7-2-2020 9:00 AM

Applying Knowledge Translation in Rehabilitation: An Exploration of What it Means to Change Clinical Practice

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A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Health and Rehabilitation Sciences

Abstract

Health care providers are often required to implement evidence-based recommendations into the care they deliver. Resources that support health care providers' efforts are a useful knowledge translation strategy. This thesis describes the development and usability evaluation of an evidence-informed clinical practice implementation toolkit to support implementation efforts. Two studies were undertaken to provide insight into what was needed to support health care providers, and to inform the development of the toolkit. A retrospective evaluation analyzed the performance of a team implementing a pressure ulcer risk assessment for patients with spinal cord injury. The rates of adherence to the risk assessment and action plan were low at both admission and reassessment. A phenomenology of practice study was conducted to understand the experiences of implementation by health care providers. This study identified five essential themes of the experience: decision making, implementation as a process, lived time, lived human relation, and lived space. The principles of integrated knowledge translation, the Knowledge Exchange Framework, and toolkit development resources were used in this study. This toolkit contains a simplified, phased implementation process based on the Active Implementation Frameworks, and is accompanied by tools. The toolkit received very positive usability ratings: 92% of respondents learned something new from reviewing the toolkit; 100% of respondents said the toolkit was well organized; 92% of respondents said the toolkit was easy to use; 92% of respondents would recommend the toolkit to a colleague; and 92% of respondents showed intention to use the toolkit. This body of work contributes to the fields of knowledge translation and implementation science by generating insight into and appreciation of the process, context, and stakeholders in relation to implementing evidence-based guidelines into routine care delivery practices.

Keywords

Knowledge translation, implementation, delivery of healthcare, rehabilitation, evidence-based practice, spinal cord injury, pressure injury, translational medical research.

Summary for Lay Audience

Making improvements to care, and how this care is delivered by health care workers, is tough and slow. One of the research studies in this thesis looks at a real-life example of a team effort to improve the care delivered to patients with spinal cord injury. How well the health care workers did the care, patient health outcomes, and the process of improvement is evaluated. The second research study explores how health care workers experience changes and improvements in the care they deliver to patients. The goal was to get a better understanding of their experience in order to know how best to support them in making improvements. The third research study describes the development of a resource by a team to help health care workers make changes or improvements to the care they deliver to patients.

Co-Authorship Statement

The studies in this thesis were designed, carried out by, analyzed, interpreted and written by Stacey Guy. David M. Walton, Eldon Loh, Shannon Sibbald and Dalton L. Wolfe provided guidance and feedback on the studies described in Chapter 2, Chapter 3 and Chapter 4. Heather Askes aided in collecting the data used in Chapter 2. Jane T. Hsieh, Anna Kras-Dupuis, and Dalton L. Wolfe also co-designed, and analyzed the data in Chapter 4.

Acknowledgments

I am grateful to Dr. David Walton and Dr. Eldon Loh for their mentorship and wisdom throughout this PhD degree. Thank you for driving me to develop the knowledge and skills to be an independent researcher. Thank you to Committee Members, Dr. Shannon Sibbald and Dr. Dalton Wolfe for their feedback and guidance. Thank you to the examiners for their thoughtful questions and helpful suggestions: Dr. B.J. Cunningham, Dr. Alan Gob, Dr. Sander Hitzig, and Dr. Dalton Wolfe. I would like to extend a thank you to my lab mates, Dr. Swati Mehta and Dr. Joshua Lee, for their advice and support during this roller coaster ride.

I had the privilege of working with a number of healthcare providers at St. Joseph's Health Care London. Thank you for contributing to this body of work, and for striving to improve the care you deliver. I especially would like to mention Anna Kras-Dupuis, and Dr. Dalton Wolfe who introduced me to applied clinical practice implementation.

This research would not be possible without the love and support of my family. To my mom, Carole-Anne Guy, who taught me that you can be whoever you want to be, and achieve whatever you set your mind to; you will always be my role model for how to be a strong, resilient woman. I will be eternally grateful to my husband, Dr. Jordan Downey, who came into my life at the beginning of this PhD journey, showed me what it takes to complete a PhD, and who continues to be the biggest blessing.

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1

1.1. Introduction

Clinical practice guidelines are tools that should be systematically developed with quality to assist health care providers, policy makers, management and patients in making decisions about appropriate health care for specific clinical circumstances [1,2]. Numerous studies show clinical practice guidelines continue to be underused; with low compliance rates illustrating multiple challenges to achieving a more evidence-based routine clinical practice [3].

Implementing evidence, such as clinical practice guidelines, into routine practice is often slow and complex [3,4]. Implementation is the specified set of activities designed to put into practice an activity of known dimensions [5]. It has been suggested that on average interventions to implement clinical practice guidelines have modest effect – 10% - on the process and outcome of care [1]. Despite this potential modest impact, there is growing attention and impetus for the need to increase the uptake of clinical practice guidelines to strengthen health care delivery systems and patient outcomes [6]. In fact, the impact of clinical practice guidelines on practice and outcomes is complex, and much is still yet to be uncovered about this phenomenon [1]. Much progress has been made, however there is still wide variation in the implementation of evidence-based programs, practices and policies [7].

This valley between evidence generation and the application of that evidence into routine clinical practice is often referred to as the knowledge-to-action gap, science-to-service gap or knowledge-to-practice gap [8]. Closing this gap is the goal of implementation research or implementation science, and knowledge translation. Specifically, both fields focus on improving healthcare delivery by promoting the routine practice of evidence [9,10]. Studies on implementation take on a different flavour than their health outcome counterparts, typically focusing on the rates and quality of use of evidence-based practices rather than their effects [8]. The areas of inquiry for these studies may include: the

beliefs, experiences, and perceptions of clinicians delivering the care service; the organizational context in which the clinical practice is delivered; and components of the intervention being delivered [11].

Knowledge translation and implementation science share key elements and are often considered interchangeable [12]. Namely, a deliberative process of exchange of knowledge between producers and users; synthesizing evidence to inform practice; combining values and effectiveness in decision making; and improving health outcomes of patients [12]. The practices to which both fields refer can be defined as simple procedures adopted by individual health care professionals, and programs can be described as a collection of practices that may integrate several intervention practices [5]. For the purpose of this dissertation, practice refers to a clinical service delivered by health care providers. This could include practices done by individuals, or a collection of practices. The scope of both fields includes at patient, health care professional, organizational, and policy levels [8].

Both knowledge translation and implementation science attempt to bridge this knowledge-to-action gap by using multiple theories, models and frameworks to support the implementation of evidence into routine practice. In recent years there has been more uptake in using theories, models and frameworks to increase success rate of implementing evidence-based practices [6]. These range from process models, determinant frameworks, classic theories, implementation theories, to evaluation frameworks [6].

The commonalities across implementation frameworks were grouped into 6 areas by Meyers et al.[13]. These six areas are: assessment strategies, decisions about adaptation, capacity building strategies, creating a structure for implementation, ongoing implementation support strategies, and improving future applications. Bhattacharyya, Reeves, & Zwarenstein [12] concluded the following are common steps attributable to both implementation science field, and knowledge translation. Firstly, conducting a needs assessment and identifying gaps. Secondly, identifying barriers and facilitators to implementation. Thirdly, reviewing the evidence on implementation interventions. Fourthly, developing and implementing an intervention to improve performance. Fifthly,

evaluating the implementation process. And lastly, evaluating the outcomes of the intervention.

Implementation strategies, the ‘how to’ of the implementation process, is a key focus area of both knowledge translation and implementation research. Implementation strategies refer to any systematic intervention process to adopt and integrate evidence-based health interventions into routine care [11]. The Cochrane Effective Practice and Organisation of Care[14] committee has compiled a taxonomy of health systems interventions. This taxonomy includes implementation strategies which are categorized into interventions targeted at healthcare organizations, at healthcare workers, and at specific types of practice, conditions or settings.

There is a focus amongst implementation research on implementation strategies to change the behavior of health professionals [11]. This is a logical target area given health care professional teams are responsible for delivering evidence-based care, and are often the ones expected to ‘do something differently’ as a result of adopting a clinical practice guideline recommendation. As of 2017 there were 53 systematic reviews in the Cochrane Library on implementation strategies intended to change health care professional behavior [11]. These reviews suggest interactive implementation strategies are more likely than passive strategies to result in a change in health care professional behavior [11]. Strategies that are seen to be more successful are those that establish and reinforce group norms within particular contexts, where peers relate their performance of the practice to these norms [11].

Across the implementation theories, frameworks, and models relative advantage, compatibility with current values and norms, trialability, observable benefits, low complexity and the flexibility of the setting are potential facilitators of evidence-based interventions [5]. Potential facilitators thought to relate to the health care providers themselves, include social values, skill, confidence, openness to change, tolerance for ambiguity, and motivation [5]. The dissemination and diffusion of information alone, and training is thought not to facilitate practice change [5]. System-level facilitators of implementation include good internal communication, technical support for change,

decentralized decision-making, diverse professionals with specialized knowledge, and lack of formality [5].

Modifications to clinical practice, such as the uptake of guidelines, are happening against a backdrop of the complexity of health care delivery; characterized by the delicate interplay of multiple interacting levels of factors that vary from setting to setting including the characteristics of the intervention, the context in which the intervention is being implemented, and individual health care provider attributes [8,15]. Complexity is described as dynamic and emerging processes and objects that interact with each other, adapt, co-evolve with other systems, and are defined by those interactions [16].

1.2. Thesis purpose

The overall objective of this thesis was to develop and evaluate a practical, evidence-informed toolkit to support health care professionals implementing clinical practice guideline recommendations into routine care. This research contributes to the body of knowledge by evaluating longitudinal data on the performance of a clinical team implementing a new practice, exploring health care professionals' experience of implementation, and developing a new resource to aid in the adoption of guideline recommendations. This research was undertaken to gain a deeper understanding and appreciation of the process, context, and stakeholders in relation to implementing evidence-based guidelines into routine care delivery practices.

The work being presented throughout this thesis was part of a national best practice implementation initiative – the Spinal Cord Injury Knowledge Mobilization Network. This network was comprised of seven rehabilitation centers across Canada. The goal of this network is to utilize implementation science processes to facilitate the adoption of best practice in spinal cord injury rehabilitation. Parkwood Institute is a rehabilitation care site that participated in the Spinal Cord Injury Knowledge Mobilization Network. I was a Knowledge Mobilization Specialist for this site.

1.3. Thesis layout

The integrated article format has been used to organize this thesis. The subsequent chapters are divided into three studies. Statistical process control and descriptive statistics are used to assess health care provider adherence to performing activities required by the practice and are reported in Chapter 2. The clinical practice being implemented is a comprehensive risk assessment to improve the care of pressure injury in persons living with spinal cord injury. The prevalence and incidence of pressure injury in patients receiving the new practice are detailed. Results suggest a review of the intervention itself, and the implementation strategies used would be beneficial to improving the success of the initiative. Chapter 3 describes the experience of implementing guidelines or making changes to care from the perspective of health care professionals. Phenomenology of practice methodology is used to provide a deeper understanding of this phenomenon. The findings suggest a number of themes are associated with the experience of these health care providers in a specific context. The learnings from Chapter 2 and 3 contributed to the development and evaluation of a knowledge tool used to guide health care professionals in implementing clinical practice guideline recommendations into routine clinical care. Chapter 3 describes the development and usability evaluation of this toolkit which includes a phased approach to implementing change, and is accompanied by a list of curated tools.

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Chapter 2

Evaluating the delivery of an interprofessional pressure injury risk assessment initiative for persons living with spinal cord injury within an inpatient rehabilitation service

2.1 Introduction

Pressure ulcers are localized injuries to the skin and/or underlying tissue that develop as a result of continued pressure with shear and/or friction on bony prominences [1]. People living with spinal cord injury (SCI) are at high risk for developing pressure injuries as it is a common secondary medical complication [2,3]. Despite efforts to prevent and treat pressure injuries, the prevalence of pressure injuries in people with SCI continues to increase [3]. Pressure injuries increase patient length of stay and the cost of treatment more than other medical conditions [4]. Multiple clinical practice guidelines emphasizing an evidence-based approach to the prevention and management of this common secondary complication have been published in response to the need for improved care [5-9].

Implementing clinical practice guidelines into routine practice is often challenging, slow and complex [10,11]. Much progress has been made, however there is still wide variation in the implementation of evidence-based programs, practices and policies [12]. A treatment or intervention outlined with a guideline recommendation will not be effective if it is not implemented well; this emphasizes the importance of evaluating the effectiveness of implementation strategies, as distinct from the impact of the treatment or prevention approach [13].

Implementation outcomes are the effects of deliberate and purposive actions to implement new practices, and function as indicators and/or proximal indicators of implementation success [13]. Implementation outcomes include measuring acceptability, adoption, appropriateness, costs, feasibility, fidelity, penetration, and sustainability [13]. Depending on the implementation outcome, the evaluation of an implementation initiative will occur at different stages, require different levels of analysis, and sources of data [13].

The purpose of this paper is to retroactively evaluate the fidelity of a new pressure injury risk assessment initiative implemented in an SCI rehabilitation unit, by measuring the adherence of the interprofessional healthcare provider team to the required practice, to determine if changes need to be made to the clinical intervention and/or the implementation intervention. The team adherence performance is examined against the milestones of the implementation process, and the prevalence and incidence of pressure injury amongst patients.

2.2 Methods

2.2.1 Study design

This retrospective evaluation study focuses on an implementation fidelity process using a post-within-site design, examining implementation successes or failures, and changes within a care process occurring inside an inpatient SCI rehabilitation unit [14]. The emphasis is placed on healthcare professional team adherence to the assessment of patients, rather than the health outcomes of patients [14].

2.2.2 Study setting

This effort to improve the delivery of pressure injury prevention and management by an interprofessional team of healthcare providers takes place in a not-for-profit tertiary care centre located in South-Western Ontario. Specifically, an SCI inpatient rehabilitation program. This unit is subsumed under the rehabilitation program, which is funded by the province of Ontario. The inpatient program has fifteen beds dedicated to rehabilitation of traumatic and non-traumatic persons living with SCI. The inpatient ward is shared with amputee and brain injury inpatient rehabilitation. The unit is serviced by a physiatrist and a hospitalist. The rehabilitation team conducts weekly rounds (the full team, led by the program coordinator, provides progress updates and action plans for each patient on their service), daily comfort rounds (nurses perform brief check-ins at the bedside with each patient), and monthly council meetings (nominated members of the team, including management, address program-level strategic directions, upcoming priorities and problem solve program-wide issues). The rehabilitation program is supported by quality

improvement, research, and professional practice departments. See Figure 1 for the strategic priorities of the organization at the time of implementation.

Table 1 Organizational strategic priorities at the time of the pressure injury assessment implementation initiative

Key Priority Areas	
Be a national leader in quality and patient safety.	Leverage technology to enhance quality and patient safety.
Provide integrated patient care.	Enhance research focus in existing and emerging areas.
Foster system-wide dissemination, translation, and implementation of knowledge to improve teaching and care delivery.	

Healthcare providers, management and researchers from this organization participated in an externally funded network of hospitals focused on the translation and adoption of evidence-based practices to standardize care in SCI rehabilitation. This network, The Spinal Cord Injury Knowledge Mobilization Network (SCI KMN), was comprised of six rehabilitation centers across Canada. The goal of this network was to utilize implementation science processes to facilitate the adoption of best practice in SCI rehabilitation. The SCI KMN infrastructure consisted of sponsoring agencies, a national coordinator, Steering Committee, and working groups; and local (site-specific) implementation teams.

2.2.3 The clinical intervention

The SCI KMN utilized an online, six-stage Delphi process to prioritize pressure injury prevention and management best practice recommendations and performance indicators from the Canadian Best Practice Guidelines [5] that were to be implemented into in SCI inpatient rehabilitation [15]. The Delphi process resulted in the selection of two best practices; with one of which being the focus of this paper: comprehensive risk assessment.

The recommendation chosen to be operationalized and implemented by all six sites was: conduct comprehensive, systematic and consistent assessment of risk factors in individuals with SCI [15]. This can be further described as i) assess and document the risk on admission and reassess on a routine basis, as determined by the health care setting, institutional guidelines, and changes in the individual's health status, ii) use clinical judgement as well as a risk assessment tool to assess risk, iii) assess demographic, physical/medical, and psychosocial risk factors associated with pressure ulcer prevention [15].

A national operationalization team comprised of leadership and knowledge mobilization specialists from each site, detailed the recommendation into specific, clinically relevant practices to encourage standardization across the six sites [16]. Further operationalization and delivery of the pressure injury risk assessment initiative was carried out at site-level by a team of SCI specialized health care providers, management, research staff and a clinical nurse specialist.

Each rehabilitation site could customize the comprehensive risk assessment recommendation according to the local context. The implementation team at this Southwestern Ontario rehabilitation unit chose to use the Spinal Cord Injury Pressure Ulcer Scale (SCIPUS) [17] which is a specific risk assessment based on risk factors associated with pressure injury development post-SCI as the risk assessment tool component of the practice. The team championed the conversion of the paper-based tool on to the organization-wide electronic health record, and agreed the tool should be initiated within 24 hours of a patient being admitted to the unit, and completed within 72 hours of admission by a nurse. The allied health providers each developed discipline-specific paper-based risk assessments to be completed within 10 days of admission. Patients were assessed for risk based on the following factors: demographics, medical, environmental, physical, and psychosocial attributes.

The implementation team included an interprofessional risk assessment and prevention plan as part of the comprehensive risk assessment recommendation. The nursing and allied health team were to complete an assessment and plan within 10 days of admission

by at minimum 5 providers, for patients scoring high or very high risk on the SCIPUS (score of ≥ 6), and to review this plan within 4-5 weeks of admission. The form (plan) documented information on current pressure injuries, mattress type, seating, dietary considerations, turning schedule, educational opportunities, comorbidities, psychosocial considerations. The risk assessment and action plans were discussed at weekly team rounds, with some disciplines completing the form together.

2.2.4 The implementation intervention

The implementation of a pressure injury risk assessment began across six rehabilitation sites in 2012. The Active Implementation Frameworks (AIFs) were used to guide the network's implementation process [18]. The AIFs consist of five components: 1) Useful Innovation, 2) Implementation Stages, 3) Implementation Teams, 4) Implementation Drivers, and 5) Improvement Cycles 21. Throughout the stages, the implementation team reflects on implementation drivers, which are structural components and activities that may influence the success of a program [19]. This framework uses improvement cycles to monitor ongoing implementation [19]. Monitoring and evaluation of the national implementation initiative continued until 2017.

The implementation of the clinical intervention occurred through identified champions, training of existing health care providers and new hires, discussions within weekly team rounds, monitoring by the implementation team, performance feedback to the health care providers through personalized email reports, monthly SCI Council meetings, and coaching. This implementation team met every three weeks to initially design, and then monitor implementation efforts and successes. The research team provided support to the clinical team in the form of implementation expertise, data collection, and data analysis.

Performance indicators were chosen to evaluate the best practice recommendation. These include: i) percentage of patients with pressure ulcer, documented by stage and location, ii) percentage of new patients with documentation of comprehensive pressure ulcer risk assessment within specified time frame, iii) percentage of patients identified as having a documented action plan associated with their pressure ulcer risk assessment [15].

2.2.5 Data collection and analysis

2.2.5.1 Interprofessional team practice adherence rates

The comprehensive risk assessment and action plan completion rates for each patient admitted to and discharged from the SCI inpatient rehabilitation unit between June 2012 and June 2017 were tracked on a spreadsheet by the research assistant during the implementation process. Each component of the risk assessment and action plan delineated by health care provider discipline was recorded. The data points collected included: SCIPUS on admission at 24 hours (nursing), SCIPUS re-assessment at 72 hours (nursing), action plan at 72 hours (nursing); risk assessment and action plan within 10 days of admission by discipline (social work, psychology, therapeutic recreation, nutrition, physical therapy and occupational therapy), reassessment of risk assessment and action plan at fifth week by discipline (social work, psychology, therapeutic recreation, nutrition, physical therapy and occupational therapy). Data on the date the component was reviewed, signature by discipline, and the presence of checks in boxes were collected.

Data were collected from 408 patients admitted to the inpatient unit between June 2012 and June 2017. Of these admissions, 124 were removed from the analysis as they were admitted for less than the required number of days to have received the full practice as defined by the site implementation team. As a result, data from the 284 patients who received the comprehensive risk assessment and action plan practice were analyzed. The team adherence rate is defined as percentage of new patients with a comprehensive risk assessment and action plan completed 100% of the time by 5 out of the 6 disciplines. Descriptive analysis of this data includes counts, percentage and frequency. These adherence rates have been plotted over time to examine potential variation in the process to guide decision making about the implementation. Control chart analysis has been used to examine this variation.

Statistical process control helps to identify the variability present in any and all processes of best practice implementation so that the practitioner may make a more informed decision as to whether the intervention has had the desired outcome, and whether the

desired impact is sustainable [20]. This branch of statistics detects process changes and trends earlier than classical statistical methods, and emphasizes the utility of time-ordered data [20]. If a process is judged to be stable, one can establish statistical limits and tests that provide evidence of change due to deviations from predicted paths [20]. Statistical process theory describes two types of variation: common cause, and special cause.

Common cause variation is considered natural variation that is inherent in a process due to ordinary, regularly occurring causes [20,21]. This type of variation results in a stable process that is predictable, and within statistical control [20]. The resultant data from such a process is said to be predictable within a range [20].

In comparison, special cause variation is due to unnatural or irregular causes that are not a natural part of the process [20]. This type of variation could affect parts of the process but not others [21]. Special cause variation results in an unpredictable, unstable process [20]. These causes in variation could be a result of deliberate intervention or an external event outside of a practitioner's control. If a process exhibits special cause variation that is deemed positive to the process, it may be possible to account, remove or replicate external causes [20].

Control charts are a tool of statistical process theory. These charts aid decisions as to whether an implementation process needs to be re-designed, or whether the practitioner needs to investigate external causes of process variation [20,22]. By plotting data or process behavior over time instead of comparing discrete periods, a health care provider can decide whether variation in the process is random or indicates a pattern of meaningful change [23,24]. The control charts aids decision making by distinguishing between common cause variation, and special cause variation [22].

A control chart is plotted with (1) a series of values ordered over time, (2) upper (UCL) and lower control limits (LCL), and (3) a centre line or mean [25]. To detect meaningful changes and balance the risk of type I or type II errors, the control limits are set at ± 3 standard deviations (SD) [20]. The charts can be interpreted by looking for randomly distributed data that occur between the control limits, which suggests the process is stable; and for data that falls outside of the limits. Tests for special cause variation

include (1) a single value outside a control limit (2) two out of three successive points more than 2 SD on the same side of the centre line and more than 2 SD from the line (3) 4 out of 5 successive values more than 1 SD from the mean on the same side of the centre line (4) 8 successive points on the same side of the centre line (5) six successive points increasing or decreasing [20,25,26]. If the process remains in control, future measurements will continue to follow the same previous probability distribution i.e. if a stable process produces data that follow normal distribution, you can expect 95% of future measurements to fall within ± 2 SD around the mean. Almost all data will fall within ± 3 SD of the mean if the underlying distribution is stable.

2.2.5.2 Implementation process milestones

Multiple data sources were used to map the process milestones of this implementation initiative in order to further contextualize team adherence rates. These include reports to funding organizations, local site implementation meeting minutes, and process development tools or exercises. These data sources were examined for redundancy, convergence and consistency of activities. As the Active Implementation Frameworks (AIFs) [19] formed the guidepost for this initiative, activities were mapped according to the stages of implementation and synthesized on a chronological timeline. A description of the AIFs are provided in 2.2.4.

2.2.5.3 Pressure injury prevalence and incidence

Pressure injury outcomes for each patient admitted to the inpatient unit between June 2012 and September 2015 were tracked on a spreadsheet by the research assistant during the implementation process. Each pressure injury related outcome from the SCIPUS, the risk assessment and action plan, and information from the National Rehabilitation Reporting System (NRS) database were recorded. The NRS is a database maintained by the Canadian Institute for Health Information to facilitate the collection of standardized rehabilitation outcomes [27]. The data points collected included: admission date, discharge date, history of pressure ulcer on admission, total SCIPUS risk score, pressure ulcer location, pressure ulcer date of onset, pressure ulcer stage on admission, pressure ulcer stage on discharge.

For the prevalence and incidence, descriptive statistics were used to analyze the data from 253 patients admitted to and discharged from the inpatient rehabilitation program between June 2012 and September 2015, with a documented pressure injury. Descriptive analysis includes counts, percentage and rate. One hundred and twenty-four patients that did not receive both a risk assessment on admission and a re-assessment at discharge due to length of stay, were omitted from this analysis. Pre-implementation practice compliance rates were not included in the analysis as the authors believe this provides false representation of the previous practice as we cannot know if there was a standardized inter-professional approach to pressure injury management.

2.2.6 Ethical considerations

As an inpatient rehabilitation program in South-Western Ontario has been used as the main unit of analysis there is no way to ensure complete anonymity of the site. All process data has been analyzed and displayed in an aggregate team level to prevent the identification of individual disciplines. All the information related to patients admitted and discharged from the inpatient program have been deidentified and presented without the month in which the person was admitted. This initiative began with REB approval (#107766) and was then reassessed to be a quality improvement undertaking.

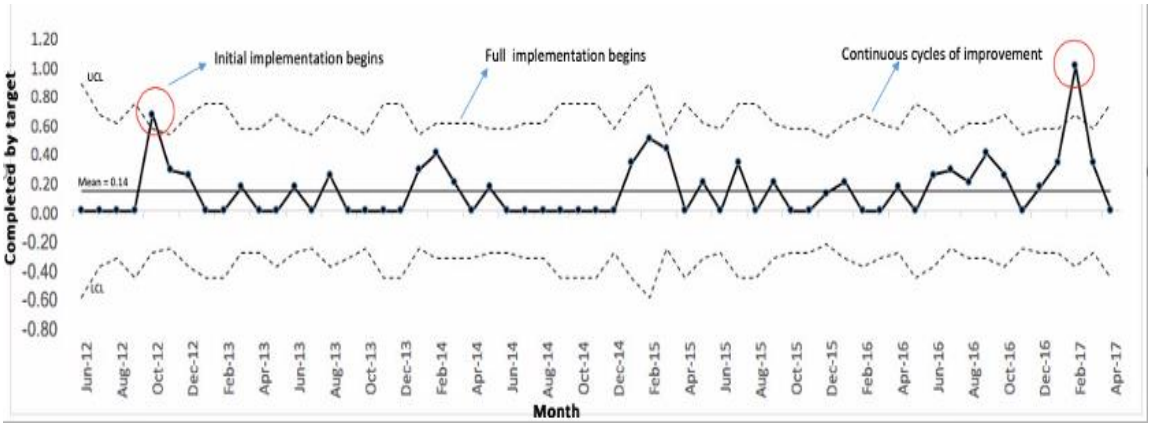
2.3 Results

2.3.1 Interprofessional team practice adherence rates

2.3.1.1 Comprehensive risk assessment and action plan on admission

The data shows that for 30 consecutive months the comprehensive risk assessment and action plan on admission never achieved 100% adherence by the interprofessional team. There was a wide range of adherence, from 0% adherence to close to 85% adherence on for risk assessment on admission. The data suggests team adherence to risk assessment and action plan on admission was better than team adherence to risk assessment and action plan on reassessment.

Figure 1: A control chart displaying the interprofessional team practice adherence rates for the comprehensive pressure injury risk assessment and action plan on admission between June 2012 to April 2017



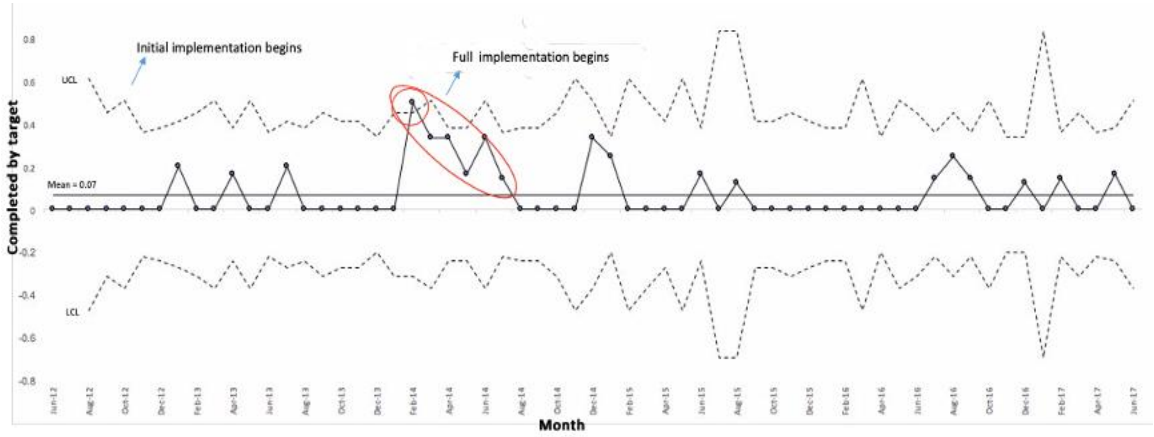
The data displayed is within the limits of statistical process control. The full process needs to be reviewed for possibilities of improvement as common cause variation is displayed. Tests of special cause were applied and evidence of one type of special cause variation can be seen: there are two instances of one data point outside of the UCL. A factor occurring during initial implementation in October 2012 and towards the end of full implementation in February 2017 influenced the 'normal' completion of the assessment by the team. Special cause needs to be investigated and if appropriate, replicated as it is in a positive direction i.e. the adherence rates increased impressively.

2.3.1.2 Comprehensive risk assessment and action plan on reassessment

Data shows that for 30 consecutive months the comprehensive risk assessment and action plan at reassessment never achieved 100% adherence by the interprofessional team. The range in the rates of adherence are consistently lower than the rates at admission, ranging from 0% to 50% completion by target by the team. Tests for special cause variation were applied and the data shows two signals of special cause variation. The first is inferred by one data value outside of the upper control limit just before full implementation began between December 2013 and February 2014. The second signal is a shift of 6 consecutive

data values above the centerline, in descending order between December 2013 and August 2014.

Figure 2: A control chart displaying the interprofessional team practice adherence rates for the comprehensive pressure injury risk assessment and action plan at reassessment between June 2012 to April 2017



2.3.2 Implementation process milestones

The implementation milestones are mapped according to the stages of the Active Implementation Framework. Beginning in 2011, stakeholders began discussions to determine the readiness and feasibility of undertaking a national best practice implementation initiative. The lead researchers and organizational leadership from the site Rehabilitation Program were involved in these discussions, and later became the Network lead. The Exploration stage began in 2012 and transitioned into the Installation stage within the same year. Late in 2012 the implementation process entered the Initial Implementation stage. The implementation initiative was considered in the Full Implementation stage as of 2014, due to the types of activities reported in documents.

Table 2: A timeline of process milestones present in the pressure injury risk assessment implementation initiative at the local site

Year	Active Implementation Framework Stages	Implementation Milestones
2011 - 2012	Pre-Exploration	Discussions between external funding organizations, researchers and organizational leadership
2012	Exploration	Pressure injury care delivery selected as the focal area for improvement
		Stakeholders participate in modified Delphi to vote on clinical practice guidelines recommendations
		Site Implementation Team established
	Installation	Implementation tools and training in place Implementation initiated
		Operationalization of pressure ulcer risk assessment practice with tailoring to local context
		Developed implementation action plans to address barriers
		Operationalization of complimentary patient education practice
		Completion of stages of implementation analysis self-assessment tool

		Training of interprofessional team
2012 – 2013	Initial Implementation	Launch of practice delivery
		Monitoring process outcomes through analysis of data
		Process and outcome data entered into Global Research Platform
		Interprofessional team receives discipline-specific performance data through feedback loop
		Implementation team revises processes
2014 – 2017	Full implementation	Improvement cycles with continuous monitoring
		Evaluation
		Engage leadership in conversations around sustainability

2.3.2 Pressure injury prevalence and incidence

Between June 2012 and September 2015, 45 patients admitted and discharged from the inpatient unit out of 253 had a documented pressure injury. Across these 45 patients reported as having a pressure injury, there were 53 pressure injuries. Of the 45 patients with a reported pressure injury: a) 18 patients (40%) had a history of pressure injury prior to entering rehabilitation, b) 34 patients (75%) had a pressure injury recorded at the time of admission, c) 17 patients (14%) developed a pressure injury whilst on the unit, d) 23 patients (51%) were discharged with a pressure injury. The most common location for a pressure injury in this dataset is the coccyx.

Table 3: Documented prevalence and incidence of pressure injuries across 45 patients admitted to the inpatient rehabilitation program between June 2012 and September 2015

n = 53 PrIs	Admission (% of patients)	Admission (# of PrIs)	Incidence (% of patients)	Incidence (# of PrIs)	Prevalence (% of patients)	Prevalence (# of PrIs)
Stage I	6 (13)	7 (13)	8 (17)	8 (15)	14(31)	15(28)
Stage II	23 (51)	27 (50)	5 (11)	5 (9)	28(62)	32(60)
Stage III	1 (2)	1 (1)	1 (2)	1 (1)	2(4)	2(3.7)
Stage IV	2 (4)	2 (3)	0 (0)	0 (0)	2(4)	2(3.7)
Unstageable	2 (4)	2 (3)	0 (0)	0 (0)	2(4)	2(3.7)

PrI = pressure injury

Table 4: Location of 53 pressure injuries across 45 patients admitted to the spinal cord injury rehabilitation program between June 2012 and September 2015

Location	N (%)
Upper extremity	
Elbow	6 (11%)
Upper core	
Neck	1 (1%)
Lower extremity	
Trochanter	1 (1%)
Gentils midline	1 (1%)
Midline sacral	1 (1%)

Heel	5 (9%)
Foot	1 (1%)
Lower core	
Buttocks	4 (7%)
Ischial tuberosity	6 (11%)
Coccyx	31 (58%)

2.4 Discussion

This evaluation study focused on an implementation process to improve pressure injury risk assessment care delivered on an inpatient SCI rehabilitation unit. Against a backdrop of implementation milestones, data was analyzed pertaining to interprofessional team adherence to practice activities, and pressure injury prevalence and incidence amongst patients. Between 2012 and 2017, low rates of team adherence to the pressure injury risk assessment practice was observed. In addition, common cause variation present in both the assessment and reassessment practice process with these low rates suggests there may be a need to redesign the implementation intervention, and/or the clinical intervention.

Comparing the practice adherence rates findings in this study to a recent analysis of the practice adherence rates across the 6 SCI KMN sites puts these findings into context. Scovil, Delparte, Walia et al.[28] separate the pressure injury risk assessment into SCIPUS completion rates, interprofessional risk factor identification completion rates, and interprofessional action plans. To be considered 'complete' four out of five disciplines need to have filled out their sections. The data shows an improvement in SCIPUS completion rates from 45.7% pre-implementation and 93.7% post-implementation; however, these rates did not change from initial to full implementation [28].
Low rates of completion for the interprofessional risk assessment were observed pre-implementation (30%) and post-implementation (37%) [28]. Very low rates of completion for the interprofessional action plan were observed from pre-implementation (23%) to post-implementation (29%) [28]. The very low practice adherence completion rates found in

this study are consistent with the low rates found across the 6 other rehabilitation sites implementing the same recommendations.

Across the 6 SCI KMN sites pressure injuries were common [28]. On admission, 75% of patients in this database were documented as having a pressure injury; while 22.5% of individuals across the 6 sites had pressure injuries. Scovil, Delparte, Walia et al.[28] reported 14% of patients developed new pressure injuries during rehabilitation; the same percentage is found in this study. Scovil, Delparte, Walia et al. [28] note similar findings of pressure injury prevalence and incidence have been reported in other SCI acute and rehabilitation settings. There was no statistical difference observed in documented pressure injury incidence prior to and during implementation across the six SCI KMN sites [28]

Implementing best practice recommendations into routine practice is complex and challenging; as illustrated in this article by low team practice adherence rates. Barriers to implementing recommendations may exist at multiple levels of delivery including at provider, organizational or policy [29]. There may be multiple factors hindering the implementation of this pressure injury risk assessment. One such barrier noted by analyzing data from the six SCI KMN sites is that interprofessional collaboration may be a challenge; as the completion of the interprofessional risk assessment across the 6 sites remained a challenge throughout implementation and absolute rates remained low [28].

It is our recommendation, based on the low adherence rates, that the site implementation team conduct investigations, such as audits, interviews, and/ or member checking, into possible barriers to the completion of the pressure injury risk assessment. The site implementation team needs to focus on the relative advantage, complexity, and cost of the intervention as it currently stands [29]. The team needs to explore the external policies and incentives outside of the organization, the culture within the organization, the implementation climate within the organization, and to reassess organizational readiness for implementation [29]. In addition, the team may want to reassess the knowledge and beliefs about the intervention held by the providers who have been carrying out practice activities, and the stage of change of the individual [29]. Based on these barriers,

modifications both to implementation strategies and to the clinical intervention itself may be needed.

Plotting the completion rates over time through the use of the control chart provides a quick way to assess whether the implementation process was in control and needed to be improved or redesigned. Most of the data concerning pressure injury risk assessment on admission displayed common cause variation – suggesting a process that is stable and subject to regular, ordinary causes. For the site implementation team, this process might be functioning at an unacceptable level given the low team adherence, and they may feel the need for fundamental process improvements and redesign in order to not continue to produce the same result [23]. If a different level of performance is wanted, the site implementation team must intervene and introduce a change [20].

In the case of the team adherence rates on reassessment, the special cause variation will need to be investigated by the site implementation team so that they may replicate the action given the (small but) positive effect on completion rates. The site implementation team might also consider eliminating the special cause variation in order to bring the process under control however given the very low team adherence rates, the implementation process and/or the clinical intervention might need a fundamental redesign.

2.4.1 Study limitations

The data presented in this paper does not establish a causal link between the pressure injury risk assessment implementation initiative and pressure injury prevalence and incidence in patients. This is not in contradiction with the goal of the SCI KMN network which was to utilize implementation science processes to facilitate the adoption of best practice in SCI rehabilitation, and not explicitly to decrease the presence or incidence of pressure injury in this population. In addition, there was no tracking of whether providers carried out the tasks associated with the plans to address risk factors; and there is yet to be a direct link made between the practices recommended in the guidelines and impact on pressure injury incidence. A recent Cochrane review concluded that it is unclear whether

different types of care delivered to people with pressure ulcers affected the number of people developing pressure ulcers and how fast existing ulcers healed [1].

This paper does not distinguish between the quality of the implementation initiative and the effectiveness of the intervention (the pressure injury risk assessment). The data did not capture the frequency, duration, or coverage of the intervention being delivered. No conclusions may be drawn as to where in the process redesign needs to occur. In addition, more than 30 data points were included in the analysis of the admission adherence rates which increases the chance of type I error.

Although the pressure injury prevalence and incidence were reported in the study of the 6 sites [28], the authors chose not to include the pre-implementation data as there was no established standardized reporting and collection of pressure injury data at this site prior to implementation. Any conclusions drawn would have been an inaccurate representation of the prior practice.

The control chart analysis was done retrospectively as opposed to during the implementation initiative. Had this tool been chosen as the means to provide feedback in 3 month increments to the interprofessional team carrying out the practice any exhibited variations could be examined for underlying causes in a timely fashion; by applying cycles of improvement for a more responsive approach and perhaps quicker pivots.

2.5 Conclusion

This evaluation study focused on the fidelity of a new pressure injury risk assessment initiative implemented in a SCI rehabilitation unit, by measuring the adherence of the interprofessional health care provider team to the required tasks, against a backdrop of implementation milestones. Data examining the prevalence and incidence of pressure injuries amongst the patients on this unit was included to additional context, although no causal links may be drawn. Between 2012 and 2017, low rates of team adherence to the pressure injury risk assessment practice were observed. Common cause variation present in both the assessment and reassessment practice process, along with low rates of practice

adherence suggests there may be a need to redesign the clinical intervention and/or the implementation intervention.

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Chapter 3

A phenomenological exploration of the lived experience of clinical practice implementation by clinicians in a rehabilitation hospital

3.1 Introduction

Implementation in the clinical environment can be defined as the systematic uptake of evidence into routine care and policy with the goal of improving health outcomes for patients [1]. There are multiple frameworks and models to guide implementation initiatives in health care; with a consistent concept being identification of the target of the behavior change, whether that be adopting a new behavior or abandoning an old one. A central stakeholder who is required to change during healthcare implementation initiatives is the clinician.

Clinicians are key stakeholders in the adoption and implementation of clinical interventions. Implementation practitioners or knowledge brokers ask clinicians to enact multiple roles: early adopters, idea generators, problem identifiers, champions, end-users, decision makers, team members, agents of change. For those implementation practitioners who are not clinicians by training, developing a deeper understanding of what such an experience of implementation is like from the perspective of a clinician may enhance one's practice.

This article aims to contribute to the insight, thoughtfulness and tact of the implementation practitioner. We aim to do this by creating a phenomenological text characterized by rich descriptions of lived experience of changing routine care that enables an implementation practitioner to reflect on and better understand clinicians' experiences of implementation. Studying lived experience and seeking the essence of a phenomenon is essential to phenomenology [2]. Using a phenomenological lens, implementation is characterized as an everyday lived through experience saturated with meaning [3]. The phenomenological question asked by our study is: What is the lived experience of clinical practice change in rehabilitation? With the goal of understanding

how clinicians experience adoption or implementation of new practices or modifications to clinical practices.

3.2 Methodology

The creation of data, analysis and interpretation in this study is informed by the phenomenology of practice. Phenomenology of practice is a form of phenomenological inquiry seeking to identify practical acts of living as we immediately experience them [3-5]. These experiences are accessed through narratives that increase awareness and offer opportunity to reflect on practice [5]. The experiences under study are those that truly interest the investigator [2].

Phenomenology of practice is a questioning method rather than one that provides answers, discoveries, or conclusions [6]. Phenomenology of practice consists of six methodological features: 1) turning to the nature of lived experience – asking 'what is it?', 2) investigating experience as we live it – gathering experiential material, 3) reflecting on essential themes, 4) writing and re-writing, 5) maintaining oriented relation, and 6) balancing research context by considering parts and the whole [7].

3.2.1 Methods

This qualitative study uses social science methods, specifically in-depth phenomenological interviews, to collect lived experience [2,5]. A researcher adopts an attitude of wonder and invites openness by practicing epoché-reduction in an attempt to remove pre-understandings, theoretical concepts, and assumptions [3,6,8]. A researcher orients herself to the purpose of the research and her role [2]. This research is considered a joint production of the clinicians, researchers, and their relationship [5].

3.2.2 Study setting and participants

The study was conducted in a Canadian government-funded health care facility housing multiple rehabilitation programs. All participants were practicing clinicians, including occupational therapy, physical therapy, therapeutic recreation, speech language pathology, psychology disciplines. Seven clinicians participated in the conversational interview method. Participants self-identified if they had previous experience

participating in or leading the implementation of a clinical intervention. The participants served across a number of programs including inpatient and outpatient spinal cord injury rehabilitation, outpatient acquired brain injury, inpatient and community stroke rehabilitation, inpatient amputee rehabilitation and some participants serviced more than one program. Participants had been practicing clinicians for a number of years, with some transitioning between programs. Five out of the seven participants were female.

3.2.3 Participant recruitment and participation

A purposive sampling method was used by the researchers. If clinicians met the inclusion criteria, they were invited to participate. Clinicians were included in the study if they identified as having previous experiences participating in implementation initiatives, were an employee of the organization, and worked within a rehabilitation program at the organization. Potential participants were excluded if they were unable to meet in person for at minimum a one-time 60 minute interview. A combination of in-person conversations and e-mail requests with the researchers was used to recruit clinicians. During these conversations a researcher (SG) explained the process and offered clarifications. The researcher was mindful of time parameters and professional duties of participants. Being mindful of the clinicians' available time during work hours, a one-off in-person interview no longer than 60 minutes was conducted with each participant. In-person interviews were arranged at convenient times for participants and took place either in personal office space or meeting rooms within the facility. Sociodemographic data were not explicitly collected as representativeness is not the objective, and for fear of loss of anonymity [5].

3.2.4 Ethical considerations

This study protocol was approved by the research ethics board at the University of Western Ontario (REB 107766). Details of the study were explained to each participant before the signing of informed consent. Each participant was guaranteed confidentiality. A code number was assigned to each audio recording and transcript for identification and confidentiality. Audio recording was done on a password protected device, with a transcript prepared by the researcher (SG) being stored on a password protected,

encrypted flash drive. The participants and researchers worked in different programs, and reported to separate leadership.

3.2.5 Data collection

Data were gathered through a phenomenological interview in order to reach a deeper understanding of the phenomenon. A researcher (SG) employed a conversational interview method [7]. Individual interviews were conducted using the following interview guide: *Tell me about your experience of clinical practice change*. Different prompts were used depending on the interview. These included "*Can you give me an example*?", and "*Can you be more specific?*"

3.2.6 Data analysis and interpretation

Written transcripts of the conversations were analyzed by a researcher using a wholistic technique [3]; with the intent to uncover themes or structures of meaning and experience [7]. Wholistic or macrothematic analysis does not involve coding or searching for patterns; rather the researcher attends to the text as a whole while asking oneself what captures the fundamental meaning or main significance of the text as a whole [7]. Analysis also occurred through rewriting [5]. The researcher attempted to bracket or put aside beliefs, and assumptions about implementation in clinical practice; and instead employ an attitude of thoughtfulness and reflection [3].

Firstly, each transcript was read in an attempt to answer the following questions: How does this speak to the phenomenon? What does it reveal about the phenomenon? What passages, phrases, or words stand out? What phrases are descriptive of experiences or reflections? What might this say about the phenomenon of interest? Secondly, transcripts were reviewed by the researcher to identify any of the four existential themes to retrieve a sense of the lived world: spatiality, corporeality, lived time, relationality [3]. Words, phrases and statements describing the experience of clinicians with implementation were highlighted and identified in the transcripts. The researcher chose statements that evoked a nod of recognition. These statements were isolated to form themes. Each transcript was read a minimum of three times by a researcher (SG).

Thirdly, incidental and essential themes were identified by looking at each individual transcript, and then looking across transcripts to see if the phenomenon remained the same if a theme is deleted [8]. Themes refer to structures of experience that are a form of capturing the phenomenon which evokes richness and uniqueness [2,7,9]. Where possible themes with similar meaning were grouped together to form a larger experiential structure. These themes were re-organized multiple times over the writing process; some themes were eliminated, some were subsumed within others, and some sub-themes were moved between larger themes. Each theme contains anecdotes that is an example of the possible experience, and reflects back to the pre-reflective material provided by the participant [4].

3.3 Findings

Five essential themes that we identified include: approaches to decision making in implementing or modifying clinical practice; implementing a new practice or modifying an existing practice is experienced as a process; lived time; lived human relation; and lived space. Each theme is described below with exemplars. At the end of each exemplar we list the participant's interview number.

3.3.1 Approaches to decision making in implementing or modifying clinical practice

Participants experienced various forms of decision making whilst implementing or modifying clinical practices. Specifically, there is a duality between hierarchical approaches to decision making that identify who makes the decisions, who identifies the need for change to clinical practice, how decisions are made, how much time is allocated to make decisions, who is expected to follow the decisions, and how those approaches may impact the outcome of the implementation. There is a difference between when a team of clinicians or an individual clinician identify a need to make a change to practice, and when someone perceived as external to the team or from leadership identifies a need to make a change to practice.

I've kind of had it both ways. I've had it where though shalt do this and you get told what you have to do. And I've had it where we need to do this, and we're going to create it and give it to our manager, right? So I've kind of gone both ways. And again it's much more satisfying and rewarding, much more exciting when you're creating it yourself. (P02)

Some participants described, and labelled, bottom-up decision making. This is where modification to existing clinical practice is initiated, through an identified need or decision, from the team or an individual clinician. This type of decision making is seen as advantageous whereby clinicians see the need for change, are motivated to make the change, feel ownership of the change as they are part of the decision making, have a voice in making decisions, and work collaboratively to achieve this clinical practice change. One participant (P02) described an experience where management supported the team's decision by asking what resources the team would need to carry out the change.

Why I felt like they were successful is because it came from the clinicians identifying that there was something that needed to be changed and were motivated to make that change. And it came from like everybody giving their input and from everybody giving their ideas. And working together to kind of figure out the best way to go about it as opposed to other practice changes that have come from the organization where they've been more like top-down – this is how it's going to go, this is what you're going to do without getting the feedback from the actual clinicians or the frontline staff first. (P01)

In contrast to the approach described above is that of top-down decision making. This is described by multiple participants as a change coming from leadership in which they are not part of the decision making or were part of a tokenistic process where the decision was already made but they were consulted. One participant (P03) describes being removed from the planning and as a result not understanding the rationale behind the change.

So when the clinician is not involved in the initial development of these recommendations it becomes really tough to implement that…sometimes changes required of you as a

healthcare professional from top down don't result in better care and cause moral distress…Because you don't go through the planning and you don't go through how this is going to benefit everybody because you've been told to do it. (P04)

Participants described experiences of being motivated to change clinical practice in a formal way or in an informal way. One participant described an external organization supplying funding to support a need to change that was identified by the external organization. This is seen as a more formal manner in which to initiate the adoption of best practices. Another participant described formal practice change as being deliberate, distinguishing the activity from something arising organically or unconsciously.

…there was an organization behind it and there was funding behind it and there was a lot of people kind of involved in it…it was more like a formal process where there was a working group and things got done. (P01)

Related to the essential theme of decision making is that of a clinician's agency or autonomy within the adoption or implementation of clinical practice. Multiple participants made reference to the imagery of machines and factories. Participants described implementing a new practice or modifying a practice as being in a factory where they are fulfilling a recipe or performing a repetitive action that is part of a chain of actions. These participants expressed experiencing a loss of agency, a lack of autonomy and their ability to make clinical judgements. This is in contrast to being trained to be an autonomous clinician.

…and so you just basically…you basically do it like a robot. You do it because you have to do your best to still maintain as high a degree of care as you can with these new guidelines pressed upon you from above. (P03)

…we're all professionals on this program who have autonomy and clinical judgment and are regulated by a college so I'm not a robot carrying out like therapy or whatever. (P04)

…so clinicians don't really have a say in it…there's not a lot of control with clinicians. We don't have a lot of autonomy anymore because we're basically being forced to do this. Not because we think its better care for the patients but because a higher group thought that…I might as well be in a factory then. I might as well be putting car parts on. Right? Then it almost seems robotic a little bit. (P02)

Because a lot of us are autonomous clinicians, right? We…I can make a clinical decision myself without having to clear it with someone because I'm the treating therapist, right? (P02)

3.3.2 Implementing a new practice or modifying an existing practice is experienced as a process

Multiple participants expressed experiencing implementation as being a process, consisting of phases or stages or parts. This process is seen as deliberate rather than spontaneous. Participants described a range of discrete stages, steps or activities that take place within the implementation process. These include: involving multiple people right from the designing phase, assessing the practice they are doing currently, understanding the context, identifying what the practice should look like, getting buy-in, working out how to do the change, training people to deliver the practice, rolling out the practice, monitoring how things are going and building in time to reflect, evaluating outcomes by analyzing data. One participant experienced implementation as trying things out to see what works and what does not - having trial periods.

In my mind it's always a little bit messy but I think if you look at it over time it probably has a similar cycle. So I guess we're talking about implementing the change and how that actually happens. I think there is a process. You need to know that there's a change to be made. If I'm thinking on a higher level: know the change, get the information, finding the appropriate clients to try it with, and then just doing it. And evaluating it back. (P05)

One would be to, well of course to confirm that this particular change is a valid one and a useful one and it will pay off in the future…I have to talk to my colleagues about it. I have to see if my college is okay with it…I have to see if my organization would be okay

with that change as well…And then of course comes the actual implementation. And that in itself to me is another stage. (P03)

…so I think I felt the difficulty from that side of working through the process and learning what is practice currently. What do we want it to look like? And then going through the thought process of how do we make that change? (P04)

The implementation process encompasses modifying an existing practice, and/or adopting a whole new practice. Modifying an existing practice may involve incorporating a new aspect or removing a component that is not working. One participant shared an experience where they modified an existing tool rather than starting from scratch. Another participant mentioned the challenge of carrying out a new practice while still needing to continue with existing practices while you perfect the new one. There seem to be competing priorities between the new practice and all the other activities that still need to be done. The clinician is juggling daily regular practice while they are trying out the new practice.

So if you're starting a new implementation over here, again do we just stop doing what we did before? And start, this is the date we implemented and keep going from there? Or is it more of do we implement little changes along the way right? Like little tweaks, change it up, and then we go. (P02)

The machine needs to keep running while you're tinkering with the wheels right? (P02)

Multiple participants shared experiences centered on the rationale for implementation. A clinician needs to understand, believe in and agree with the rationale for the change in order to want to make the change. The rationale needs to be of value to the clinician(s). Key to the rationale is identifying the clinical relevance.

I think at the beginning of this practice change I felt a little bit frustrated being the one who was trying to implement it because it felt like oh my gosh you really don't get it.

That's not what we're trying to do here. We're not trying to take away resources from, you know, such-and-such program to fill in…And I think maybe those learnings from those early days of, we do all this work on the side and then we tell people or disseminate information, versus we do all this work, we invite people to share their input and reflect and have a little bit more of a conversation around rationale. (P04)

…we need time to wrap our head around it. We need time to understand why we're doing it. And how it fits best with our patient right? (P02)

…implementing the change, you have to buy into it, you have to know about it. (P05)

Part of the implementation process is identifying who is responsible for changing the practice, or carrying out the behaviors required to change the practice. Participants had experiences where a range of stakeholders carried out the change: the clinical team, an individual clinician, leadership, an external organization, a research team. There is usually a group of people who are supporting and driving the change by doing those activities outlined in the implementation as a process subtheme.

So one example of us driving…my team driving forward with clinical practice change was we changed our model of care in acute brain injury [ABI acronym used in speech]. *We went from doing individual one-on-one therapy to group therapy.* (P02)

It's a different experience if you're on the team making the clinical practice change like if you're part of forming it or if you're just rolling it out. Very different. (P07)

3.3.3 Lived human relation

A few participants spoke about team dynamics and working in groups when trying to accomplish clinical practice implementation. They shared how there are different types of people within the team; for example, resistors or those who do not want to do the change required, and champions or those who direct and support change. There are 'coasters' who follow orders. There also appears to be a large group of people who occupy the

ambivalent middle-ground, those will do the change but have no strong opinions in either direction. Other are those who are perceived as ‘coasters’ who simply do what they’re told to do.

A number of participants made a distinction between implementation on an individual level – a change made to an individual’s practice by that individual, and implementation at a team level- where a number of people are working on the process.

So it could be, you know, something that’s done on like a team level or it could be something that you just decided individually that you would like to do. (P05)

One participant mentioned there may be many motivated people contributing ideas and input in an implementation initiative they were involved in. An issue arose when one team member dominated the conversation. One participant called clinical practice change a population-based activity: a population of clinicians. In comparison a clinician making a change to their individual practice, based on perceived dissatisfaction or inefficiency, can be done without the aid of a team.

So when people came in I used to always type up my assessments. Like it would be a very formal assessment…But as times changed and as our patients are moving through more quickly and as people come back…so then I realized that my…the way I do assessments needed to change. I needed to be able to do them quickly, on the fly, get the critical information and provide good patient care…And so I started to weed out and change my psychosocial assessment. And then Jane [name changed for confidentiality] *took the assessment she used on* [name of another clinical program] *and she changed our assessment to just 2 pages and we worked on it together.* (P07)

3.3.4 Lived time

Experiences of implementing a new practice or modifying an existing practice were described as an ebb and flow, back and forth, constant flux or revision, and as slow. More than one participant described the process as time consuming, taking a lot of time, not

having dedicated time at work to go through the steps or activities, and needing to use personal time outside of work to get things done. One participant expressed, based on previous experience, needing to have time set aside for reflection, as well as time to have a break from implementation. There is also a sense that if you are part of the group preparing for the implementation it takes a lot of time and effort.

…it does take a lot of time, a lot of effort. You need to read and be knowledgeable if you're part of the team that's preparing for the change…you're adding workload to other people. (P07)

Because I knew it was going to be a lot of work and a lot of work on our own time so not like not during work hours… We were willing to put the time and effort in. The extra time and effort to do it. (P02)

3.3.5 Lived space

One participant described the importance of context, and where the practice change was taking place. Specifically, identifying a difference between an implementation initiative taking place in a hospital setting, and an initiative being conducted in a community setting. This participant experienced a difference in how structured one environment was over another, and whether the patient has a choice in the matter or not.

Or another barrier is the client's not ready for therapy and you go and you have something planned and now you're in their home and they say, "No way José. I'm not ready for this and you're not doing it." Whereas in the hospital they kind of have no choice…they have a choice but. They get therapy done to them. We do therapy based on what the client wants. So I think it's very different what we offer than in the hospital…Yeah it's up to us to offer them the practice change that we want to implement. (P05)

3.3.6 Limitations and strengths

Van Manen[3] acknowledges that it is impossible to fully understand and know the phenomenon under investigation absolutely as some lived experience is indescribable and

immense in nature. Studies using phenomenology of practice are not looking to make generalizations or empirical claims; rather the experience is contextual [3]. There is no final or complete insight into the lived experience of a phenomenon [8].

The clinician participants self-identified as having been involved in a previous implementation initiative. It is possible that people who are invested in making a clinical practice change chose to participate. We cannot know this for sure, and we cannot know participants' motivations for taking part in this study. It is expected that other clinicians have different perspectives of implementation in clinical practice.

This article aims to create a feeling of resonance and authenticity of the lived experience of these clinician participants. We have attempted to elicit this feeling of resonance through richness of description, heuristic questioning (spurred by an attitude of wonder) and trustworthiness.

3.4 Conclusion

Our findings show that while the experience of implementing or modifying clinical practice by clinicians share some commonalities, there is variation. These findings reflect a complex experience of implementation or changing clinical practice from the perspective of clinicians that have been through an implementation initiative. It is valuable for implementation practitioners to develop a deeper understanding of how clinicians experience implementation initiatives. This article brings attention to different experiences of the same phenomena.

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Chapter 4

The development and evaluation of an implementation toolkit for rehabilitation health care professionals.

4.1 Introduction

Implementing clinical practice guideline recommendations into practice remains a challenge as studies have shown limited success in transferring research-based evidence to observable change in clinical practice behaviors [1,2]. Health care toolkits have the potential to be an effective approach to facilitate the application of evidence in practice, and to improve health outcomes [3].

A toolkit is characterized by the curation of multiple resources into a package which leads an end-user through an action-oriented process to accomplish a specific task; with the purpose of sharing knowledge, education, and ultimately changing behavior [4,5]. Health care toolkits offer greater flexibility of use and more expedient methods than multifaceted knowledge translation interventions [3]. There is no defined format, ideal combination of knowledge translation strategies or number of tools to inform the development of toolkits [3].

Two recent reviews on the use of toolkits found topics, design, and end-users vary [3,4]. These published toolkits have a number of common goals including informing and generating awareness about a practice [3,4]. The topics of the toolkits addressed health conditions ranging from cancer, Alzheimer's Disease, fall prevention, arthritis, diabetes, gastro-oesophageal reflux and depression [3]. None of the reviewed toolkit studies provided a general process on how to implement a clinical practice [4].

A number of design components were seen across the reviewed toolkits: pocket guides, handout sheets, and education modules [3]. The target audience or end-users included health care providers, community partners, decision makers, school professionals, patients and parents/ caregivers [3,4]. Barac, Stein, Bruce et al.[4] found 13 of the reviewed toolkit studies included data on process evaluation, 8 studies included data on outcome evaluation, and none of the 15 online toolkits contained data on effectiveness.

In some instances, end-users or knowledge users are engaged in the development and/or testing of the toolkit. There is a growing body of knowledge to support the engagement of end-users in the research process as it may result in increased use of findings and improved relevancy of the research or product [6,7]. Key recommendations made by stakeholders [5] include specify the target audience of the toolkit, making the toolkit available in multiple formats, providing a brief resource, easy to tailor tools, and presenting materials that have been tested.

Yamada, Shorkey, Barwick et al. [3] made recommendations to those intending to publish studies on the development of a toolkit. Firstly, the purpose and rationale for each component of the toolkit needs to be clearly described. Secondly, the components need to be informed by evidence and rigorously developed. Thirdly, the methods through which the toolkit is delivered need to be guided by the implementation process. Fourthly, a rigorous evaluation plan and study design need to be included.

4.1.1 Objective

This paper describes the first phase in the development and formative evaluation of the Parkwood Institute Clinical Practice Implementation Toolkit (referred to as the Toolkit) for use by health care professionals. The intention is to provide enough detail for other professionals to adopt the processes used here for their own implementation practices. The resultant Toolkit contains an implementation process, activities, and associated tools to support health care professionals in adopting clinical practice guideline recommendations.

4.2 Methodology

Over a 12 month period, using a collaborative process, a working group developed and tested the Parkwood Institute Clinical Practice Implementation Toolkit. Before undertaking this initiative, the research ethics board confirmed the status of this knowledge translation initiative as quality improvement. The methodological procedures and activities described in this section were informed by a combination of integrated knowledge translation principles, the Knowledge Exchange Framework, [8] and toolkit development guidance documents. The phased approach to implementation described in

the Toolkit is a modified version of the Active Implementation Frameworks (AIFs) [9]. The primary outcome evaluated is usability of the Toolkit. The purpose of this Toolkit is to provide evidence-based resources to support clinicians with implementing or modifying practice.

4.2.1 End-user engagement

Central to this study is the use of a collaborative research model which emphasizes the meaningful and active involvement of end-users [7]. Researchers work with end-users who have lived experience, knowledge of the context, authority to implement findings, and/or subject matter expertise from the outset of the study [7,10]. End-user engagement or integrated knowledge translation facilitates the understanding of the needs of end-users, the context in which the research may be applied, enhances the relevance of the research and increases the use of the findings [6,7].

End-user or stakeholder engagement exists on a spectrum [11]. End-users may be engaged at different levels of participation, at different phases of a study [11]. At one end of the spectrum, end-users may provide by input or feedback which is categorized as consultation activities. Researchers may work directly with end-end-users to understand and consider hopes and concerns; this is called involvement. Collaboration is seen as researchers and end-users actively partnering; including developing priorities, the research question, and the study design for example. At the other end of the spectrum is empowered or directed research whereby the end-user controls or leads the research agenda. End-users in this study have actively partnered with the authors to identify the need for the Toolkit, and to develop user-centered content.

4.2.2 The Knowledge Exchange Framework

The Knowledge Exchange Framework [8] informed the procedures for the development and evaluation of the Toolkit. This framework was developed through the authors' experience with knowledge brokering activities to support various projects, as well as a realist review. This framework was used in the successful development of the Peer Support Best Practice Toolkit [12].

This conceptual framework for knowledge dissemination is comprised of 5 actions or activities that the authors found in common across knowledge exchange projects they were supporting. These actions can occur separately, simultaneously, at different points in process, without a set order, and at different levels of intensity [8].

The 5 actions in this framework are labelled: problem, context, knowledge, intervention, and use. Defining the 'problem' refers to identifying, reviewing, clarifying, evolving and focusing the problem. Exploring the 'context' refers to the influence of contextual characteristics which include personal, interpersonal, organizational and professional. Activities to do with 'knowledge' include locating, tailoring, assessing, classifying, usability and relevance. 'Intervention' refers to actions such as iterative processes, integrating, clarifying, negotiating, linkage, managing information, developing capacity, and supporting decisions. 'Use' of the knowledge includes spreading, sustaining, practicalities, direct, conceptual and political.

4.2.3 Establishing the development team

The team which developed the Toolkit consisted of people with lived experience of clinical practice change, clinical expertise, and knowledge translation expertise. Firstly, a technical working group (WG) was established. This consisted of 3 researchers, and an advanced clinical practice nurse. All working group members had expertise in clinical practice implementation.

Secondly, the working group sought to collaborate with a Clinician Advisory Group (CAG). Based on previous involvement in implementation initiatives, and an interest in improving care delivery, the WG identified possible CAG members. Five health care professionals chose to accept the invitation. The CAG included two speech-language pathologists, a social worker, an occupational therapist and a physiotherapist; spanning 3 rehabilitation programs.

4.2.4 Conducting a needs assessment and assessing the context

An initial needs assessment was conducted by the WG. This included informal conversations with health care professionals involved in an ongoing implementation

initiative, and interviews with the CAG. This activity provided validation that a knowledge gap existed. This need, and practical considerations such as available funds and time frame, began to define the scope of the Toolkit.

Through experiential observation supporting a national knowledge mobilization network, [13] and local implementation efforts, the WG identified the need for more resources to support the adoption of guideline recommendations. As employees of the organization, the WG were aware of a number of efforts to improve clinical practice across the program and had been involved as support for some of these efforts. Many efforts were grassroots initiatives led by health care professionals with mixed results and resulted in the development of new questions of practice sustainability.

Between May and June 2017 SG conducted a 30-minute face-to-face interview with each CAG member. The WG sought to validate the gap in knowledge observed during the national implementation initiative. The interview guide presented a scenario whereby the health care professional in question had been asked to lead the implementation of a specific recommendation from a recent clinical practice guideline. CAG members were asked what they would find helpful to achieve this. Probing questions were developed including asking for examples and seeking clarification. The idea of an implementation guide that provided tools was proposed and feedback on the concept was invited. The recommendations from the CAG members were analyzed and grouped into themes based on the components provided by the Consolidated Framework for Implementation Research [14].

The WG scanned the organization's internal portal for resources related to implementing best practices. Through engagement with the quality measurement and clinical decision support team within the organization the WG learned of the planned development of a quality improvement resource. The content of this resource promoted the use of a quality improvement framework and tools to improve the efficiency of care in the organization. Based on the recommendations put forward by the CAG and the expertise of the WG it was determined the quality improvement toolkit may meet a specific need for improving

efficiency only, and that more than one resource on implementation would be helpful. The two resources were developed in parallel.

Based on this needs assessment and understanding of the organizational context, the purpose of the Toolkit was to support a health care professional implementing a clinical practice guideline recommendation. The scope of the Toolkit was to provide a process to follow and accompanying tools to achieve this implementation.

4.2.5 Using guidance documents to inform study procedures

The WG conducted a Google search for grey literature or unpublished health care toolkits, and documents on developing and testing toolkits. The reference list of the two recent reviews on toolkits was hand searched for primary studies of toolkits. These toolkits, and published articles describing the development of the toolkits were used as guidance for tailoring the toolkit to the potential end user. Two guidance documents from recognized agencies were selected to inform the methodology of this study: the Agency for Healthcare Research and Quality (AHRQ)[15] resources, and the United States Agency for International Development (USAID)[16] conceptual framework for producing K4Health toolkits.

The AHRQ [15] resource provides a number of checklists to aid the development and evaluation of a toolkit. The “Is this a Toolkit?” checklist provides questions to make sure you are intending to develop a toolkit. The “Tool Checklist” provides questions to guide your selection of tools for the toolkit and whether they are appropriate; addressing organization, design, and language use. The “Tool Content Checklist” helps to plan what you will be including in the toolkit and what you want to get out of the information you are including. This also outlines standards for accessibility, and guidance on style and format. The WG used the “Is this a Toolkit?” Checklist as a reflection exercise at the beginning of the project; and then again after content development to ensure the resource was aligned with the principles of a toolkit. The WG chose not to develop any tools but rather used existing, tested tools.

The USAID [16] resource was used to inform these methodological procedures as it describes key steps for developing a toolkit. The first being to determine the scope of the toolkit and the needs of the end-user. Practical considerations for this step include dividing the toolkit into a maximum of 8 to 10 sections, and keeping the length to an average of 200 documents. The second step is to identify and select the information resources and assessing whether new resources need to be developed. Step three requires the resources and information to be organized into logical categories. The fourth step is writing the content of each section's landing page. And step 5 is reaching consensus that the toolkit is ready to be released by the technical working group.

4.2.6 Synthesizing and tailoring the content of the toolkit

The WG developed criteria for selecting the information that was to be included in the toolkit. The content needed to be presented in a concise manner, relevant, reliable, useful for the end-user, evidence-based, up-to-date, and adaptable. The content needed to be organized in logical manner with topic-specific categories and headings. Each section was to be written by asking, what does the end-user need to know?

The AIFs [17] had been used to support an ongoing national knowledge mobilization network initiative conducted within the organization [13]. Significant training and mentoring on the use of these Frameworks had taken place with a number of employees including researchers and rehabilitation program health care professionals.

The AIFs have been used in social justice, education and healthcare settings [17]. The AIF was developed by Fixsen and colleagues as part of the National Implementation Research Network (NIRN) [2,18-20]. The AIFs consists of five components: 1) Useful Innovation, 2) Implementation Stages, 3) Implementation Teams, 4) Implementation Drivers, and 5) Improvement Cycles [21].

Usable Innovation refers to the program, practice or intervention that is being implemented. This focuses on the intervention quality, description of the approach, essential features, operational definition, and essential function [21].

There are four Stages of Implementation: 1) Exploration, 2) Installation, 3) Initial Implementation, and 4) Full Implementation. The stages are non-linear, may overlap, but have separate goals and activities [20].

The third component is Implementation Teams. An implementation team is established at the outset of the initiative and is seen as an essential driver of the implementation process. The team designs, leads and monitors the implementation of the intervention [21].

Implementation Drivers are environment factors that impact the implementation initiative. Each driver entails questions or items that prompt operationalization of the chosen practice. The Competency driver category includes the selection, training, coaching, and fidelity assessment drivers. The Organization category includes decision support, data system, facilitative administration, and systems intervention drivers. The Leadership category includes both technical and adaptive drivers [21].

The fifth component, Improvement Cycles, refers to communication loops, and Plan-Do-Study-Act cycles. These cycles operate throughout the stages, and are ongoing [21].

Based on the interviews with the CAG, the WG distilled the AIFs into core steps and essential activities. This was achieved iteratively through multiple versions of the process; each time asking what could be removed while retaining the integrity of the AIFs. Knowledge translation websites hosted by government agencies and academic centres were searched for evidence-based tools to support the activities outlined in the Toolkit.

The CAG provided feedback on the format and content of the first version of the Toolkit. The suggestions received included advice on how to best display the overall process in diagrammatic form, additional text to be added for clarity, and suggestions on flow. The WG met to review the suggestions, and decisions were made based on what was achievable given the budget and time constraints.

Following a review of the usability results by the CAG, a leadership representative and the WG, the WG developed a second version of the Toolkit. This second version was sent to the CAG for another review. In parallel, the authors engaged Communication and

Marketing personnel within the organization for design advice, and a review on compliance with branding rules. The third draft of the Toolkit was circulated to the CAG and senior leadership for final review. The WG agreed on a final version through consensus.

4.2.7 Testing the usability of the toolkit

The WG developed a survey to measure the usability of the Toolkit; this survey was reviewed by the CAG. The survey items were adapted from USAID K4Health [16] resources and knowledge product indicators [22]. The survey consists of 9 Likert scale items, and one open-ended item (see Table 6). Items 1 through 5 measure usefulness, specifically user satisfaction; items 6 and 7 measure intention to use; and items 8 and 9 measure usefulness. The survey Likert item responses were analyzed for frequency; and the text comments were analyzed using the Consolidated Framework for Implementation Research (CFIR) [14].

An email introducing the purpose of this usability survey, indicating voluntary consent to completing the survey, and the link to the survey was sent to health care professionals and leadership representatives. Health care professionals were also encouraged to send the survey link to colleagues within the organization who might be interested in the initiative.

4.3 Results

4.3.1 Recommendations for the content, and format of the toolkit

Through one-on-one meetings with the CAG, multiple recommendations were made for the toolkit (see Table 5). All CAG members indicated that a resource that guides healthcare professionals in making a clinical practice change would be very useful. Recommendations detailed a need for simplified, practical, and tailored implementation support.

Table 5: Recommendations from the Clinician Advisory Group for the format, and content of the first draft of the Parkwood Institute Clinical Practice Implementation Toolkit

Intervention Characteristic	**Recommendation**	**Examples of Direct Quotes**
Adaptability*	• The toolkit needs to be applicable to multiple clinical contexts. • The toolkit needs to reflect the internal organization support structures, and any internal resources on offer. • A user should be able to start from anywhere in the implementation process.	"use in different contexts" "link to internal support teams" "incorporate how to best use internal resources" "identify the organizational resources available"
Complexity*	• The toolkit needs to be practical, and simple. • There needs to be a central process for implementation throughout the toolkit.	"easily digestible" "streamlined" "don't want to dredge through it" "easy to look for specific resources"

Accessibility	• The toolkit needs to be readily available to all clinical programs and units. • The toolkit needs to be user-focused. • The toolkit needs to be available in multiple formats.	"people have different learning styles" "at our fingertips" "pick up and use" "training on how to use it"
Design quality and packaging	• The toolkit needs to be well-organized. • The toolkit should be available in multiple formats.	"be able to scan it quickly and easily"
Evidence strength and quality*	• The toolkit should be based on research. • The organization should approach the methods used.	"we need to know the research behind it"
Intervention source*	• Needs to be supported, and approved by the organization – specifically leadership. • Multiple stakeholders need to be consulted in the development of the toolkit.	"organization approved methods" "co-creation" "legitimized by the organization"

		"partnership is key"
Content	• Should contain templates, a process diagram, project co-ordination tools. • Should contain advice on selecting the team, and how to get buy-in from stakeholders. • Should contain questions to ask yourself (as the healthcare professional doing the implementing).	"itemize specific steps" "simple templates" "ingredients for practice change" "organized according to stages" "help understanding what's in it for them"
Trialability*	• Users need to be able to try the toolkit out in practice.	"pilot test" "small scale trials"

* CFIR intervention characteristic [14]. Three CFIR intervention characteristics are omitted as they did not appear in interview text (Cost, Relative Advantage, Design Quality and Packaging).

The second version of the toolkit included an introductory page; which contained toolkit information on development, use and content. Engaging with the Communications and Marketing support team resulted in an improved and clearer process diagram. Minor edits were made based on the CAG review, and the new process diagram was included.

4.3.2 Usability testing

Of the 18 health care professionals and leadership representatives within the organization who received the request to respond to a usability survey, 13 completed the survey (72%) (see Table 6).

Table 6: A usability survey of the Parkwood Institute Clinical Practice Implementation Toolkit (N = 13)

Items	**Response Options**				
	Strongly Disagree n(%)	Disagree n(%)	Not sure n(%)	Agree n(%)	Strongly Agree n(%)
1.The toolkit is easy to use	0(0%)	0(0%)	1(8%)	9(69%)	3(23%)
2.The toolkit is well organized	0(0%)	0(0%)	0(0%)	9(69%)	4(31%)
3. It is easy to locate what I am looking for	0(0%)	0(0%)	0(0%)	9(69%)	4(31%)
4.The toolkit provides sufficient information for each section	0(0%)	0(0%)	1(8%)	9(69%)	3(23%)
	No	Unsure	Yes		

5. Did you learn something new from this toolkit?	0(0%)	1(8%)	12(92%)		
6.I plan to use this toolkit when or if I want to implement a new practice or change an existing practice	0(0%)	1(8%)	12(92%)		
7.Would you recommend this toolkit to colleagues who would like to implement a new practice or change an existing practice?	0(0%)	1(8%)	12(92%)		
	No	Not sure	Probably	Definitely	
8.Do you believe the toolkit will	0(0%)	0(0%)	6(46%)	7(54%)	

build knowledge around implementing a new practice change or changing an existing practice?					
	Not interesting/ useful	Somewhat interesting/ useful	Interesting/ useful	Very interesting/ useful	Extremely interesting/ useful
9. Was the topic covered in the toolkit interesting and useful to you?	0(0%)	1(8%)	2(15%)	8(62%)	2(15%)
	13(100%)	13(100%)	13(100%)	13(100%)	13(100%)

The survey included an open-ended question where potential end users or respondents could provide additional comments or suggestions (see Table 7).

Table 7: Additional survey comments on the Parkwood Institute Clinical Practice Implementation Toolkit from healthcare professionals (N = 8)

Themes	**Example quotes**
Format • Simple	"Overall, easy to follow"

• Straight forward • Organized well • Move item 6 in between items 3 and 4 • Step-by-step process • Too lengthy	
Content • Liked links to the organization support teams • Practical • Overwhelming for clinicians • Useful for leadership • Helpful • Needs a graphic to outline the entire process • Good checklist • Further explanation of key constructs needed • Punctuation issues • Good resources	"I see value in having a graphic to outline the entire process" "I do think that the toolkit offers good guidance and process support"

Implementation • Use as a facilitation tool • Conduct an in-person session to build awareness of the toolkit • Support is needed with the toolkit	"I think the toolkit is a nice way to have everyone on the same page but will continue to need guidance to make changes"

4.3.3 The Parkwood Institute Clinical Practice Implementation Toolkit

The Toolkit is prefaced by information on how it was developed, who developed it, and suggestions on how to use it. The Toolkit includes a two-phased process for implementing a practice change, and has 12 accompanying tools to work through the recommended activities. A diagram of this phased approach to the implementation process is included. Where applicable, there are hyperlinks to internal organizational support teams.

The implementation process is divided into a planning phase and an executing phase. In the planning phase users are asked to think about the who, what, where, and how of implementation. There are 16 activities in this phase. Nine out of the 16 activities have tools to help achieve the implementation process activity. For example, there is a stakeholder mapping tool to better understand who will be impacted by this change in practice. In the executing phase the activities are arranged into delivering, evaluating, and sustaining the practice change. An example of a tool provided is the Plan-Do-Study-Act (PDSA) worksheet [23].

The Toolkit is not a stand-alone resource and should be facilitated by a professional with expertise in implementation. The toolkit is currently in PDF format and stored on a shared clinical drive. Communication has been sent out by leadership to generate awareness of the Toolkit. Health care professionals can request support to use this Toolkit from the program clinical nurse specialist and/or an in-house research scientist. The

Toolkit was made available to all health care professionals in the rehabilitation program in May 2018.

4.4 Discussion

This paper describes the development of the Parkwood Institute Clinical Practice Implementation Toolkit. The purpose of the Toolkit is to support health care professionals from this organization by providing them with a simplified process for implementing clinical practice guideline recommendations. The Toolkit contains an introduction, a process, and tools. A formative evaluation of use, usefulness, and usability were conducted.

Engaging stakeholders in developing and testing an intervention is a core component of integrated knowledge translation [1]. This serves two main purposes: 1) to ensure the product meets the needs of the potential end users, and 2) facilitates buy-in. Conversations with program leadership began before health care providers were asked about the need for a toolkit, and ideas for the resource. The rehabilitation program coordinator was the gateway to informing other personnel occupying leadership positions. The WG was invited to 'pitch' the idea during a leadership council meeting. During this meeting a representative was identified with whom we could ask for input on the toolkit. This also provided permission to involve staff in the development.

Initial conversations with organization-wide support teams were unsuccessful. There may be a number of factors that influenced the outcome of this attempted engagement. At the time of development there were other organizational priorities which may have limited the time employees within that support team could contribute to being involved in this initiative. Additional factors may have been differences in program or departmental culture, type of leadership style, and perceived level of influence of members of the WG. Constrained by project timeframe, the WG made a decision to move forward without the support team input.

Tailoring the Toolkit to the potential end-user or target audience is necessary for successful implementation [17]. Adapting existing frameworks processes and tools to the

needs of health care professionals at this organization was critical. Initial needs assessments identified the desire to simplify, streamline, provide a step-by-step process, and use multiple formats. The literature suggests working collaboratively with end-users increases the likelihood that an intervention is adopted and used [24].

Assessing the context in which the toolkit is intended to be implemented and tailoring it to that context is necessary [14]. The WG had worked for decades within this organization, and had first-hand experience and knowledge of the culture, social networks and communication channels. Through their own experiences, the WG believed the rehabilitation program culture showed receptivity to new ideas; as evidenced by the allocation of resources to prior initiatives and the active role taken by leadership. By scanning the policies and resources available the WG worked to ensure compatibility between the Toolkit and the infrastructure of the organization, specifically those local support teams.

There is an absence of reference to considerations included in the CFIR intervention characteristics - cost, relative advantage, design quality and packaging [14] - from the initial needs assessment with the CAG. This is possibly because it was framed as a resource for employees of the organization, which implies there would be no cost to the resource. With regards to relative advantage, the WG did identify a quality improvement toolkit that was in development at the same time as this Toolkit. However, the WG felt the toolkits would be complimentary and that having more than one resource would be useful to health care providers. The CAG as well as survey respondents identified the need for a streamlined, simple, short, and practical process to be captured in the Toolkit. This speaks to considerations around the level of complexity of the intervention - where complexity can be determined by assessing the number of sequential sub-processes for using the intervention, and the number of choices presented at decision points [14].

4.4.1 Strengths and limitations

Employing an integrated knowledge translation approach increased the involvement and input of end-users, providing a space to collaborate meaningfully on the end product. The end-users participating in the development and evaluation were employees of the

organization in which the Toolkit was to be used and represented the target audience for the Toolkit. As such the end-users were familiar with the organizational context, and had knowledge of barriers to implementing interventions within this context.

Distilling the AIFs into a simplified, practical process by continuously revising the core components represents a modified version of a tested framework. However, as directed by the potential end-users there was a need to simplify the lengthy frameworks and to remove jargon where possible.

The effectiveness of the Toolkit has not yet been evaluated. We do not know if health care professionals in the rehabilitation program have used the Toolkit whilst undertaking implementation initiatives. The WG will need to study the awareness of, use, and impact of the Toolkit. The WG will conduct a readiness for change assessment to explore leadership engagement, available resources, and access to knowledge and information [14].

4.5 Conclusion

Toolkits represent a useful knowledge translation strategy, and have the potential to affect healthcare outcomes [3]. This paper describes the approach taken, the process, and the formative results of a toolkit to support health care professionals put clinical practice guideline recommendations into action. The end product contains a phased process for implementation based on an adaptation of the AIFs, and includes accompanying evidence-informed tools to help achieve the activities described. The collaborative, integrated knowledge translation approach undertaken to develop this Toolkit provides an example of how a team may go about developing a toolkit.

4.6 References

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Chapter 5

5.1 Summary

The overall objective of this thesis was to develop and evaluate a practical, evidence-informed toolkit to support health care professionals implementing clinical practice guideline recommendations into routine care. The first two research studies presented contributed to the development of the toolkit by providing a) the level of success of an implementation initiative that took place in the same organizational context as the toolkit to be implemented, and b) the perspective of experiencing implementation as a health care provider. This research contributes to the knowledge translation field by evaluating longitudinal data on the performance of a clinical team implementing a new practice, exploring health care professionals' experience of implementation, and developing a new resource to aid in the adoption of guideline recommendations.

Chapter 2 provided a retrospective evaluation of longitudinal data on an implementation process to improve pressure injury risk assessment care delivered on an inpatient SCI rehabilitation unit. Between 2012 and 2017 very low rates of team adherence by target date were observed. In comparison with other rehabilitation sites also implementing this clinical intervention, the rates reflect an overall low level of inter-professional team adherence by each local team. It is evident that a re-design of the clinical intervention and/ or the implementation intervention needs to be considered to improve the adherence of the team to the required tasks. When used in real-time, control chart audits may provide a useful feedback mechanism to the team carrying out the clinical intervention. The prevalence and incidence of pressure injury within this population as revealed by the evaluation are similar to those reported in other SCI acute and rehabilitation studies.

A phenomenology of practice study to understand the first-hand experiences of implementation by health care providers identified shared aspects of the experience, as well as variation in the experience (see Chapter 3). Five essential themes were identified: 1) approaches to decision-making, 2) implementation as a process, 3) lived time, 4) lived human relation, and 5) lived space. These findings reflect a complex experience of implementation from the perspective of health care providers who have been through one

or more implementation initiatives. The researcher is not aware of a comparable study to explore the experiences of health care providers during implementation.

In collaboration with end-users, a team developed a toolkit to support health care providers in making changes to care (see Chapter 4). Using the Knowledge Exchange Framework, toolkit development guidance resources, and the principles of integrated knowledge translation, the resulting toolkit ranked highly on levels of usability and satisfaction. The Parkwood Institute Clinical Implementation Toolkit contains a simplified phased implementation process, and accompanying relevant tools. Toolkits may be a useful knowledge translation strategy as part of a multi-component intervention.

5.2 Implications of this research for knowledge translation professionals

The knowledge translation professional may benefit from developing a deeper understanding of how clinicians experience implementation initiatives, and what could influence their behavior during an implementation initiative so that he/she/they may provide better implementation support to health care providers. How and when health care providers become involved in an implementation initiative may influence their motivation to carrying out the practice. Perceptions about levels of control, or autonomy within the implementation may influence health care provider behavior. Leadership appears to play an influential role in the perceived success or failure of the implementation effort. Some health care providers conceptualize implementation as a process with structured activities that takes a long time, and they may not be aware of all the activities needed to execute implementation.

While a knowledge translation professional may need to be familiar with all the frameworks, models and theories, this is not necessarily the case for health care providers. The goal is not to turn them into knowledge translation experts, but rather acknowledge their scope of work and enhance their ability to deliver evidence-based care a simple, practical process to implement might be the best approach.

Toolkits may be useful within a multicomponent knowledge translation intervention. The toolkit is more useful to clinicians when it is anchored within the context it is going to be used, and simple. It will likely not be a stand-alone resource and will need to be accompanied by coaching from a knowledge translation professional.

There are a number of potential advantages to using statistical process control, of which control charts are a tool, to analyze the performance of health care providers and to give feedback to the team to make decisions about what needs to be changed [1]. If data is routinely being collected you can use control charts in the daily management of processes; to focus on the variations in a running record of behavior over time; to estimate the capability of the process; and to identify dysfunction within a process [2-4]. Statistical process control also provides a rigorous, and time sensitive analysis which is needed in pragmatic approaches to improvement. In a setting where rapid cycles of improvement are valued, and the risk of wasted investment is high, control charts could provide quicker access to process performance which could translate into quicker course corrections [1].

5.3 Future directions

The immediate next step is to develop and activate a more comprehensive dissemination plan for the Toolkit. This refers to the ‘use’ element in the Knowledge Exchange Framework which is beyond the scope of the funding provided to develop the Toolkit. To date there has been formal email communication from leadership to the program on the availability and location of the Toolkit.

In addition to a dissemination plan, next steps may involve conducting a readiness for change assessment which includes exploring leadership engagement, available resources, and access to knowledge and information. This could be followed by evaluating the impact of the Toolkit on chosen outcomes. For example, questions could be asked of end-users as to whether the Toolkit has been used to guide implementation, made a difference to the process of implementing a clinical practice change within the specific organization, and how much of a difference (if any) was made. This effectiveness evaluation could be a

pilot test for the Toolkit's effectiveness in guiding a clinical team through a clinical practice implementation.

5.4 References

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Appendices

Appendix 1: Interprofessional team practice adherence rates to pressure injury risk assessment and action plan on admission between June 2012 to April 2017

Year	**2012**												**2013**											
Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Number of patients per month	NA	NA	NA	NA	NA	2	4	5	3	6	7	4	3	3	6	6	4	6	7	4	5	7	3	3
Proportion completed by target	NA	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.67	0.29	0.25	0.00	0.00	0.17	0.00	0.00	0.17	0.00	0.25	0.00	0.00	0.00	0.00
Centre line	NA	NA	NA	NA	NA	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Upper control limit	NA	NA	NA	NA	NA	0.87	0.66	0.60	0.74	0.56	0.53	0.66	0.74	0.74	0.56	0.56	0.66	0.56	0.53	0.66	0.60	0.53	0.74	0.74
Lower control limit	NA	NA	NA	NA	NA	-0.59	-0.38	-0.32	-0.46	-0.28	-0.25	-0.38	-0.46	-0.46	-0.28	-0.28	-0.38	-0.28	-0.25	-0.38	-0.32	-0.25	-0.46	-0.46
Year	**2014**												**2015**											
Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Number of patients per month	7	5	5	5	6	6	5	5	3	3	3	6	3	2	7	3	5	6	3	3	5	6	6	8
Proportion completed by target	0.29	0.40	0.20	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.50	0.43	0.00	0.20	0.00	0.33	0.00	0.20	0.00	0.00	0.13

Centre line	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Upper control limit	0.53	0.60	0.60	0.60	0.54	0.56	0.60	0.60	0.74	0.74	0.74	0.56	0.74	0.87	0.53	0.74	0.60	0.56	0.74	0.74	0.60	0.56	0.56	0.50	
Lower control limit	-0.25	-0.32	-0.32	-0.32	-0.28	-0.28	-0.32	-0.32	-0.46	-0.46	-0.46	-0.28	-0.46	-0.25	-0.25	-0.46	-0.32	-0.28	-0.46	-0.46	-0.32	-0.28	-0.28	-0.22	
Year	**2016**												**2017**												
Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Number of patients per month	5	4	5	6	3	4	7	5	5	4	7	6	6	4	6	3	NA	NA	NA	NA	NA	NA	NA	NA	
Proportion completed by target	0.20	0.00	0.00	0.17	0.00	0.25	0.29	0.20	0.40	0.25	0.00	0.17	0.33	1.00	0.33	0.00	NA	NA	NA	NA	NA	NA	NA	NA	
Centre line	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0;14	0;14	0;14	0;14	0;14	NA	NA	NA	NA	NA	NA	NA	NA	
Upper control limit	0.60	0.66	0.60	0.56	0.74	0.66	0.53	0.60	0.60	0.66	0.53	0.56	0.56	0.66	0.56	0.74	NA	NA	NA	NA	NA	NA	NA	NA	
Lower control limit	-0.32	-0.38	-0.32	-0.28	-0.46	-0.38	-0.25	-0.32	-0.32	-0.38	-0.25	-0.28	-0.28	-0.38	-0.28	-0.46	NA	NA	NA	NA	NA	NA	NA	NA	

Appendix 2: Interprofessional team practice adherence rates to pressure injury risk re-assessment and action plan between June 2012 to June 2017

Year	**2012**												**2013**											
Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Number of patients per month	NA	NA	NA	NA	NA	0	0	2	4	3	7	6	5	4	6	6	3	7	5	6	4	5	5	8
Proportion completed by target	NA	NA	NA	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.17	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
Centre line	NA	NA	NA	NA	NA	NA	NA	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Upper control limit	NA	NA	NA	NA	NA	NA	NA	0.61	0.45	0.51	0.35	0.38	0.41	0.45	0.51	0.38	0.51	0.35	0.41	0.38	0.45	0.41	0.41	0.34
Lower control limit	NA	NA	NA	NA	NA	NA	NA	-0.47	-0.31	-0.37	-0.21	-0.24	-0.27	-0.31	-0.37	-0.24	-0.37	-0.21	-0.27	-0.24	-0.31	-0.27	-0.27	-0.20
Year	**2014**												**2015**											
Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Number of patients per month	4	4	3	6	6	3	7	6	6	4	2	3	8	2	3	5	2	6	1	1	5	5	4	5
Proportion completed by target	0.00	0.50	0.33	0.33	0.17	0.33	0.14	0.00	0.00	0.00	0.00	0.33	0.25	0.00	0.00	0.00	0.00	0.17	0.00	0.13	0.00	0.00	0.00	0.00
Centre line	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07

Upper control limit	0.45	0.45	0.51	0.38	0.38	0.51	0.35	0.38	0.38	0.45	0.61	0.51	0.34	0.61	0.51	0.41	0.61	0.38	0.83	0.83	0.41	0.41	0.54	0.41
Lower control limit	-0.31	-0.31	-0.37	-0.24	-0.24	-0.37	-0.21	-0.24	-0.24	-0.31	-0.47	-0.37	-0.20	-0.47	-0.37	-0.27	-0.47	-0.24	-0.69	-0.69	-0.27	-0.27	-0.31	-0.27
Year	**2016**												**2017**											
Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Number of patients per month	6	6	2	8	3	4	7	4	7	3	8	8	0.00	0.14	0.00	0.00	0.17	0.00	NA	NA	NA	NA	NA	NA
Proportion completed by target	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.25	0.14	0.00	0.00	0.13	0.07	0.07	0.07	0.07	0.07	0.07	NA	NA	NA	NA	NA	NA
Centre line	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.83	0.35	0.45	0.35	0.38	0.51	NA	NA	NA	NA	NA	NA
Upper control limit	0.38	0.38	0.61	0.34	0.51	0.45	0.35	0.45	0.35	0.51	0.34	0.34	-0.69	-0.21	-0.31	-0.21	-0.24	-0.37	NA	NA	NA	NA	NA	NA
Lower control limit	-0.24	-0.24	-0.47	-0.20	-0.37	-0.31	-0.21	-0.31	-0.21	-0.37	-0.20	-0.20	0.00	0.14	0.00	0.00	0.17	0.00	NA	NA	NA	NA	NA	NA

Appendix 3: Documented location of pressure injuries in patients admitted to the inpatient spinal cord injury rehabilitation program between June 2012 and September 2015 (n = 45)

Patient	History of PrI on Admission	SCIPUS Score on Admission	PrI Present on Admission	Stage of PrI on Admission	Stage of PrI on Discharge	Location of PrI
1	No	12	No	NA	I Resolved	Coccyx
2	No	6	Yes	II	II Closed	Coccyx
3	No	8	No	NA	II	Coccyx
4	No	13	Yes	I	I Resolved	Left Foot
5	No	9	No	NA	II Closed	Coccyx
6	Yes	13	Yes	II	II Closed	Coccyx
7	Yes	9	Yes	II	II Closed	Coccyx
8	Yes	15	Yes	II	II	Right Elbow
				II	II	Back of Neck
9	Yes	14	Yes	IV	IV	Coccyx
10	No	11	Yes	Unstageable	IV	Right Buttock
11	Yes	9	Yes	II	II Closed	Coccyx
12	No	8	Yes	II	II	Coccyx
13	No	10	No	NA	I Resolved	Coccyx
14	No	15	Yes	I	II Closed	Coccyx

15	Yes	8	Yes	II	II	Coccyx
16	Yes	11	Yes	I	II Closed	Coccyx
17	No	9	No	NA	I	Right Heel
18	Yes	13	No	NA	I Resolved	Coccyx
19	No	8	Yes	II	II Closed	Left Elbow
20	No	8	No	NA	I Resolved	Left Ischial Tuberosity
21	Yes	9	Yes	III	IV	Coccyx
22	Yes	8	Yes	II	II	Coccyx
23	Yes	13	Yes	IV	IV	Left Ischial Tuberosity
			Yes	II	II	L Trochanter
			Yes	I	I Resolved	Right Ischial Tuberosity
			Yes	I	I Resolved	Coccyx
24	No	9	No	NA	III Healing	Coccyx
25	No	8	No	NA	II Closed	Gentils Midline
26	Yes	17	Yes	II	II	Coccyx
27	No	9	Yes	II	II Closed	Coccyx
28	No	12	No	NA	I	Midline Sacral

29	No	11	No	NA	I	Right Buttock
30	No	11	Yes	II	II Closed	Coccyx
31	Yes	13	Yes	II	II	Buttock
32	Yes	12	Yes	II	II Closed	Coccyx
33	Yes	12	Yes	Unstageable	Unstageable	Right Ischial Tuberosity
				II	II	Left Heel
				II	II	Right Heel
34	No	8	Yes	I	I	Left Buttock
35	No	10	Yes	II	II Closed	Coccyx
36	Yes	9	No	NA	II Healing	Coccyx
37	Yes	12	Yes	II Closed	IV	Right Ischial Tuberosity
38	No	10	Yes	II Closed	IV Closed	Coccyx
39	No	12	Yes	II	II	Coccyx
				II	II Closed	Right Heel
				II	II Closed	Left Heel
40	Yes	14	Yes	II Closed	IV Closed	Coccyx
41	No	13	Yes	II	II Closed	Coccyx
42	No	9	Yes	I	I	Coccyx

43	No	7	No	NA	I	Left Ischial Tuberosity
44	No	10	Yes	II Healing	II Closed	Coccyx
45	No	9	No	NA	II Closed	Coccyx

Appendix 4: How each theory, framework, or model was applied in this thesis

Study chapter	**Name of the theory, model, or framework**	**How this was applied in the study**
Chapter 2	Active Implementation Frameworks [19]	Used to implement the comprehensive risk assessment.
	Statistical Process Control [20 – 22, 25]	Used as a data analysis technique.
Chapter 3	Phenomenology of Practice [3, 7, 8, 9]	Used as method of inquiry including to inform data collection and data analysis.
Chapter 4	Integrated Knowledge Translation [6,7]	Used to guide the early inclusion of stakeholders including the development of a Clinician Advisory Group.
	IAP2 Spectrum of Engagement [11]	Used to identify the types of activities stakeholders may be involved in.
	Knowledge Exchange Framework [8]	Used to inform the methodology procedures and processes.
	Active Implementation Frameworks [9,17, 20]	Used for the content of the toolkit.
	Consolidated Framework for Implementation Research [14]	Used to analysis the survey findings.