists\textsuperscript{164}. It was found that APA was adopted more frequently by pharmacists in ambulatory care, those with higher levels of education, and those with colleagues who also have APA\textsuperscript{164}.

From the international perspective, experiences in the UK, New Zealand and USA have suggested that barriers to adoption of pharmacist prescribing are mainly associated with remuneration, lack of time and lack of continued support\textsuperscript{163}. Pharmacists also describe challenges in convincing other healthcare professionals of their expanded roles without being perceived to want to intrude into the clinical responsibilities of these other providers\textsuperscript{163,164}.

7.3 What is the role for continuing educators in practice change?

Preparing pharmacists for an expanded role in healthcare requires an understanding of the factors that influence practice change. Helping pharmacists strengthen their skill set during a state of rapid evolution in the profession has important implications and challenges for continuing educators. The literature on change management provides a foundation for greater understanding of the learning needs of the profession and motivation to change. In addition, an
understanding of the models of Continuing Education (CE), Continuing Professional Development (CPD) and Knowledge Translation (KT) is essential for continuing educators to understand how to prepare individual pharmacists, practice settings and the profession as a whole for the expanded scope of practice.

7.4 What are the lessons to be learned from change management theories and research?

There are multiple definitions of change management in the literature. One that is useful for continuing educators states that change management is composed of activities involved in: (1) defining and instilling new values, attitudes, norms, and behaviors within an organization that support new ways of doing work and overcoming resistance to change; (2) building consensus among customers and stakeholders on specific changes designed to better meet their needs; and (3) planning, testing and implementing all aspects of the transition from one organizational structure to another.

Many theorists and researchers have explored change management at the level of the individual and within organizations. From this literature, the important lessons for those involved in continuing education center on:

- Barriers to change
- Needs assessment
- Characteristics that facilitate change

7.4.1 Barriers to Change

Resistance to change in pharmacy practice has been linked to the features of individual pharmacist as well as the practice setting and the profession as a whole. Some authors have
suggested that characteristics inherent to many pharmacists will be a barrier to the expanded scope of practice in pharmacy\textsuperscript{177,197}. Among these characteristics are: risk aversion, lack of confidence, need for approval, and fear of new responsibilities\textsuperscript{177,192}.

Beliefs, practice patterns and habits can become barriers to one’s ability to incorporate change and can translate into anxiety, concerns or anger\textsuperscript{173}. Continuing educators need to recognize that some pharmacists will come to learning opportunities with potential barriers that may impact on their ability to learn and challenge their personal and professional growth. Educational events should address existing beliefs and practice patterns and challenge pharmacists to change. Open discussions about potential barriers, including suggestions for solutions, are critical to overcoming this potential barrier.

7.4.2 Needs Assessment

As with planning educational events, the process of change begins with a needs assessment. A needs assessment can be used to identify individuals’ strengths and weaknesses and also to identify gaps in available resources. For the purpose of this discussion, the focus of needs assessment will be at the level of individual gaps in the domains of knowledge, skills or relationships with other professionals. Continuing educators can provide opportunities for learning that help to build confidence and promote interprofessional collaboration as well as to improve clinical knowledge and skills.

7.4.3 Characteristics that facilitate change

Roberts and colleagues have explored implementation of cognitive services in community pharmacy\textsuperscript{198}. Through a review of the literature, they compiled a list of facilitators for change at
both the individual and organizational levels. From this literature, the facilitators or characteristics that contribute to pharmacists adopting change include\textsuperscript{198}:

- pharmacist education and training
- communication skills
- motivation
- leadership skills
- professional satisfaction
- professional knowledge and attitudes
- confidence in one’s ability to provide the expanded scope of practice.

Some facilitators for change lie outside the scope of education and rely on legislative changes that affect pharmacy practice. Others relate to the motivation and readiness of individuals for an expanded role. It is these facilitators that can form the content of educational programs, e.g. the need for additional clinical knowledge, the need to improve communication skills needed to engage in collaborative care both intraprofessionally (with pharmacy assistants and technicians) as well as interprofessionally (with other healthcare providers).

\textbf{7.4.4 Summary of change management and relevance to continuing educators}

Change management theories inform the process of implementation of practice change but do not address the personal and professional development necessary for embracing the expanded scope of practice. The models of CE, CPD and KT will be explored for their relevance to continuing educators in preparing pharmacists for the expanded scope of practice.
7.5 Preparing pharmacists for practice change – lessons for continuing educators

7.5.1 Continuing Education

Traditionally, pharmacists have attended continuing education lectures as a means to support their need for knowledge in clinical areas. Continuing Education (CE) is a structured educational activity designed to support pharmacists to maintain and enhance their competence.

Continuing education must take into consideration the principles of adult education. These include that the adult learner: is purposeful, is a voluntary participant in their learning experience, needs meaning and relevance in terms of his or her life and experiences, must be actively involved in learning, and needs clear goals and objectives.

7.5.1.1 Educational Design

Many of the lessons on effective CE design in pharmacy come from the literature in Continuing Medical Education (CME). A systematic review of strategies for CME found that the most effective strategies for changing physician behaviour were: reminders, patient-mediated interventions, outreach visits, multifaceted activities, and the use of opinion leaders. In a similar review focusing on formal CME (e.g. conferences and lectures), it was revealed that didactic interventions did not improve healthcare outcomes or successfully change physician behaviour. However, the authors suggest that these methods, while not bringing about change, play an important role by increasing knowledge, skills and attitudes. Formal CME that used interactive methods was found to be far more effective in creating immediate positive changes in physician behaviour. These findings are echoed in the pharmacy literature where it has been suggested that traditional CE alone is not enough to produce changes in practice. However,
if CE is delivered in multiple ways (e.g. didactic lectures, small group workshops, peer to peer mentoring) and over a longitudinal timeframe, it can support improvements in knowledge, skills, attitudes, and behaviours²¹ ³⁵ ⁴⁰ ²⁰¹.

When designing CE, it is important to make it relevant and interactive, allowing for problem-solving and application of knowledge. CE should include the use of learning objectives based on an assessment of need, and should use interactive teaching techniques (e.g. discussion groups, skills sessions, simulations, self-assessment inventories, and technology-enabled learning). Evaluation of the educational program is also fundamental to ensuring its success and to informing its continued improvement¹¹ ²⁴ ²⁵ ²⁰².

7.5.1.2 The role of CE in preparing for change in practice

The use of traditional CE by pharmacists has a longstanding history and has been the main strategy used by pharmacists to maintain competence. Despite its widespread uptake, the delivery of CE in pharmacy continues to be primarily through didactic lectures with content focused on knowledge acquisition. CE in pharmacy has rarely been evaluated for outcomes beyond participant satisfaction. Conclusions regarding CE have been based on the literature in CME, and as discussed above, traditional CE alone has not demonstrated change in healthcare outcomes. For these reasons, CE alone is not sufficient as a model for practice change in pharmacy. Traditional CE does not engage pharmacists in transformation and is insufficient for personal and professional development. However, traditional CE is a foundational component for readiness to change at the micro level (the level of the individual pharmacist). Each pharmacist must feel confident that they have the knowledge and skills needed to engage in practice change¹⁹⁸. Interactive CE provides a safe environment for pharmacists to meet their learning needs and maintain and improve competence for the expanded scope of practice.
7.5.2 Continuing Professional Development

In the 1990s, a shift was seen in the model for continuing competence in pharmacy from a model that focused primarily on CE credits to one of Continuing Professional Development (CPD). CPD is “the lifelong process of active participation in learning activities that assist individuals in developing and maintaining continuing competence, enhancing their professional practice, and supporting achievement of their career goals”\(^2\). CPD is a self-directed, ongoing, systematic and outcomes-focused approach to learning and professional development.\(^3\) It involves a cycle of learning that includes: reflection on practice and an assessment of knowledge and skills, identification of learning needs, a learning plan to address those needs, implementation of the plan, and evaluation of outcomes.\(^4\)

CPD is not intended to replace CE, rather it is recognized that quality CE is an essential component of CPD.\(^2\) While the focus of CE is mainly on formal learning activities, a learning plan for CPD utilizes formal and informal learning activities chosen to meet needs in knowledge, attitudes and skills. This becomes paramount in supporting the education needs of pharmacists in the “soft skills” such as communication and team work. The value of CPD in pharmacy is reinforced by the work of McConnell and colleagues who found that pharmacists who participated in CPD were more likely than peers who did not participate in CPD to report improvements in interactions with healthcare-providers, practice/work changes as well as improved patient care changes.\(^4\)

7.5.2.1 The role of CPD in practice change

CPD has the potential to be transformative. The model of CPD encourages self-reflection and self-assessment of learning needs and can encourage pharmacists to challenge their assumptions,
explore new roles and create a plan of action to improve the skills and knowledge needed for a change in practice.

In pharmacy, experience with CPD and ongoing competence is growing. However, evidence of transformative learning in CPD in pharmacy is lacking. Educators can create learning opportunities that encourage pharmacists to bring their own experiences to learning, provide a forum for dialogue with others, and to allow for self-reflection. Through these actions, pharmacists can be encouraged to challenge their existing values and beliefs, critically think about their assumptions and engage in discourse to create a new view. For example, an education event can involve a discussion about collaborating with physicians. This can encourage a discussion of attitudes, beliefs and behaviours of pharmacists around collaboration with physicians and provide pharmacists with an opportunity to critically think about their assumptions and create new ideas of how to collaborate in their practice. Through these exposures, CPD can facilitate transformative learning and prepare pharmacists for change at the micro level (the individual) as well as at the meso level (the groups or organizations within which pharmacists work).

7.5.3 Knowledge Translation

As pharmacists become more involved in the management of medication therapy, there is an increased need for them to ensure that research evidence is incorporated into their clinical practice. It is therefore essential that pharmacists have an understanding of Knowledge Translation (KT). KT is a “dynamic and iterative process that includes the synthesis, dissemination, exchange, and ethically sound application of knowledge to improve health, provide more effective health services and products, and strengthen the health care system”75.
KT expands the focus of practice change beyond the individual practitioner and acknowledges that there are multiple participants involved in putting evidence into practice. These players include researchers, guideline developers, healthcare providers, policy makers, managers and patients themselves\textsuperscript{74 76}. KT goes far beyond continuing education of healthcare providers as it recognizes that knowledge must be applied within the social, political and economic context of healthcare\textsuperscript{74 76}.

The process of KT involves the identification of gaps between evidence and patient care and an exploration of the barriers and facilitators of knowledge use. KT interventions are designed to facilitate change in practice. They incorporate the characteristics of the evidence (e.g. quality of the evidence), the practitioners (e.g. awareness of evidence), and the environmental or social setting factors (e.g. influence of peers, availability of resources) that impact KT\textsuperscript{88}. Interventions may be organizational (e.g. revision of professional roles), professional (e.g. education, audit and feedback), patient-directed (e.g. a patient decision aid), or financial (e.g. reimbursement for patient counseling) interventions.

KT highlights the need to measure knowledge use and, similar to organizational change theory, ensure that the interventions put in place make a sustained change in patient outcomes, processes of care, or the healthcare system as a whole.

7.5.3.1 The role of KT in practice change

KT provides a framework for knowledge use in healthcare environments in order to facilitate change. It encourages pharmacists to evaluate the impact of patient interventions as well as the expanded role of the pharmacist in healthcare. In addition to its direct application to patient
interventions, KT can be used to apply evidence of successful implementation of the expanded scope to practice to practice.

The focus in KT is the implementation of evidence into practice but KT does not specifically address the personal development that is necessary for pharmacists to prepare for practice change. KT expands the focus from the individual pharmacist to the healthcare setting and uses application of evidence to improve patient outcomes. This is important and relevant for the expanded scope, however, for many pharmacists, there is still a need to challenge existing roles to prepare for a new set of competencies. KT’s macro level focus does not address this level of personal development on its own.

7.6 New Model for Practice Change – The RETAE Framework

The mandate for continuing educators is increasingly to help pharmacists bolster their skill set on the backdrop of a rapidly evolving profession. The needs for different pharmacists at different steps in this evolution will vary and continuing educators must adopt different models in order to meet these needs. A review of the literature described above revealed that existing models have valuable characteristics to contribute to practice change but none are able to capture the unique needs of pharmacists preparing for an expanded scope of practice. As a result, the RETAE Model (Figure 7-1) was developed as a conceptual framework customized to the pharmacy context to more accurately connect to the needs of pharmacists. The RETAE model can be used to help continuing educators prepare practicing pharmacists for personal and professional transformation to succeed in implementing the expanded scope of practice.
7.6.1 What is RETAE?

RETAE is a conceptual framework that identifies the key variables important to preparing pharmacists for practice change. It is a dynamic entity that builds on lessons from change management, CE, CPD, and KT. Although designed as a cyclical model, RETAE does not need to be followed in a cycle and can be started at any of the five external points. All components contribute to the core of the model, personal and professional development. RETAE allows continuing educators to think differently about how to address pharmacists’ readiness for the expanded scope of practice by considering both the traditional focus on education and professional development but also the need for personal transformation. The focus on personal transformation is unique to RETAE and differentiates this framework from other models for professional development or change management. RETAE is comprised of five inter-related components that contribute to pharmacists’ preparedness for practice change.

The “R” in the RETAE model refers to “Reflection”. This involves self-reflection as well as reflection on practice. Critical self-reflection allows pharmacists to identify their personal learning needs, to identify gaps in pharmacy practice as compared to the proposed new role and to consider the barriers to practice change. Reflection on practice helps identify evidence-care gaps in direct patient care aspects of pharmacy practice through the use of techniques such as audit and feedback. This process can identify areas where pharmacists can use their knowledge and skills to improve patient outcomes through implementation of evidence-based care. For continuing educators, reflection can serve as a needs assessment for educational programs to identify learning needs at level of the individual, gaps in practice and gaps in the healthcare system that can inform the content and format of educational programs.
The “E” in the RETAE model highlights the role of “Education” including educating pharmacists on their expanded scope of practice and changing competencies. Continuing education, if designed and delivered well, can help develop the foundation of knowledge, skills and confidence necessary to take on the expanded scope of practice. Continuing educators can offer pharmacists a variety of learning opportunities to meet their perceived and unperceived learning needs including: active learning in traditional CE, practice tools, social networks for learning and, learning from opinion leaders and leaders in practice change.

Self-reflection and educational activities play an important role in the “T” of the RETAE model which represents “Transformation”. RETAE can be used to identify existing beliefs, feelings, interpretations, and decisions that may be barriers to change and encourage reflection on their content, how they were learned and their premises (social context, history, and consequences). Educational opportunities should allow pharmacists to step out of their usual environment and encourage critical assessment of their internal assumptions. Opportunities for discussion should be built into educational events to allow pharmacists to consider the experiences of others, explore options for new behaviours and build competence in new roles. Continuing educators should create opportunities for pharmacists to experiment in a comfortable environment with new practice roles. In order to accomplish transformation, continuing educators need to provide support and feedback for the new behaviours or beliefs. Transformation will likely need to occur at a personal and professional level especially for beliefs or behaviours that require pharmacists to build confidence in order to engage in the practice. Pharmacists must have the opportunities to gain confidence and trial new roles to prepare for transformation and thus prepare for practice change.
Integral to practice change in the expanded scope of practice are the “A” and “E” of the RETAE model which represent “Application” and “Evaluation”. Application refers to incorporation of new knowledge and skills to practice and to patient care. For pharmacists to take on a greater role as members of the healthcare team and become more involved members of the healthcare system, learning needs should be those of the individual but may also be derived from needs of the healthcare system. This process involves identifying evidence-care gaps (the needs of the system), identifying barriers to knowledge use and designing interventions to facilitate knowledge use. The Application component of the RETAE model relies on an understanding of the principles of KT for application of knowledge to patient care and also application of evidence of best practices regarding practice change.

Integral to successful application is the assessment of outcomes, “Evaluation” of the RETAE framework. Evaluation will incorporate both educational outcomes (e.g. participant satisfaction, knowledge acquisition) and patient/healthcare system outcomes (e.g. improvements in process of care, resource utilization, patient outcomes).

7.6.2 How is RETAE different from change management, CE, CPD and KT?

RETAE integrates principles from change management, CE, CPD, and KT to provide pharmacists with education to maintain competence but also to develop new knowledge and skills necessary for new competence.

Unlike change management, RETAE couples needs assessment (reflection in RETAE) with opportunities to prepare pharmacists for change (through education and transformation). The focus of RETAE is beyond the implementation of change and centers on the need to build capacity for change through personal and professional transformation and development.
the focus of CE is on increasing knowledge as a means to maintain competence, RETAE suggests that education of the individual pharmacist is only one component to meet the needs of the profession for practice change. In RETAE, development of skills and attitudes are proposed to be just as important as knowledge. RETAE is similar to CPD in that it is a dynamic, cyclical framework. However, where the focus of CPD is on the professional development of the individual pharmacist, RETAE focuses on the individual but also the profession as a whole and thus indirectly to the healthcare system. RETAE encourages continuing educators to consider how knowledge will actually be used in practice and to prepare pharmacists with the tools for personal maintenance of competence and with the tools to improve healthcare outcomes through application of knowledge. While KT serves as a model for application of evidence to practice, it differs from RETAE in that the focus of KT is on barriers to knowledge use and designing interventions to apply evidence in practice. RETAE values the application of evidence to practice and the evaluation of outcomes but, as a model, for practice change encourages greater emphasis on the professional and personal growth of pharmacists. This is an important distinction as RETAE is designed to recognize that some aspects of the expanded scope of practice require transformation of work systems but also personal transformation of pharmacists to equip them with the “soft skills” needed for intraprofessional and interprofessional collaboration.

RETAE integrates the principles of each of the contributing models to allow continuing educators to design educational opportunities that will address gaps in knowledge and skills but also gaps between available evidence and current practice. RETAE’s dynamic nature allows for each component of the circle to inform the others. As an example, reflection can identify learning needs that inform the content of educational events. However, educational opportunities
may also challenge an individual’s personal beliefs and assumptions and connect back to self-reflection. This is true among all components of RETAE and for this reason, the components that make up RETAE are connected but no directionality is prescribed. RETAE encourages educational opportunities that address knowledge, skills and attitudes but it also emphasizes the need for application to practice and evaluation of outcomes. In this way, RETAE focuses on the individual, the work system and healthcare system to prepare for practice change.

7.6.3 How can continuing educators use the RETAE framework with practicing pharmacists to prepare them for the expanded scope of practice?

RETAE can be used by continuing educators as a framework for designing and evaluating educational opportunities for practicing pharmacists, pharmacy leaders and pharmacy practice researchers. The application of RETAE can also extend beyond pharmacy to any profession undergoing changes in their scope of practice.

RETAE suggests that educators draw on the literature on barriers to practice change and use these barriers to identify learning needs and challenge pharmacists to think about their comfort level with the expanded scope of practice. It can be used to conduct a needs assessment and to teach pharmacists how to critically reflect to identify their personal gaps in practice and those in their practice setting. Assessment methods may include having pharmacists complete an inventory of knowledge and skills to identify learning needs. Questions may include: “If you were working with a patient with suboptimal hypertension control, how comfortable would you be to call the physician and make a recommendation for treatment?” Educational opportunities for pharmacists may involve workshops for increasing knowledge or learning from peers who have successfully implemented a practice.
RETAE can be used to design opportunities that increase awareness of knowledge but also teach skills, e.g. critical appraisal skills. Education can involve providing pharmacists with knowledge tools to facilitate practice change such as templates for documentation, pharmacist guidelines, and patient education tools for pharmacy services or drug information. These tools may be based on knowledge use but they may also be tools to support communication, collaboration and documentation of patient engagement.

As an example of how RETAE may be used in practice, a continuing educator may be working with a group of pharmacists that are preparing to take a greater role in helping patients improve their control of hypertension. Examples of using the RETAE framework for this scenario may include:

- **Assessing the need** – what is the evidence that hypertension is not optimally controlled? What evidence exists that pharmacists can improve patient outcomes? What knowledge (e.g. pharmacotherapy options and blood pressure targets) and skills (e.g. communication skills, motivational interviewing, patient monitoring and follow up) are necessary for pharmacists to take on a greater role in this aspect of patient care? Where are some of the potential barriers that may exist to taking on this greater role?

- **Designing opportunities for reflection** – providing pharmacists with a knowledge test to identify learning needs and a self-assessment questionnaire to assess confidence in taking on a greater role in patient care and identify any beliefs, assumptions or behaviours that may act as barriers to the new practice. As an example, a quiz could be developed to assess knowledge of hypertension management (e.g. quiz requiring application of knowledge of medication management to patient cases) along with a survey assessing
confidence and beliefs / behaviours (e.g. beliefs around how involved patients should be
in treatment decisions).

- Providing educational opportunities (e.g. didactic lectures, small group workshops,
  virtual learning opportunities) to increase awareness of the evidence (e.g. hypertension
guidelines, practice models involving pharmacists in hypertension care)

- Creating educational opportunities to challenge pharmacists to critically reflect on their
  values, beliefs, behaviours, etc. that can impact on adopting the new practice. For
  example, for pharmacists that are preparing to take on a greater role in medication
management for patients with hypertension, they may be limited by existing beliefs, e.g.
belief that the physician is the one to decide on drug therapy adjustments for
hypertension. Pharmacists may also not be aware of the behaviours associated with this
greater role in care, e.g. following up with patients to monitor therapy, communicating
with the healthcare team, documenting patient interactions and outcomes. Existing
values and beliefs that may act as barriers to practice change may be elicited by creating
opportunities that allow for self-reflection. Educational opportunities may involve
leading facilitated discussions that encourage participants to defend alternate viewpoints
and discuss how their existing values, beliefs and behaviours may impact on their ability
to take on a greater role in hypertension care as part of an interdisciplinary team.

- Encouraging transformation by creating opportunities for pharmacists to:
  - discuss their concerns about the new practice, e.g. what do they see as personal
    challenges to getting more involved in direct care of patients with hypertension?
    To getting more involved in collaboration with physicians and nurses? To
    interpreting and applying hypertension guidelines into practice?
• network with peers, learn from the success of others and challenge their concerns about the new role in patient care

• practice interactions in the learning setting to increase confidence, e.g. create role plays that simulate interactions with patients with hypertension and other healthcare providers (e.g. interviewing and counseling patients, making recommendations, providing follow up information)

• Providing pharmacists with knowledge tools – hypertension guidelines for pharmacists, examples of documentation of interventions, templates for communicating interventions/recommendations for hypertension management to patients and other healthcare providers. This would be done in order to facilitate application to practice.

• Measuring outcomes
  
  o Educational outcomes – to evaluate the impact of the educational program. This could involve: surveys of participant satisfaction, evaluations of knowledge acquisition (e.g. pre- and post-quizzes), and application to practice (e.g. do participants report taking on a greater role in the care of patients with hypertension? Have they applied the knowledge to practice? Have they challenged their beliefs and behaviours and taken on a greater role in patient care? Have they made recommendations for improvement management of patients with hypertension?)

  o Patient outcomes – has the pharmacist’s greater involvement in hypertension care improved patient outcomes. This is also a measure of the personal and professional growth of the pharmacist and their ability to apply evidence to practice to improve patient care. This may involve measuring how many patients
they have counseled, how many recommendations for changes to medication management they have made and the impact of those changes on blood pressure control. Evaluation can be done quantitatively (e.g. surveys, data collection of patient outcomes) or qualitatively (e.g. focus groups, interviews)

- Reflecting on the impact of the educational programs to identify areas for improvement but also additional gaps in practice that may arise after the new knowledge and skills are applied to the practice setting.

As this example illustrates, the RETAE model would allow for assessment of changes at the level of the pharmacist, the practice setting and ultimately the patient. Using RETAE, educators can develop opportunities for pharmacists to take on a greater role in patient care and improve patient outcomes. In the example of hypertension control, this would involve developing knowledge of hypertension management, improving patient interviewing and counseling skills, improving communication skills for improved collaboration and communication with the healthcare team (including the patient), applying evidence into practice, monitoring knowledge use to determine the impact on patient outcomes. A similar approach could be used in various other scenarios related to practice change and the expanded scope of practice for pharmacists.

7.7 Conclusion:

The anticipated changes in pharmacy practice identify challenges for continuing educators. Pharmacists need support and the learning opportunities to strengthen the skills necessary to embrace an expanded scope of practice and contribute more broadly to the health of their patients. Lessons from the change management literature suggest that the learning needs and readiness for change of each professional will vary between individuals and within an individual
at different points in the process. Continuing educators can work with pharmacists to develop personalized learning plans that help address this variability. An understanding of the barriers and facilitators for change is essential to identify the beliefs, values or behaviours that may be barriers to change and to design opportunities to challenge pharmacists and foster transformation. The proposed RETAE model for practice change highlights the need to reflect on current practice in order to prepare for change. It emphasizes the need for education as essential in bolstering the knowledge and skills necessary to give pharmacists the confidence to embrace the expanded scope of practice. The RETAE model emphasizes the need for learning to be transformative through helping pharmacists challenge their knowledge, skills, attitudes, values and beliefs. In order to have an impact on patient care and improve healthcare outcomes, application is necessary for pharmacists to utilize their unique skill set as medication experts to contribute to the health of their patients. As pharmacists increase their involvement as part of healthcare teams, application of new roles, knowledge and skills will be essential in preparing them to identify and mitigate barriers to knowledge use - only one of which may be knowledge. The RETAE model combines principles of change management, CE, CPD, and KT in a model that is useful for continuing educators as they prepare pharmacists for personal and professional development necessary for practice change in pharmacy.
Figure 7-1: The RETAE model - Preparing for practice change
Chapter 8 – Conclusion and Implications for Future Research

8 Conclusion

8.1 Summary

In a series of chapters, two studies and a theoretical paper, this thesis has discussed the use of CE, CPD and KT as models for preparing pharmacists for an expanded scope of practice. The goal of this thesis was to develop a model for preparing pharmacists for the expanded scope of practice. The model should improve the knowledge and skills of pharmacists with the ultimate objective of improving healthcare outcomes of patients. Each of the studies conducted was designed to address a unique research question; therefore, the studies were analyzed and reported separately. An understanding of the theoretical underpinnings of the frameworks utilized in each of the studies and an exploration of the application to pharmacy was used to develop a theoretical paper on how these models or frameworks inform RETAE, proposed as a useful framework for continuing educators in pharmacy to prepare pharmacists for practice change.

The studies reflect micro-, meso- and macro-levels of promoting change. In the first study, the models of CE and CPD are explored through the development and assessment of a CPD course, “Thrombosis Management for Pharmacists”. This study demonstrates that incorporating principles of continuing education into course design helps to meet learning objectives. The course was designed based on objective and subjective needs assessments. Participants chose participation based on self-identified learning needs as well as the needs of their practice setting. Participants in this course expressed satisfaction with the program. Results on pre- and post-quizzes demonstrated short-term knowledge acquisition and, through interviews, pharmacists described how they applied their new knowledge to practice. The evaluation of the CPD course
employed a mixed methods approach to assess the impact of the program at various levels of Moore’s expanded CME framework. Evaluation of participation satisfaction as well as declarative knowledge was conducted using quantitative methods while competence and performance were assessed through self-report using a qualitative approach of participant interviews.

As pharmacists prepare for an expanded scope of practice, traditional CE will continue to have an important role in predisposing pharmacists to change. CE can be used to increase awareness, not only by increasing therapeutic knowledge but also knowledge of practice models, changes in practice and patient care strategies to improve patient outcomes.

The second study, TOPPS, evaluated the effectiveness of a pharmacist-led knowledge translation intervention designed to overcome barriers to use of evidence-based thromboprophylaxis. TOPPS was a cluster randomized trial in 8 hospitals across the Greater Toronto area and involved 3 patient care groups (GIM, MGS and HFS) at each site. The intervention included strategies that were predisposing, such as the use of education and dissemination of guidelines to increase awareness. However, the primary emphasis of the intervention was on enabling interventions, such as the support of senior administration at each of the hospitals, the use of order sets that included VTE prophylaxis, and pharmacists as reminders. The reinforcing strategy of audit and feedback measured the impact of the intervention to reinforce progress and encourage further improvement from the teams.

The results of the TOPPS study indicate that a multi-component intervention can lead to increases in the use of thromboprophylaxis in hospitalized patients at risk. The TOPPS study also identified some of the challenges of bringing knowledge to practice and both the barriers
and possible facilitators to knowledge use. It highlights the challenge of finding and maintaining an adequate control group in KT studies that are designed to improve process of care. The small improvement in the intervention groups compared to control may have occurred because of unintended spread of components of the intervention outside of the active groups. The improvement in thromboprophylaxis rates in all three groups over the study period are likely attributable to participation in study as rates at baseline were similar to those seen in the literature and no other strategies were in place at the hospitals over the study period. TOPPS demonstrates the challenges of knowledge use in practice. It highlights the value of strategies that enable practitioners to apply evidence to practice (e.g. order sets) and evaluate knowledge use (e.g. audit and feedback). As pharmacists take on a greater role in direct patient care, the need for them to use evidence to improve outcomes for the patient and for the healthcare system will increase even further.

The models of CE, CPD and KT share many similarities. Specifically, both the CPD and KT frameworks use knowledge to improve patient outcomes and outcomes for the healthcare system. Considering the application of these models to pharmacy, CE, in its traditional sense, is an enabling strategy that increases awareness and predisposes pharmacists to change. CE is useful in laying the foundation for change through the development or enhancement of the knowledge and skills that assist participants in reflecting on their own practice and in considering practice change. CPD encourages the pharmacist to self-reflect to identify learning needs. The CPD process offers the lesson that formal and informal learning can be used to meet learning needs. Formal learning should involve learning activities outside of the traditional didactic lecture, ones that are interactive and enable application of learning.
As pharmacists take on a greater role as part of healthcare teams and in direct patient care, their need to apply knowledge to practice and to evaluate the impact of knowledge use on outcomes will also be increased. KT and the KTA cycle provide pharmacists with a framework with which to approach gaps in practice by providing guidance on identifying evidence-care gaps, adapting knowledge to the local context, identifying barriers to knowledge use and designing interventions to overcome them, evaluating outcomes and sustaining improvements. Building upon the educational approach taken through CPD, KT proposes targeted change activities (e.g. use of reminders, audit and feedback) and uses a theory-based approach to facilitate the uptake of evidence and enable changes in practice. Using many of theoretical underpinnings described in Chapter 4, KT enables changes through the use of interventions targeted at the individual (e.g. education), the process of patient care (e.g. reminders, use of order sets), the healthcare systems (e.g. remuneration for the new service, available resources). KT expands beyond an individual’s readiness and willingness to apply evidence by considering the context in which the individual is applying the evidence (e.g. resources, support of senior administration, etc.). As such, KT enables changes in the healthcare system with a target of pharmacists and all knowledge users, including patients with the intended outcome of improved health outcomes.

From this perspective, Chapter 7 synthesizes the lessons from these frameworks and studies and proposes the RETAE model for practice change. RETAE suggests that practice change in pharmacy requires both personal and professional development. In order to accomplish this, RETAE involves “Reflection” to identify learning needs and practice needs. The use of “Education” remains important to prepare practitioners for change and arm them with the skills and knowledge necessary for the expanded scope of practice. Practice change also involves “Transformation” which can be accomplished both through transformative learning and
challenging the values, beliefs and behaviours of individuals in practice. Personal and professional development requires “Application” of knowledge, skills and evidence to effect practice change and improve healthcare outcomes and “Evaluation” to determine the impact on outcomes.

8.2 Thesis Strengths

The studies and discussions that comprise this thesis address timely and relevant issues in pharmacy practice. The important and relevant components of the disciplines of CE, CPD and KT have been incorporated to propose a new model to help facilitate practice change in the pharmacy profession, RETAE.

The CPD study is one of the few studies in continuing pharmacy education to describe the development and assessment of an educational program in pharmacy using a theoretical approach for course design and a framework for assessment that expands beyond the level of learner satisfaction. The mixed methods approach used for this study allowed for quantitative analysis of satisfaction and knowledge acquisition and qualitative analysis of participants’ experiences and application of learning into practice. Support from the Office of Continuing Professional Development at the Leslie Dan Faculty of Pharmacy at the University of Toronto provided the infrastructure for the program and the flexibility to design and evaluate the program.

The TOPPS study was successful, in part, because of the support of the department of pharmacy and the thromboembolism program at Sunnybrook Health Sciences Centre as well as the lead pharmacists and quality improvements teams at each of the 7 other participating hospitals. Early support from senior administration at each of the sites helped to ensure that the project was
perceived to be an institutional priority. The cluster randomized trial design provided an assessment of outcomes related to changes that occur at the level of the patient care teams with the cluster being the patient care group.

The RETAE model proposed in Chapter 7 is based on extrapolation of educational and change management theories as well as the CE, CPD and KT frameworks and the results of the two studies in this thesis. RETAE provides a synthesis of this body of literature as well as the lessons learned from the Thrombosis course and TOPPS to create a conceptual framework for continuing educators to address the diverse learning needs of a diverse group of professionals.

Another strength of this thesis is the author’s experience and perspective. As a pharmacist with 15 years of practice, the approach to this research comes from knowledge of the profession of pharmacy, its history and the future that lies ahead with the expanded scope of practice. This experience has provided the privilege of working in a variety of practice settings including community pharmacy, hospital practice, research, education and healthcare leadership. The author has also worked in an environment supportive of practice change. This perspective helped to ignite interest in the thesis subject and to bring a perspective from within the profession to the past, the present and the future of pharmacy.

8.3 Thesis Limitations

One of the potential limitations of this thesis is the author’s role as the developer, implementer and evaluator of both of the studies. As the developer and coordinator of the CPD course, the author’s involvement as interviewer as well as evaluator of the program may have biased the responses given by the participants on both the written surveys and in the interviews. Attempts were made to minimize this bias by having the course evaluation forms administered and
summarized by staff of the Office of Continuing Professional Development and by encouraging participants to be honest and forthcoming with their feedback of the program so that feedback would be incorporated for future offerings of the course. In the analysis of the interview transcripts, a second data analyzer was involved to ensure that the coding of themes from the interviews was not interpreted with an inappropriate positive bias.

A similar possible limitation exists in the author’s role as study coordinator and data abstractor for the TOPPS study. The study coordinator and the individual who collects the data are invested in the success of the intervention and could have less inclination for accuracy and rigor of the results. In order to minimize this risk, the study was conducted as a cluster randomized trial with predefined inclusion and exclusion criteria as well as standardized, objective criteria for appropriate thromboprophylaxis. In cases where there was uncertainty about the patient’s risk for VTE and the need for thromboprophylaxis, the case was reviewed and adjudicated with another member of the study team who is a clinical expert in the area.

Another possible limitation in the TOPPS study is that local teams led the intervention and, therefore, controlled the degree and pace of implementation of the interventions. Some members of the team were involved in patient care in more than one study patient group. This may have influenced the care they recommended or provided in the control group(s) while implementing the project in their other patients in the intervention group(s). An attempt was made to minimize this risk by focusing on the use of order sets as the main intervention. Order sets were to be implemented in the intervention group(s) only and not in the controls. However, at one of the sites, order sets were already in place in all patient groups involved in the study thus making it difficult to attribute changes to this component of the intervention. The real-world
implementation of the KT interventions made it difficult to control the intervention as uptake was at the discretion of the local teams.

The TOPPS study was focused on implementation of evidence in a hospital setting with the main knowledge users being pharmacists and physician prescribers. For pharmacists working in a variety of fields (e.g. community pharmacy), KT will be more heavily dependent on patient involvement and patients’ use of knowledge. This is an important distinction as a greater focus on patient interventions and patient mediated interventions will be necessary where patients will need to use knowledge and where patient medication-taking behaviour will be essential in knowledge use. For many pharmacists, there will be a learning need around the design and delivery of patient education to ensure that recommendations are understood and implemented by the patient.

A second potential limitation of this thesis is that interprofessional interactions and interprofessional education are not explored in detail as part of this thesis. The main reason for this exclusion is that pharmacy practice change is still a novel concept for many pharmacists and pharmacists need to develop the knowledge, skills and confidence in their own competence to be prepared for interprofessional collaboration, education and practice. In the TOPPS study, pharmacists involved in patient care were working as part of interprofessional patient care teams. As well, the local team leading the KT intervention was led by the director of pharmacy as part of a multidisciplinary team. The impact of interprofessional collaboration and multidisciplinary care was not evaluated in our study.

A final potential limitation of this thesis is that the RETAE model is proposed as a conceptual framework for continuing educators to prepare practicing pharmacists for the expanded scope of
practice but RETAE has not been tested or proven. Studies demonstrating the use of RETAE to design, deliver, and evaluate educational interventions are needed to understand how RETAE applies to practice.

8.4 Contribution to the Literature

In the pharmacy literature, there have been a number of papers suggesting that pharmacists experience improved satisfaction and educational outcomes associated with CPD over traditional CE. The experience with CPD for pharmacists in Ontario, Canada has also been well-described. However, very few studies have described the development and evaluation of a CPD program for pharmacists. The study presented in Chapter 3 of this thesis adds to the literature in continuing pharmacy education by describing a process for course development based on adult learning theory and assessment of the program using a framework used in CE (Moore’s expanded framework). Most studies of CE in pharmacy do not explore evaluation at the higher levels of the expanded Moore’s framework and therefore do not assess the impact of learning on practice.

In reviewing the literature on pharmacy and KT, there is no published study on KT as a model to be used in pharmacy practice. The current literature explores the dissemination of research findings rather than studying KT through the use of framework such as the KTA cycle.

The Canadian Pharmacists Association has begun producing a newsletter called *The Translator* as a place to summarize and disseminate research findings relevant to pharmacy practice. However, this knowledge tool does not address the KTA cycle and the important and relevant impact of context on knowledge use. How pharmacist will use the knowledge tool and what barriers may exist in their practice are not addressed by this publication. The paper described in
Chapter 5 of this thesis, the TOPPS study, describes and evaluates a KT intervention led by pharmacists in the hospital setting for use of evidence-based thromboprophylaxis guidelines. Although the knowledge utilized in this study is not specific to pharmacy practice, it is an example of evidence-based knowledge use to improve patient outcomes and the processes of care and can serve as an example of how to identify knowledge-care gaps and use knowledge to action cycle.

The TOPPS study is believed to be the first study using a multi-center, cluster randomized trial design to evaluate the impact of a pharmacist-led multicomponent intervention to improve the use of evidence-based thromboprophylaxis for hospitalized patients at risk. The findings of the TOPPS study are of value not only in the area of thromboprophylaxis but can provide a framework for addressing other knowledge-care gaps and measuring the impact on outcomes. A similar approach can be used for identifying other gaps in practice (e.g. low immunization rates, management of hypertension, diabetes or cholesterol) and learning from the literature and the practice sites about barriers to knowledge use and interventions that may facilitate application to practice.

The paper presented in Chapter 7 of this thesis proposes the RETAE model for preparing the profession of pharmacy for practice change and explores the principles of CE, CPD and KT to design a conceptual framework to guide micro-, meso- and macro-level change. This is a timely and relevant issue in pharmacy practice as pharmacists prepare to embrace the rapidly evolving scope of practice. The RETAE model proposes a framework to support personal and professional development necessary for embracing the expanded scope of practice. This model is useful within pharmacy practice but can also be applied outside of the profession of pharmacy as a framework for preparing for practice change. This new model takes a different perspective
than CE, CPD and KT by suggesting that at this point in the evolution of the profession, practice change requires both personal and professional development. This is a novel approach as traditionally, the focus has been on professional development without recognizing that values, beliefs and behaviours may become barriers to the expanded scope of practice and practice change. Existing attitudes and behaviours may need to be challenged and educational opportunities should be designed to encourage personal growth consistent with the values and beliefs associated with the vision for the profession. The RETAE model is the first model to build upon educational and change management theories with the purpose of being used by continuing educators in preparing pharmacists for the expanded scope of practice.

The profession of pharmacy and individual pharmacists are in a position to demonstrate the value that they can provide through greater involvement in patient care and their potential impact on the healthcare outcomes of Canadians. Previous literature in pharmacy has demonstrated less than favourable uptake of pharmacy clinical services and uptake of prescribing authority for pharmacists. Understanding the motivation for change, change management theories and transformative learning can help continuing educators support pharmacists at various levels of skill and readiness for change through the possible points in the process. Continuing educators can help create awareness by exposing pharmacists to new evidence, knowledge tools or research in both clinical areas as well as practice change. They can create educational opportunities that enable use of evidence in practice by teaching pharmacists how to recognize and overcome barriers to knowledge use but also allowing them to practice application to practice.

Additionally, educators can create opportunities for pharmacists to learn from example, to learn from peers and support one another in practice change. This can include both in-person as well as online discussion groups and forums to encourage continued interest in practice change and
personal or professional growth. In addition, continuing educators should consider interprofessional educational opportunities to encourage pharmacists to interact with the other healthcare professionals with whom they will collaborate and learn from their perspectives on patient care.

In order for the profession to experience success with the expanded scope of practice, the expanded role needs to be embraced by its members and the members need to be prepared and able to take increased responsibility for patient care. The work in this thesis helps to build on the literature on practice change by suggesting a new model of readiness for change and the need to work with pharmacists as equal partners in their need for lifelong learning.

8.5 Implications for Future Research

The work that comprises this thesis can be used to further explore the RETAE framework in the context of pharmacy practice as a tool to design and evaluate education for preparing pharmacists for practice change. As a number of learning opportunities are developed and implemented over the next few years for pharmacists, there are multiple opportunities to further explore some of the findings presented in this thesis and utilize a similar framework and methodology for assessment. Creating learning opportunities that use some of the suggested strategies for transformative learning and incorporating learning opportunities that encourage active learning and enable practice change will further add to our understanding of the value of RETAE to prepare pharmacists for the expanded scope of practice.

Despite the abundance of literature in continuing medical education (CME), the literature specific to continuing pharmacy education is not as rich and diverse. One area of future research will be to develop programs that address not only the need for continuing competence in the
knowledge domain but also the maintenance and development of skills and attitudes consistent with the expanded scope of practice. Evaluation of these programs will enrich our knowledge of how pharmacists learn and the important considerations when designing education for pharmacists. Evaluation of learning opportunities designed for the development of soft skills required for practice will be of particular value as a research focus. One example might be the design and evaluation of an educational program focused on improving pharmacists’ ability to provide pharmaceutical opinions. The content may include retrieval of drug information, evaluation of medical literature, clinical decision making, and succinct and clear verbal and written communication. Learning activities can include traditional didactic lectures, case based discussions, group discussion regarding skills, attitudes and beliefs, and role play to simulate practice. Evaluation of the course would include satisfaction, application to practice and impact on pharmacy practice and patient care.

In the realm of KT, there is a paucity of literature looking at pharmacists and KT. The opportunities for further research in this area are innumerable and these opportunities relate to “Application” and “Evaluation” in RETAE. Evidence-based practice continues to be a struggle for many pharmacists, especially those working in community practice. Understanding gaps in practice, applying evidence to achieve best practices, and evaluating outcomes associated with application of knowledge will provide valuable insights to the practice of pharmacy. Application of knowledge should explore barriers of knowledge use for example, of the community pharmacist and in the community pharmacy as a practice setting. Application of evidence that considers the patient as the knowledge user will be particularly relevant to pharmacists working in community practice.
Another area of further research is gleaned from the struggles with approval and implementation of order sets at the various hospitals involved in the TOPPS study. Despite efforts to provide sites with a sample order set that was modifiable, the meeting schedule of the various approval committees became the rate limiting step in the process. Given the increasing use of order sets in practice and the rapid state of change in evidence, evaluation and improvement of this process would benefit not only KT studies but more broadly, patient safety and patient care for hospitalized patients.

Looking at the RETAE framework, it is currently a theoretical model for practice change informed by the studies presented in this thesis along with a review of the literature in change management, CE, CPD and KT. The RETAE model has not been evaluated for its application in the proposed manner. Utilization of the RETAE model by continuing educators in pharmacy and evaluation of the impact on practice change would further enhance our understanding of how to prepare the profession pharmacy for successful change in practice.

RETAE can be used to explore many different areas including:

- Preparing pharmacy leaders for change management
- Preparing pharmacists for prescribing authority and clinical decision making
- Preparing pharmacists for effective communication with patients to facilitate greater involvement in patient care but also more effective use of information by patients
- Preparing pharmacists for greater interprofessional collaboration
- Evaluating educational opportunities that are transformative for further understanding of how they lead to transformation
• Educational programs that are focussed on clinical topics but are interprofessional and encourage group discussion and case discussion
• Educational programs that disseminate research findings from successful implementation of the expanded scope of practice and provide pharmacists with the opportunity to explore how the findings could be applied to their practice.

8.6 Conclusion
This thesis focused on the models of CE, CPD and KT to prepare and implement changes in practice and changes in patient care outcomes. The design and evaluation of a CPD program in Thrombosis management demonstrated the need to consider educational design in a CPD course for pharmacists. Evaluation of the program demonstrates that this CPD program was able to achieve participant satisfaction, immediate knowledge acquisition and self-reported application and changes to practice. Development and evaluation of a pharmacist-led KT intervention in VTE prophylaxis demonstrated that a multicomponent intervention involving education, the use of order sets and the involvement of the pharmacists as leaders and human reminders can improve use of appropriate thromboprophylaxis for hospitalized patients at risk. These studies, along with a review of the theoretical underpinnings of the models of CE, CPD, KT, and practice change, highlight valuable characteristics for preparing pharmacists for the expanded scope of practice. The proposed RETAE model builds on these models as well as change management theories to create a conceptual framework to help continuing educators prepare practicing pharmacists for practice change. RETAE draws on the lessons learned through the two studies in this thesis. It encourages incorporation of the educational strategies found to be effective in the CPD program in thrombosis for pharmacists. It also supports evaluation of education and
knowledge use to understand the impact of practice change on outcomes. RETAE also takes lessons from the TOPPS study and the KTA cycle. It is through this work that it was felt important for “Reflection” to include identification of learning needs but also evidence-care gaps and barriers to knowledge use in practice. The lessons from TOPPS are that educational opportunities should explore practice change and discuss, create and encourage interventions to incorporate evidence into practice. TOPPS also highlights the importance of “Application” and the value of evaluating the impact of interventions and this component influenced the “Evaluation” in RETAE.

Continuing educators in pharmacy should consider the importance of reflection to identify learning needs and practice needs. Education can be designed using optimal educational design as well as the need for transformative learning opportunities. This will allow pharmacists to challenge their assumptions and explore new roles and practice or trial their new knowledge and skills. Education and transformation encourage changes in practice. Application of knowledge to practice will be beneficial for both applications of practice change models as well as application of evidence to improve patient outcomes. Coupled with the change in practice is a role change representing a shift in responsibility from delivering quality product to improving patient outcomes. Application of knowledge involves identifying barriers to knowledge use but also facilitators for changing practice and improving health outcomes and measuring those outcomes. In this way, the RETAE model proposes reflection, education, transformation and application to support the personal and professional development necessary to support practice change. The profession of pharmacy is in a state of rapid evolution. As continuing educators prepare to support pharmacists in this transition toward an expanded scope of practice, the studies and models proposed in this thesis can be valuable in preparing for success.
References


141. SAS Version 9.1 [program]. Cary, NC.


Appendices

Appendix A: Sample Schedule of Three-Day Course

DAY 1 – Introduction to Disease States and Review of Medications

8:30-9:00  Breakfast
9:00-9:30  Welcome, introductions and review of course objectives
            Pre-session quiz
9:30-10:45  Introduction to Venous and Arterial Thromboembolic
            Diagnosis: Investigation of suspected DVT/PE
10:45-11:00  BREAK
11:00-12:00  Review of Medications: 1
            ADP Inhibitors
            Glycoprotein IIB/IIIA inhibitors
12:00-1:00  LUNCH
1:00-2:45  Review of Medications: 2
            Heparin
            Low Molecular Weight Heparins
            Oral Vitamin K Antagonists
2:45-3:00  BREAK
3:00-4:00  Review of Medications: 3
            Anti Xa Inhibitors
            Thrombin Inhibitors
            New Medications
4:00-4:30  Evaluation and Summary of the Day
            Post-session quiz
DAY 2 – Use of Medications in Clinical Situations

8:30-9:00  Breakfast & pre-session quiz
9:00-10:15  Acute Treatment of Venous and Arterial Disorders
10:15-10:30  BREAK
10:30-12:00  Prevention of VTE
12:00-1:00  LUNCH
1:00-2:15  Special Populations
2:15-2:30  BREAK
2:30-3:45  Complications of Therapy (*HIT*)
3:45-4:15  Evaluation and Summary of the Day

DAY 3 - Patient Management

8:30-9:00  Breakfast & pre-session quiz
9:00-10:15  Management of Patients on Warfarin
  
  *Initiation of Treatment*
  
  *Titration of Chronic Therapy*
  
  *Reversal of Anticoagulants*
  
  *Case Discussions*
10:15-10:30  BREAK
10:30-12:00  Management of Patients on Warfarin
  
  *Case Discussions*
12:00-1:00  LUNCH
1:00-2:15  Case Discussions
2:15-2:30  BREAK
2:30-3:30  Role of the Pharmacist in Thrombosis Care
3:30-4:00  Evaluation and Summary of the Day and Course
Appendix B:  Letter to Potential Participants

The consent letter was printed on Letterhead

Dear (potential participant)

I am writing to invite you to participate in my doctoral thesis research. I am currently a student in the Department of Pharmaceutical Sciences at the University of Toronto. For my thesis research, I am interested in exploring the impact of a Continuing Professional Development program on the participants of the program and their professional role. I feel that the best way to achieve this goal is by analyzing the knowledge acquired by the participants but also by speaking with the pharmacists who participate in the program and their managers/supervisors to gain insight into their satisfaction with the program and into the impact it has on their role as pharmacists.

The study I am conducting is under the supervision of Dr. Zubin Austin of the Department of Pharmaceutical Sciences, University of Toronto. Potential participants will be chosen from the participants in the Thrombosis Management for Pharmacists course offered through the Continuing Professional Development program at the Faculty of Pharmacy, U of T. I plan to conduct approximately 30 interviews with participants and with their consent, their supervisors or managers.

I am requesting your participation in an interview that will last approximately 30 to 45 minutes that will be arranged at a time and place convenient to yourself. Your consent is requested to audiotape the interview. You may request that your interview not be taped if you would prefer. Please be aware that transcripts of the interview will only be available to myself and my faculty advisor. They will be kept in locked files in my home and all information will be destroyed after the completion of the report. As well, your anonymity will be protected in the final report of the findings. The names of the participants will not be used at any time in the report, in publications or in presentations. As well, analysis of the results will make it impossible to associate any particular statement with the author.
During the interview, you will be asked questions about yourself (i.e. how long ago you graduated, how long you have been at your practice site, etc.), and about your experiences in the CPD program and its application to your work life. I will be asking you questions about your role at your work site and how it has or has not been enhanced by your participation in the program.

Participation in this study is completely voluntary. If you agree to participate in the study, please sign both copies of the letter of consent and bring one copy to the interview and keep the other copy for your files. Please note that at any time you may refuse to answer any of the questions asked and you may withdraw from the study at any point if you so choose without negative consequences. At the end of the study you will be entitled to a summary of the results, if desired. The raw data collected for the study will be destroyed after 5 years. The letter of consent is attached to this letter.

Once I hear back from you, I will contact you by e-mail or phone to answer any questions you may have and to set up an appointment for an interview. In the meantime, if you have any questions, please feel free to contact myself or my faculty advisor at the numbers provided below.

Thank you in advance for your time.

Sincerely,

Artemis Diamantouros (Contact Info here)

Dr. Zubin Austin, PhD, Faculty
Supervisor

If you questions about your rights as a research participant, please contact Jill Parsons, Health Sciences Ethics Review Officer, Ethics Review Office, University of Toronto, at telephone 416-946-5806 or by e-mail: jc.parsons@utoronto.ca
Consent Form

I have read the letter describing the research being conducted by Artemis Diamantouros on Continuing Professional Development, understand the procedures outlined, and agree to participate. I have kept a copy of this letter for my files.

Date________________________________

Name________________________________

Phone Number ________________________

E-mail________________________________

Signature_____________________________

I agree to have my interview audio-taped_______________(please initial)

I would like to receive a summary of the findings__________(please initial)
Appendix C: Sample Interview Questions

What is your current title?

How long ago did you complete your professional degree?

Where did you complete your degree?

In what type of setting do you currently work? How long have you worked in that setting?

If recent, where were you practicing prior to your current setting?

What is your role at your workplace?

How would you describe your role prior to enrolling in the CPD program?

What interested you in taking the Thrombosis Management for pharmacists course?

Did you receive institutional or departmental support to participate in the program?

What did you hope to gain from participation in the program?

Did the program meet your needs?

If yes, how did it achieve that?
If no, where did the program fall short of your expectations?

What do you feel you gained through participation in the program?

How have you applied what you learned in the program to your work?

Have you taken a leadership role in your institution with respect to thrombosis-related care?

If yes, how has your role changed?

If no, why would you say that your role has not changed?
Appendix D: Application of KT to the TOPPS Study

For the TOPPS study, presented in Chapter 5 of the thesis, the KTA cycle was used to try to improve the rates of prescribing appropriate VTE prophylaxis to hospitalized patients at risk. The interventions were selected based on a review of the literature. Knowledge creation was already complete and knowledge tools in the form of clinical practice guidelines were available. The ACCP guidelines were disseminated to the study sites as part of the initial meeting with key stakeholders. Additional tools for knowledge use were developed in the form of templates for order sets adapted for local use.

The knowledge-care gap was identified through a process of standardized, retrospective chart audits with provision of feedback to the relevant stakeholders. As demonstrated in the literature, a multicomponent intervention was designed for the TOPPS study. The intervention incorporated strategies that were:

- Predisposing – dissemination of guidelines, education, small group discussions
- Enabling – use of order sets, reminders for prescribers by pharmacist team member
- Reinforcing – use of audit and feedback

The centres involved in the study had not implemented computerized provider order entry and, therefore, computer-based interventions were not available for our study sites. The emphasis for the intervention was on the use of order sets as an enabling strategy. Ongoing support was provided to the hospitals by the study leaders in the form of provision of templates for order sets in the patient groups of study and feedback on order set design. The director of pharmacy at each of the sites was chosen as the study coordinator for that site and the involvement of pharmacy was highly encouraged. Pharmacy involvement was suggested at the level of creating
and/or reviewing order sets. Pharmacists were also encouraged to contribute or lead the
initiative and act as “human reminders” for prescribing VTE prophylaxis to hospitalized patients
at risk.

As a reinforcing strategy, the use of audit and feedback served to increase awareness of the
knowledge-care gap at each of the sites and in each patient care group. Audit and feedback was
also used at the end of each phase of the study in order to measure the effect of the intervention.
Sustained knowledge use was not directly assessed in the TOPPS study.

Evaluation of the proposed intervention used the most rigorous method that was appropriate and
feasible for the study, a cluster randomized trial design. The nature of the interventions were
targeted at healthcare professionals, mainly pharmacists and physicians, that were involved in the
care of hospitalized patients admitted to general internal medicine, major general surgery and for
hip fracture surgery. The interventions involved would be difficult to randomize at an individual
patient level. The use of order sets in a randomized fashion, although possible, would be
counterproductive to the overall aim of the intervention.

**Lessons Learned During Implementation**

Some of the lessons learned during the implementation of the TOPPS study are of value in our
understanding of how KT occurs in the real-world setting. It was instructive to attempt
implementation at 8 study sites each with their own local barriers to implementation and each
with their own culture of interprofessional care, patient safety and quality improvement.

Implementing interventions, such as order sets, can be a far more difficult and prolonged task
than it appears as operationalizing this task requires approval from a number of hospital
committees which may meet infrequently and may be backlogged with forms for approval. For some sites involved in the study, more than half of the time period between the phases of implementation and assessment of the intervention was required to develop and obtain approval for new order sets. At some sites, the order sets had only been in use for a short period of time, sometimes only a month, at the point of chart audits.

Working with local teams was important in ensuring an understanding of the local barriers to use of VTE prophylaxis and also to ensure that the evidence was adapted to the local context. A limitation of this approach is that some of the members of the local teams were involved in patient care or development of order sets in more than one patient group at the site. For example, some of the pharmacists were working on multidisciplinary teams in surgery. When reviewing their patients’ medication lists, they would be reviewing both general surgery patients and hip fracture surgery patients. These pharmacists were aware of the intervention and the need for VTE prophylaxis and may have inadvertently made the same recommendations for the patients who were in the control group for that phase of the study.

Some of the educational interventions used, e.g. medical grand rounds presentations on prevention of VTE were open to all healthcare professionals at the institution. Any effect that education may have on increasing awareness may have happened in those that were providing care for patients in the control groups in the same way as it did in the intervention groups.

Finally, the culture of each of the sites involved in the study was different. At some sites, there was already a clear commitment to quality improvement, multidisciplinary care and patient safety. At others, it was more difficult to pull together a committee to guide the study as there
was far less collaboration between the various healthcare professionals and less commitment from quality and patient safety committees.