HARMONIZATION OF GROUP PERSPECTIVES: A CASE STUDY OF CLINICAL PRACTICE GUIDELINE IMPLEMENTATION AT A LARGE REGIONAL HEALTH AUTHORITY

by

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Abstract

Policy makers, health industry leaders, clinicians and researchers struggle to understand how new evidence-based practices, including Clinical Practice Guidelines (CPGs), can be implemented more quickly and more consistently. This retrospective qualitative case study explored sepsis CPG implementation at a British Columbia Regional Health Authority (RHA) between 2011-2017 to understand how individuals and teams with various functions and decision-making purviews come together to implement a prioritized CPG in a large RHA. The study was informed by practice theory and designed to provide practical guidance as to how CPG implementation might be better supported. Interviews involved 38 participants reflecting three functional groups: academics, regional managers and support staff, and clinicians. Over 350 documents and implementation process and outcome data were analyzed.

The CPG implementation process was dynamic, involving different activities and intensities of involvement of individuals from each of the three groups. The three groups each behaved in a manner consistent with what some practice theorists call a community of practice. Individuals from each community of practice (COP) had a different perspective about the implementation along five dimensions (focus and rationale, vision, priority, appropriate balance and application of power, and goals, strategies and actions to be taken). The different COPs undertook actions that were consistent with their own COP perspective but not sufficiently aligned to ensure adherence to the CPG. The result was a discordant, and unsuccessful implementation. CPG adherence was not achieved. The differences in perspectives among the three COPs were substantial and appeared to have been deeply rooted in the beliefs, functions, experiences, and day-to-day realities of each of these groups of participants. The discordance in the implementation resulted from an insularity of each

COP from the others, brought about by inadequate engagement among participants; insufficient connections across COPs to support shared understanding and alignment of action.

Without some intervention, differences in perspectives will prevail and discordance is the likely outcome of any complex CPG implementation. This dissertation proposes the novel concept of harmonization as a means of achieving more successful CPG implementation; a process intended to reduce insularity of individual COPs within and beyond a RHA. Harmonization is conceptualized as a process comprised of many harmonizing activities that support engagement, relationship-building and explicit reflection and reconciliation of key differences in perspective among the three COPs. As a relational process, harmonization is largely determined by longstanding, contextual factors that support connections and collaboration among COPs. Widely engaging, horizontal, service-oriented improvement structures (with clear supporting roles and processes) establish a foundation for harmonization. Ongoing local interprofessional learning and improvement activities are essential to ensuring that the service improvement benefits from strong clinical engagement. RHA managers, particularly clinical managers, can support harmonization by encouraging open sharing of perspectives and managing in a way that is responsive to the realistic ebbs and flows of the implementation process. Harmonization integrates and builds upon many known CPG implementation determinants and strategies to bring a practical focus for future research and action.

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Glossary

AAP: Academic, Advocacy and Policy community of practice described in this study.

BCPSQC: British Columbia Patient Safety and Quality Council. A Council and secretariat established in 2010 to promote and support quality improvement in health service in British Columbia.

Boundary: Applied by practice theorists as a conceptual and very loose demarcation of the people, processes, and structures considered to constitute a community of practice.

Boundary Spanning: An activity that can involve people, processes, and/or structures (e.g., boundary objects) that helps to bring about sharing of information between two or more communities of practice while meeting the needs of each. Boundary spanning activity can involve activity situated between the two communities of practice (as a broker might operate between two parties) or as varying degrees of overlapping or shared activity.

CCM: Clinical Care Management. An initiative promoting clinical care improvement, including clinical practice guideline implementation, among British Columbia Regional Health Authorities from 2011-2017.

CFIR: Consolidated Framework for Implementation Research.

CLAHRC: Collaborations for Leadership in Applied Health Research and Care.

CNE: Clinical Nurse Educator.

Community of Practice (COP): a fluid but tangible network of individuals learning, negotiating meaning, and establishing personal identity in situated, social practice. A community of practice is recognized by the degree to which its participants demonstrate mutual engagement, joint enterprise, and shared repertoire (Wenger, 1998).

Constellation of practices: Also constellation. A loosely defined set of practices or communities of practice that demonstrate some degree of mutual engagement, joint

enterprise, and shared repertoire (Wenger, 1998). The three communities of practice described in this study – academics, regional managers and support staff, and clinicians – together, might be considered a constellation of practices when referring to participants involved in implementation of a Clinical Practice Guideline (CPG).

CNS: Clinical Nurse Specialist.

CPG: Clinical Practice Guideline.

DC: Direct Care community of practice described in this study.

EBP: Evidence-Based Practice.

Practice: "Doing in a historical and social context that gives structure and meaning to what we do" (Wenger, 1998, p. 47). Other definitions introduce, as important, concepts of routine and interaction with "the material elements that co-constitute the practice" (Spaargaren et al., 2016, p. 55).

RHA: Regional Health Authority. Terminology used for each of five large, multi-service and multi-hospital, geographically defined regional health organizations in British Columbia. Select Health (pseudonym) is one of the five.

RLS: Regional Leadership and Support community of practice described in this study.

Situated Learning: Learning that takes place in the same social context and setting as it is applied (Lave & Wenger, 1991).

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Chapter One: Introduction

Sackett and Rosenberg first defined and described processes for evidence-based medicine in 1995 as "the integration of best research evidence with clinical expertise and patient values" (Sackett & Rosenberg, 1995, p. 2). While debate is ongoing about what constitutes evidence, the concept that, to the greatest extent possible, clinical practice should be based on the best available evidence has spread across healthcare professions and the industry overall (Rycroft-Malone, 2004; Stannard, 2019). With the spread of the concept beyond medicine, the term evidence-based practice (EBP) has become commonly used.

CPGs are part of a broader base of EBPs. The U.S. Institute of Medicine (IOM) defines clinical practice guidelines as "Statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence, and an assessment of the benefits and harms of alternative care options" (Institute of Medicine, 2011). Clinical practice guidelines (CPGs) are well-established EBP tools in support of quality improvement in healthcare through the reduction in unnecessary practice variation, which can lead both to improved clinical outcomes and reduced costs (Eddy et al., 2011; Grimshaw & Russell, 1993; Martin et al., 2017).

When adopted by health practitioners and organizations, CPGs can lead to better health outcomes (Eddy et al., 2011; Grimshaw & Russell, 1993; Martin et al., 2017). CPGs have been the focus of extensive research in recent decades as researchers seek to understand the factors that affect successful implementation (Ellen et al., 2014). As a result, much is known about the many determinants of success and potential strategies for CPG implementation. Though CPGs offer great promise, industry-wide uptake of them is limited and slow (Braithwaite et al., 2020; Ebben et al., 2018; McGlynn et al., 2003; Rogers et al., 2020). There remains a need for a better understanding of CPG implementation from the

organizational perspective, to help inform health organization decision-makers of the people/roles, structures, and processes they can establish to support better CPG implementation.

The Problem with Implementation of Clinical Practice Guidelines

Better clinical outcomes could result, and thousands of complications, even deaths, could be avoided in Canada if CPGs and the broader family of EBPs could be implemented more reliably (Baker et al., 2004; Ebben et al., 2018; Fonarow et al., 2011). Yet consistently across locations and services in healthcare, CPG/EBP uptake tends to be partial and slow (Ebben et al., 2018; McGlynn et al., 2003; Runciman et al., 2012). Rogers et al. (2020) note literature indicating a 17-year gap between the generation of evidence and implementation and routinization (Slote Morris et al., 2011). Braithwaite et al. (2020) describe a "60-30-10 challenge" in CPG implementation, where 60% of care conforms to guidelines, 30% is waste, and 10% of people/patients are harmed.

As a result of significant research activity, there is a wide base of knowledge about implementing CPGs and EBPs in a variety of settings, beginning with a robust understanding of determinants (barriers and enablers) of successful CPG and EBP implementation (e.g., Ellen et al., 2014). Research into determinants is now sufficiently rich to enable meta-review of systematic reviews (Ciro Correa et al., 2020). Similarly, researchers have documented and synthesized strategies used to implement CPGs and EBPs in a variety of settings (Cassidy et al., 2021; Ebben et al., 2018; Powell et al., 2015; Sarkies et al., 2017; Spoon et al., 2020). Some strategies have been evaluated for effectiveness, though evaluation is difficult as strategies are often inconsistently defined in the literature and methodological issues have limited comparison and evaluation against implementation outcome (Prior et al., 2008; Proctor et al., 2013).

Little is known about the interplay among the many implementation factors (e.g., determinants and strategies) that have been identified by researchers (Helfrich et al., 2010; Nadalin Penno et al., 2019; Sarkies et al., 2017). Nor is there a good understanding of how a multi-site regional health organization's multiple actors, teams, and hierarchical decision-making purviews could come together toward the realization of better implementation processes (Helfrich et al., 2010; Leonard-Barton, 1990; Li et al., 2018; Miake-Lye et al., 2020). As a result, there is a continuing lack of clarity, particularly for decision-makers within large complex regional health organizations, as to how to practically use all this information to bring the people, processes, and structures of the organization together toward effective implementation, or what the most important conditions for success might be. A more organizational, relational view of CPG implementation is needed.

Research Focus and Scope

The research was designed as a retrospective qualitative case study to understand CPG implementation at the organizational level, specifically within one large regional health organization (known in British Columbia as a Regional Health Authority). The focus was on CPG implementation, as CPGs have become common ways of conveying, for implementation, evidence-based practices, particularly those that involve multiple recommendations affecting a range of organizational stakeholders.

The overarching research question was: ***How do individuals and teams with various functions and decision-making purviews come together to implement prioritized clinical guidelines in a Regional Health Authority?***

Specific research questions were:

- *How do organizational leaders and support personnel, structures and processes interact (or not) to facilitate or inhibit successful guideline implementation at the clinical practice level where the change must occur to affect patient care?*
- *What does the guideline implementation process look like from the organization's various actors' and teams' perspectives? Who is involved? When are they involved? What do they do, or not do? Who wasn't involved and why?*

The Regional Health Authority

A Regional Health Authority (RHA) is defined as an organization with the responsibility for the provision of a variety of health services, including hospital care, for a geographically defined population. Regional Health Authorities tend to be large, with multiple sites/locations and significant differentiation and distance among local teams providing care and regional teams available to lead and support. In western Canada and in many jurisdictions around the world the organizational unit for health services provision is the RHA or some similar geographic aggregation (e.g., provincial, state). The RHA is comprised of various components of healthcare service usually including public and population health and health care services ranging from acute specialist and hospital care through to residential and community care services including mental health, substance use and in-home nursing care and living support. Pharmaceuticals outside of the care setting, ambulance, and general medical care vary in their placement depending on jurisdiction but in British Columbia, Canada's westernmost province, they operate outside of the RHA mandate.

Research Approach and Results

The case study focused on the implementation of a clinical practice guideline (CPG), the Sepsis Guideline Set, within Select Health (pseudonym), a British Columbia RHA. The Sepsis Guideline Set was established by the British Columbia Patient Safety and Quality Council (BCPSQC) and was later mandated for implementation in the health authorities by the provincial Ministry of Health. One of Select Health's hospitals, City Hospital (pseudonym), was selected as the site for investigation of CPG implementation at the site of patient care (the hospital's Emergency Department). Three functional groups of individuals were identified initially to organize the study: a group reflecting academic, advocacy, and policy activities, another reflecting RHA leadership and support activities, and one reflecting direct care activities.

Implementation of the Sepsis Guideline Set took place within Select Health and City Hospital between 2011 and 2017. Data collection for this study proceeded between February 2017 and April 2018 through 35 individual and group interviews involving 38 participants from across Select Health and beyond.

Dissertation Overview

This dissertation is comprised of nine chapters. Following this introductory chapter, Chapter Two presents a discussion of the current implementation science literature to identify gaps in knowledge about CPG implementation in health organizations. Chapter Two also includes an examination of a body of literature related to the United Kingdom's Collaborations for Leadership in Applied Health Research and Care (CLAHRC) initiatives to gain a better understanding of EBP implementation from a more organizational, relational view. Chapter Three presents a discussion of the questions and concepts guiding the research, outlining a conceptual framework drawing on practice theory and the Consolidated

Framework for Implementation Research (CFIR) to loosely organize and guide this inductive study. Practice theory examines the implications of understanding society as people in day-to-day collective activity as they work in various social associations to learn and to negotiate meaning and identity. CFIR is a widely-used framework of determinants of EBP implementation. Chapter Four then presents the methodology and methods used to conduct the retrospective, qualitative case study. Chapter Five describes the evolving evidence about sepsis care and the entities and actions from outside the organization that had an impact on Select Health's Sepsis Guideline Set implementation. Chapters Six and Seven present description of the perspectives stemming from Select Health's regional leadership and support staff, and direct care provider participants. Chapter Eight provides a consolidation and discussion of these findings, relating back to both the EBP implementation literature and the conceptual framework. The discussion draws out the differences among the perspectives of individuals within three groups (academics, regional leaders and support staff, and clinicians) about the objectives and activities of CPG implementation and the impact that these differences had on the implementation's success. Drawing upon practice theory, particularly Wenger (1998), I recognized and interpreted the three groups as communities of practice. Together they constituted a constellation of practices. Chapter Nine concludes this dissertation by proposing harmonization as a process that is critical to successful CPG implementation in Regional Health Authorities. Harmonization is a relational process that can be supported by RHA decision-makers to explicitly address the differences in perspective of individuals within and among the three communities of practice. The implications of harmonization are described to help inform RHA and other decision-makers of the people, processes and structures they might promote to better support CPG implementation.

Chapter Two: What is Known About EBP Implementation?

A wealth of literature has been established about CPG and EBP implementation, though research on CPG implementation is largely subsumed and described in the implementation literature as EBP implementation or, occasionally, innovation spread. The literature related to EBP implementation is organized around research into determinants - barriers and enablers to successful implementation - and strategies for successful implementation (Waltz et al., 2019). This chapter begins with an overview and critique of the literature regarding EBP implementation determinants and strategies, identifying limitations in knowledge about the organizational dynamics and relationships affecting CPG implementation with a practical focus for health organization decision-makers. The chapter then presents discussion and critique of a unique body of literature that does explore EBP implementation from a relational, organizational perspective. This literature offers unique insights about EBP implementation at the organizational level, but significant gaps remain. The chapter ends with a discussion identify the compelling need for research into EBP implementation at the organizational level, examining the relationships among, and activities of, stakeholders across and beyond the health organization – particularly those from different groups and decision-making purviews.

Clinical Practice Guideline and Evidence Based Practice Implementation

Research aimed directly at clinical practice guideline (CPG) implementation is limited, having largely been subsumed as a category of the more commonly used term evidence-based practice (EBP). Where studies focus specifically on CPG implementation, they tend to be indistinguishable from the broader EBP literature or focused on the advantages of implementing a CPG and are outside the scope of this review. The term EBP

will be used for the remainder of this discussion. The next sections provide an overview and critique of the literature regarding EBP implementation determinants and strategies.

Determinants of Successful EBP Implementation

The EBP literature is rich in original research and syntheses describing and seeking to assess the relative importance of a variety of determinants of EBP implementation success. Determinants have been variously described as barriers, facilitators/enablers, and contextual attributes, all pointing to some characteristic of the context surrounding EBP implementation that has been found by researchers to have an impact on implementation success (Gagliardi & Alhabib, 2015; Waltz et al., 2019).

Many determinants have been identified. Squires et al. (2019) identify, through multi-study analysis, 62 features of context, organized into 14 unique contextual attributes, reflected in most healthcare settings: resource access, work structure, patient characteristics, professional role, culture, facility characteristics, system features, healthcare professional characteristics, financial, collaboration, leadership, evaluation, regulator or legislative standards, and societal influences. While informative, lists of attributes and features provide little direction for health organization decision-makers to determine what actions to take to better support EBP implementation (Baumann et al., 2019; Lengnick-Hall et al., 2020). With a focus on the perceptions of healthcare professionals (physicians, residents, nurses and organ donor coordinators), the Squires et al. (2019) study does not reflect potential similarities and differences among other groups of individuals across and outside the health organization (e.g., managers, support staff, academics) that might be instructive for health organization decision-makers seeking to support better EBP implementation).

A Determinant Framework Supporting Implementation Research

As researchers identified more and more determinants affecting EBP implementation, some worked to establish ways to organize and categorize them. The Consolidated Framework for Implementation Research (CFIR) is one of the "most well-operationalized and widely used" determinant frameworks (Waltz et al., 2019) – organizing 39 constructs into five domains meant to capture the breadth of the system affecting EBP implementation. The Consolidated Framework for Implementation Research (CFIR) was developed by Damschroder, Aron, Keith, Kirsch, Alexander and Lowery (2009) drawing extensively from Implementation Science (IS), Innovation/Spread, and Knowledge Translation (KT) syntheses including Greenhalgh, et al. (2004), Rogers (2003) and Kitson (1998). CFIR is a meta-model which maps system-wide evidence-based factors related to research implementation organized in five major domains: intervention characteristics, inner setting, outer setting, characteristics of individuals and process. The five domains provide a guide to the kinds of issues that might arise and should be considered when examining a clinical guideline implementation. The domains and constructs of CFIR are presented in Table 2.1.

Table 2.1

Consolidated Framework for Implementation Research (CFIR)

Domain	Constructs	Domain	Constructs
Intervention Characteristics	Intervention Source Evidence Strength & Quality Relative Advantage Adaptability Trialability Complexity Design Quality & Packaging Cost	Process	Planning Engaging Executing Reflecting & Evaluating
Inner Setting	Structural Characteristics Networks & Communications Culture Implementation Climate Readiness for Implementation	Outer Setting	Patient Needs & Resources Cosmopolitanism Peer Pressure External Policy & Incentives
Characteristics of Individuals	Knowledge & Beliefs about the Intervention Self-efficacy Individual Stage of Change		Individual Identification with Organization Other Personal Attributes

Note. From Damschroder et al., (2009).

Since its inception in 2009, the CFIR has become a focus of collaborative development, published on the CFIR website at https://cfirguide.org/constructs/. It has been expanded from its original form to provide more detailed construct descriptions and, where available, research coding instructions and potential quantitative evaluation measures. The inner setting domain constructs have been further expanded to include a) implementation climate detail regarding: tension for change, compatibility, relative priority, organizational incentives and rewards, goals and feedback, and learning climate; and b) readiness for

implementation detail regarding: leadership engagement, available resources, and access to knowledge and information.

As a determinant framework CFIR likely captures in some way most of the things that affect or must be considered when assessing and conducting an CPG implementation. CFIR, however, remains taxonomical, and lacks specificity when considering EBP implementation at the organization level. Constructs related to the healthcare organization are largely captured within the vast inner setting domain with no reflection on organizational decision-making layers or clinical/support teams. As noted by Ashok et al. (2018), CFIR sheds little light on how implementation success might be achieved, as its reflection on process (planning, engaging, executing, reflecting & evaluating) appears rudimentary, linear, and offers no direct link to outcome.

A common criticism of CFIR is that the framework does not consider the interactions among its domains and constructs (Esmail et al., 2020; Havers et al., 2019). CFIR does, however, offer some useful insights – particularly in the arrangement of its five domains – that can help organizational decision-makers to understand the areas of focus they might take support better EBP implementation. CFIR distinguishes between the inner and outer settings of EBP implementation. While CFIR promotes adaptable interpretation as to what constitutes "inner", the framework's inner and outer setting domains can prompt health organization decision-makers to consider both aspects of the organization itself (inner) and its relationship to other organizations and actors outside of the its boundaries (outer) (Damschroder et al., 2009). CFIR also prompts, but does not incorporate, consideration of the relationship between the characteristics of the intervention (EBP) itself, and the knowledge and beliefs of individuals about the intervention, a construct of the characteristics of individuals domain. Not only are the objective merits of the intervention itself important to implementation

success, but how the intervention is perceived by individuals within and beyond the health organization is relevant (Consolidated Framework for Implementation Research, 2020). Finally, CFIR introduces the importance of the implementation process itself in supporting successful implementation. While limitations of CFIR's process domain have been noted (Ashok et al., 2018), the process domain at least prompts consideration of EBP implementation from a processual perspective, and draws attention to the relationships among process and the other, more contextual, domains. Despite the intriguing potential for understanding of relationships among its domains, CFIR does not examine them in any detail and remains largely taxonomical.

Determinants Most Relevant to Health Organizations

Li et al. (2018) note that researchers have yet to reach consensus about the most important determinants of EBP implementation success for the health organization. Nor is there an understanding of how key determinants work, alone or in combination, within the health organization to affect implementation (Li et al., 2018). In response, they undertook an integrative review of the EBP implementation determinant literature to identify what appeared to be the most important determinants (CFIR constructs) for health organizations, and how they are inter-related. Li et al. (2018) prioritized six "features," they describe as consistent with CFIR constructs, as most important: leadership; culture; networks and communication; resources; evaluation, monitoring, and feedback; and champions. The researchers further noted that leadership appeared to take primary importance, strongly influencing the nature and impact of the other five features. The six determinant features identified by Li et al. (2018) are discussed below, identifying the impact they described for each, and supplemented with the findings of other relevant studies.

Culture. The culture, or cultures, promoted and prevailing in the setting within which the CPG are implemented significantly determine implementation success (Ellen et al., 2014; Nadalin Penno et al., 2019; Raveis et al., 2014). Culture refers to the "beliefs, values and perceptions" within the organization or unit (Nadalin Penno et al., 2019, p. 11). Li (2018) find that a culture that supports successful EBP implementation promotes innovation, learning, and clarity of organizational values and beliefs. Li et al. (2018) note that internal (to the organization) collaboration is important for EBP implementation success, and that high degrees of individual autonomy can be detrimental. Cammer et al. (2014) argue that EBP implementation appears to be facilitated by culture that recognizes and positively addresses flux, ambiguity and multiple underlying perspectives. Researchers, including Cammer (2014), have identified that multiple individual and group perspectives can exist within an organization, and these might relate to EBP implementation success. Limited research has explored this relationship deeply to better understand the perceptions and perspectives that exist among groups of individuals within health organizations, and how they interact and affect the actions individuals take toward EBP implementation. Argyris and Schön (1996) described "theories of action" to establish a theoretical link between individuals' underlying perspectives and their actions, contrasting the theories that underlie different actions by professionals and academics. Similarly, Bamford and Forrester (2003) contrast planned and emergent change approaches and recognize that EBP implementation success within the health organization may depend on some hybrid of the two. While promising, these relationships between perspectives of different organizational groups and their actions toward CPG implementation have not been well researched. Little is known about the nature of these groups – the perspectives they hold and the different actions they might promote related to

CPG implementation - or what actions organizational decision-makers might take in response to better support EBP implementation in response.

Leadership. Committed leadership and clear accountabilities are important enablers of CPG implementation (Li et al., 2018). Leaders introduce new knowledge and have a role in facilitating cross-department connections that can lead to the adoption of new processes (Li et al., 2018). Leadership most commonly relates to the formal actions of organizational leadership and managers or "decision-makers" (Ellen et al., 2014; Nadalin Penno et al., 2019). Leaders can facilitate implementation through their own facilitative behaviours (Ciro Correa et al., 2020; Gifford et al., 2006; Nadalin Penno et al., 2019) and through their decision-making actions, leading to prioritization and focus (Moore et al., 2016; Raveis et al., 2014), and to the commitment of resources (Ellen et al., 2013; Ellen et al., 2014; Gifford et al., 2006). Resources can be applied by leaders to support a culture that promotes the use of evidence in practice, and to enable specific EBP implementation initiatives. Leaders can support stakeholders to build skills that are supportive of EBP implementation culture (Li et al., 2018).

Middle managers and supervisors can facilitate or impede effective CPG implementation. Most research findings eschew directive or disciplinary approaches to implementation (Dopson & Fitzgerald, 2006), favouring a more facilitative role for middle managers and supervisors. In their team leadership roles, middle manager and supervisors are well positioned to act as proactive "change agents" (Birken et al., 2013). More specifically, these mid-level leaders can facilitate CPG implementation by diffusing information, synthesizing and contextualizing evidence to the work unit, mediating between the team and other parts and levels of the organization, and justifying or "selling" the implementation (Bunger et al., 2019; Li et al., 2018; Meza et al., 2021). Middle managers also support CPG

implementation by exercising their local/team resource allocation role and by initiating and authorizing required changes in policy and procedure (Urquhart et al., 2014).

Votova (2019), argued, in a published editorial, that implementation should be considered a "core competency" for organization leaders and managers. Given the importance of leadership for EBP implementation, Aarons et al. (2014) established the Implementation Leadership Scale (ILS), a survey-based approach to assess unit-level managers' leadership capabilities. The scale has been successfully applied to develop and test models of implementation leadership (Gifford et al., 2017), and leadership development programming (Aarons et al., 2015).

Researchers have established many of the important attributes of leadership that can affect CPG and broader EBP implementation success and progress is being made toward assessing and developing health organization leaders to manifest the desired attributes. Guerrero et al. (2020) have begun to theorize and test a model about the various leadership roles and inter-relationships among top managers, middle managers, and employees, establishing that middle managers mediate a relationship between top managers and employees. To-date researchers have primarily focused on manager training and development (Aarons et al., 2015; Gifford et al., 2017), surely just one of the ways to support the health organization's managers in facilitating EBP implementation. Much remains to be understood, though, about the interactions and relationships among leaders and groups across and outside the health organization toward successful EBP implementation, or the structures and processes that support them.

Networks and Communication. Implementation of evidence-based practices including CPGs is a "dynamic, fluid, interactional, and reactive" process (Raveis et al., 2014, p. 551). As such, success is highly dependent upon both intra- and inter-organizational

relationships. The Consolidated Framework for Implementation Research (CFIR) identifies two settings across which networks and communication might be considered: the inner setting (the department, site, or organization implementing the EBP) and the outer setting (other organizations or aspects of the health system that may affect the implementation) (Damschroder et al., 2009).

Within the organization or organizational unit – the inner setting - implementation is facilitated by strong communication, collaboration, social interaction and positive inter-personal relationships (Cammer et al., 2014; Evenblij et al., 2016; Fischer et al., 2016; Li et al., 2018). Researchers have also recognized the need for strong, ongoing relationships and partnerships between knowledge users and researchers and other organizations (Ellen et al., 2014; Higuchi et al., 2017; Li et al., 2018) constituting elements of CFIR's outer setting (Damschroder et al., 2009). Bowen et al. (2019) go further, to call for healthcare leaders and academics to collaboratively "reimagine" research to ensure greater relevance for health service design and improvement. Zamboni et al. (2020) note that a quality improvement collaborative is a particular type of network involving a broad range of academic and healthcare provider stakeholders collaborating on a focused improvement initiative. Quality improvement collaboratives can help facilitate successful improvement through propensity for building health professionals' knowledge and problem-solving, teamwork and leadership skills and attitudes (Zamboni et al., 2020).

There is little doubt that, in some way, intra- and inter-organizational relationships are critical to successful CPG implementation. Lost in the CPG implementation research, however, is how any of these approaches to strengthening relationships might be aligned with other organizational, or inter-organizational structures and processes, and what their strengths and limitations might be. It is often unclear what relationships within and beyond the

organization must be targeted, or why they must be targeted – and what activities or actions are dependent on them. Drawing from the previous section on culture, researchers have identified but not yet examined rigorously how the perspectives of groups of individuals with, and amongst organizations, might affect action toward CPG implementation, and how collaboration and relational strategies can then be used to help. If, as Bowen et al. (2019) suggest, a reimagining of research is necessary to facilitate evidence-based practice, it will be essential to better understand the mechanisms, people, structures, and processes, with which they must more robustly inter-relate.

Resources. The lack of resources is commonly seen as an impediment to EBP implementation success (Cammer et al., 2014). Li et al. (2018) delineate four resource types that are important determinants of EBP implementation success: staffing and workload, time, financial, and education & training. In a scoping study, Fischer et al. (2016) highlight that human resources (support personnel, freeing participants from time constraints, ensuring appropriate deployment of skilled staff) and financial resources (including appropriate incentives), have been deployed in support of EBP implementation and underlying culture development. Education and training resources described in the literature often include: printed, video and other electronic materials, educational meetings, education huddles and outreach, games, workshops, automated, written and verbal reminders (Hermens et al., 2015; Higuchi et al., 2017; Provvidenza et al., 2020; Suman et al., 2017; Sungkar et al., 2018; Vaughan et al., 2012). Potentially because many researchers seek to address the problem of CPG implementation from a perspective of pushing evidence into the health organization, many of the competency development resources described above appear didactic, oriented toward teaching or otherwise transferring information to individuals. This focus is unfortunate since Prior et al (2008) identified through a synthesis of systematic reviews

regarding CPG implementation, that passive communication/dissemination and didactic education alone were found to be ineffective in improving guideline adherence.

Lists of potential financial and human resources are of limited value for health organization decision-makers when considered separate from the broader organizational processes of financial and human resource management (Fixsen et al., 2005). Greenhalgh et al. (2004) recognize the need to align EBP implementation with the organization's broader resource management processes when arguing the importance of assessing any given implementation's relative advantage (Greenhalgh et al., 2004). Relative advantage is the degree to which a particular EBP's benefit outweighs the cost of implementation, assessed relative to the benefit/cost of others (Greenhalgh et al., 2004). More guidance is required from research to inform health organization decision-makers how specific enabling resources articulate with each other, and with other organizational roles, processes and structures.

Evaluation, Monitoring, and Feedback. Evaluation, monitoring, and feedback work to preserve engagement among stakeholders involved in implementation. Evaluation promotes the review of qualitative and quantitative evidence to guide assessment of effectiveness of the implementation and to focus future efforts. Evaluation oriented enablers include: audit and feedback, activity logs, performance and outcome monitoring, supervision, clinical incident reporting, and chart audits (Bunger et al., 2017; Higuchi et al., 2017; Spoon et al., 2020; Sungkar et al., 2018).

To support successful implementation and evaluation, evidence must be assessed and linked to patient outcomes and practice (Jeffs et al., 2013). A key component of evaluation is the establishment, dissemination, and engagement with process and outcome measures (Jeffs et al., 2013; Zhou et al., 2018). Such measures enable assessment of both the adherence to the expectations set out in the CPG (process measurement), and the degree to which the

implementation is having the desired clinical effect (outcome measurement) (Donabedian, 1988; Zhou et al., 2018). Researchers examining organizational CPG and broader EBP implementation processes continue to find, however, that this prescribed measurement approach is rarely followed (Knudsen et al., 2019), and that actual outcomes are seldom monitored and reported (Ashok et al., 2018). Research continues to be needed to better understand EBP implementation measurement and evaluation within the health organization, to observe how evidence actually flows to, and within, the organization, how its assessment might be better enabled to stimulate implementation action, if, and how, it is acted upon, and why action so often fails to achieve the anticipated results. Little is known as to how different individuals from different groups across, and beyond, the organization interact with the evidence, or the degree to which they have the same definitions of success and/or needs as they evaluate success.

Champions. CPG implementation functions can be performed by a variety of individuals regardless of formal role. Li et al. (2018) describe champions as important to successful EBP implementation as they steadily advocate for change and draw from their expertise and local presence to promote adherence. As influential peers, champions and local opinion leaders can be effective implementation enablers through problem-solving, promoting change – both organizationally and within individual work units, peer-to-peer coaching, and formal and informal education (Cunningham Goedken et al., 2019; Hendy & Barlow, 2012; Nadalin Penno et al., 2019; Sarkies et al., 2017). In a qualitative research study, Bonawitz et al. (2020) identified six key attributes of effective champions: influence, ownership, physical presence at the point of change, persuasiveness, grit, and participative leadership style.

The role of champions in adherence monitoring has been found by Cunningham Goedken (2019) to be important, yet precarious. The researcher, drawing from a case study of a hand hygiene implementation, recognized an important distinction between the champion-appropriate function of monitoring in the sense of peer-to-peer coaching and a more supervisory posture of compliance auditor that can undermine the champion's effectiveness as a peer (Cunningham Goedken et al., 2019). Santos et al. (2022) find some evidence of champions in EBP implementation but express concerns about opportunity costs if resources are over-committed toward champions as a sole implementation strategy.

Champions appear to impact EBP implementation by applying their knowledge of the EBP research and their professional influence at the local/clinical team level (Hendy & Barlow, 2012). However, Li et al. (2018) note that champions are dependent upon, and influence, broader leadership and resource decisions that often fall outside of their own decision-making purview; within the purview of management. Champions, then, characterize and intimate the importance of the intersection among three groups or decision-making purviews – research/academia, local clinical practice, and management. Little is known about the relationships and activities among individuals at the intersection of these three groups that can inhibit or enable successful EBP implementation.

The Limitations of EBP Implementation Determinants

Reflected in the EBP implementation literature, researchers have identified many enablers and facilitators – determinants – of EBP implementation (Powell et al., 2015). The Consolidated Framework for Implementation Research (CFIR) organizes and defines many such determinants under five domains of the health system (Consolidated Framework for Implementation Research, 2020; Damschroder et al., 2009). Understanding the determinants of EBP implementation is a useful step toward understanding how more timely and adherent

use of evidence-based practices might be achieved. But the literature to-date presents determinants largely as lists of "things" that might impact EBP implementation at some time and place in the health system. What is understood about EBP implementation from the perspective of the health organization arises from syntheses of findings from discrete parts (e.g., clinical unit) or professions (e.g., nursing). While instructive, this approach results in a loss of context and practicality for health organization decision-makers. Studies of EBP determinants are often criticized for ignoring the interactions and inter-dependencies among them, and for having a limited focus at the organizational level (Gagliardi & Alhabib, 2015). Researchers are just beginning to investigate how EBP implementation determinants interact with one-another. A gap in understanding exists for health organization decision-makers, examining what they might need to do to support more successful implementation; the processes, structures, and people they might need to put in place, and how these supports are to interface with other organizational processes (e.g., financial decision-making, prioritization, human resources management processes), structures, and roles to be effective.

Further, some researchers have identified that differences in perspective and philosophy might exist among groups of individuals involved in EBP implementation (Cammer et al., 2014; Li et al., 2018) and that various organizational levels and decision-making purviews affect EBP implementation differently (Guerrero et al., 2020). Unfortunately, perspectives and philosophical differences within and beyond the health organization have not yet been well elucidated, and, to-date, the health organization's multiple levels and decision-making purviews have primarily been a formative consideration for leadership training and development (Aarons et al., 2015; Guerrero et al., 2020).

Together, the EBP implementation determinants are suggestive that it might be important for researchers and health organization decision-makers to better understand the

perspectives, relationships, and activities at the intersection of different groups including academia, management, support, and clinical care. To-date, EBP implementation researchers have not set their focus on this point of activity (or inactivity) directly.

Evidence-Based Practice Implementation Strategies

As with determinants, EBP implementation researchers have enumerated and described many strategies that might be applied to enhance the potential for successful implementation. Powell et al. (2015) drew from the EBP implementation strategy literature and conducted a modified Delphi process with an expert panel to arrive at a listing of 73 unique implementation strategies reported from the Expert Recommendations for Implementing Change (ERIC) project. The ERIC listing is useful in understanding the breadth of potential strategies, and as a foundation for establishing consistent language and definitions (Powell et al., 2015), but does not offer health organization decision-makers an organizing framework, assessment of effectiveness, or conditions for use.

The Cochrane organization has developed the Effective Practice and Organization of Care (EPOC) taxonomy (Cochrane Effective Practice and Organization of Care, 2015) which identifies over 100 organizational attributes deemed to be important for effective health practice. The framework addresses delivery arrangements, financial arrangements, governance arrangements, and implementation strategies – all of which affect effective health practice, arguably including EBP implementation. EPOC organizes 22 implementation strategies into three categories, those targeted at: healthcare organizations (1 strategy), healthcare workers (19 strategies), and specific types of practice, conditions, or settings (2 strategies). A listing of the EPOC strategies is provided for reference in Appendix A. The EPOC taxonomy has been used to guide several syntheses regarding EBP implementation strategies (Ebben et al., 2018; Grimshaw et al., 2006; Spoon et al., 2020; Watkins et al.,

2015). Like the ERIC listing, EPOC is a listing of attributes, including implementation strategies, but providing little guidance on interdependencies among, or appropriate application of, strategies (Cochrane Effective Practice and Organization of Care, 2015). Studies on the use of EBP implementation strategies note that the most widely used strategies are educative in nature (Spoon et al., 2020; Watkins et al., 2015), but lament poor research quality (Grimshaw et al., 2006; Watkins et al., 2015) and weak association to the determinants described by researchers (Waltz et al., 2019).

The existing research on EBP implementation strategies offers limited utility for health organization decision-makers seeking clear direction how EBP implementation might be better supported. EPOC, for instance, offers a single strategy aimed at the organization level – change organizational culture (Cochrane Effective Practice and Organization of Care, 2015). Waltz et al. (2019) suggest that gains might be achieved by identifying groups of strategies targeted to address sets of identified barriers. Sarkies et al. (2017) draw from EBP implementation literature to offer a theoretical hierarchical flow that might be used to categorize and consider EBP implementation strategies: establishing an imperative for practice change, building trust between implementation stakeholders, developing a shared vision, and actioning change – underpinned by: employment of effective communication strategies, and provision of resources to support change.

The Limitations of EBP Implementation Strategies

To-date, the research on EBP implementation strategies is weak (Grimshaw et al., 2006; Watkins et al., 2015) and unsupportive of an approach that seeks to align, in any simple fashion, individual implementation strategies with determinants or assessed barriers (Waltz et al., 2019). Existing lists of strategies appear rudimentary and fragmented, and are not yet organized in a way that is helpful for health organization decision-makers to

understand what they might do to improve EBP implementation success. While researchers have described many strategies related to EBP implementation, much remains to be learned about any given strategy's effectiveness, to which determinants it relates, how or why it may or may not work, or how strategies work together within a successful regional health organization CPG implementation process (Sarkies et al., 2017).

While the hierarchical flow proposed by Sarkies et al. (2017) is, as yet, untested, it points to a primary importance of collaboration and alignment among stakeholders with respect to the case for change, trust, and vision. The relational strategies proposed by Sarkies et al. (2017) is consistent with indications established earlier in this chapter that it might be important for researchers and health organization decision-makers to better understand the perspectives, relationships, and activities toward EBP implementation at the intersection of different groups or decision-making purviews including academia, management, support, and clinical care. The hierarchical flow established by Sarkies et al. (2017) highlights the potential for considering EBP implementation in a processual way (action over time) and with a view to ultimately having an impact on what actually happens in practice.

Gaps in the EBP Implementation Literature

Research on determinants and strategies has evolved to a place where multiple syntheses have been conducted, and organizing frameworks proposed, for both. Researchers, including Harrison and Graham (2021), describe an ideal EBP implementation process that involves: assessment of readiness for successful implementation based on known determinants; identification of barriers; and agreement and implementation of implementation strategies, tailored to context. But the relationship between determinants and strategies is not straightforward (Waltz et al., 2019). Efforts to design and tailor strategies based on assessment of determinants have met with limited success (Wensing, 2017).

Rapport, et al. (2018) note that implementation researchers have struggled to establish a shared understanding and common terminology surrounding EBP implementation. Further, work to-date on EBP implementation determinants and strategies is largely taxonomical (listing, categorizing, ordering); researchers are just beginning to describe the interplay and interdependencies among determinants (Li et al., 2018) and strategies (Sarkies et al., 2017). Evaluations from the Tailored Implementation in Chronic Diseases (TCID) project suggest that the relationship between determinants and implementation strategies (interventions to use Wensing's terminology) is complex and fluid, requiring dynamic and ongoing assessment and reaction to contextual determinants over time (Wensing, 2017). As a result, there are significant limitations to the practicality and consistency of understanding underlying the ideal EBP implementation process, especially for health organization decision-makers looking to understand how they can better support EBP implementation.

Most research to-date has treated the health organization itself as contextual background – a "structural factor" to which the EBP must be adapted – as opposed to something that can adapt to support more successful EBP implementation (Baumann et al., 2019; Lengnick-Hall et al., 2020). Syntheses described as "organizational" or "cross-setting" tend to be amalgams – blending findings from individual studies that each have limited scope (e.g., a particular clinical setting) and informants (a particular profession, or group within the organization). The result is that a variety of individual characteristics about organizations are known to have some impact on EBP implementation success (e.g., Li et al., 2018) and some strategies are known to have been applied successfully across some settings or organizational types (e.g., Spoon et al., 2020). But there is limited research to inform how, and why, these characteristics and strategies inter-relate to affect EBP implementation, much less what health organization decision-makers can do prospectively to facilitate organizational

adaptation to better support EBP implementation. With some exceptions, little is known about the people most involved in CPG implementation – who they are, where they are, with whom they interact, the activities they perform, and the structures and processes that guide and support them.

A better understanding is needed of CPG implementation from a perspective of the health organization, reflecting the people and relationships, processes, and structures that must come together to affect action toward successful implementation. Such an understanding promises to illuminate how the various determinants and strategies described above interact *in situ*. Greater focus is needed on the groups of individuals within and beyond the health organization that need to act if the implementation is to be successful. If, as Cammer et al. (2014) suggest, these individuals and groups may hold different perspectives about implementation, a better understanding of these perspectives, and how they affect the actions people take, is likely critical to better understanding what it would take – and from whom - to better support CPG implementation.

The EBP implementation literature offering a processual, relational view of EBP implementation at the organizational level is limited. The next section provides a discussion or another body of literature that, while limited, provides some useful findings that begin to fill gaps in EBP implementation in healthcare organizations.

EBP Implementation From an Organizational Perspective

A body of literature that relates to EBP implementation at an organizational level has been established, drawing from evaluations of the Collaborations for Leadership in Applied Health Research and Care (CLAHRC) initiatives in the United Kingdom. CLAHRC initiatives were partnerships between organizations – academic health centres and the health services in a geographic area. This literature highlights how various groups of people,

relationships, processes, and structures effect action toward EBP implementation. Such a focus may offer further insight into the impact of the different perspectives of individuals within the health organization to which Cammer et al. (2014) allude.

The CLAHRC initiative, established and funded in 2010 by the UK National Institute for Health Research (NIHR) sought to promote collaboration between researchers and health provider organizations toward better creation and uptake of evidence-based practice (Kislov et al., 2018). Nine collaborations were funded by the NIHR and evaluated to understand the impact of, closer ties among participants from researcher and health provider organizations on EBP implementation and related patient outcomes (Soper et al., 2015). As an initiative promoting inter- and intra-organization level collaboration with an explicit focus on the dynamic, relational, and processual nature of EBP implementation (Kislov et al., 2018), the CLAHRC evaluations offer opportunities for insights into EBP implementation beyond single determinants and strategies discussed earlier in this chapter. The following sections outline and critique CLAHRC findings regarding EBP implementation at the organizational level, including: socially situated learning, differing perspectives and power dynamics, boundaries within and across practices, and designing structures and processes to promote participation.

Understanding EBP Implementation as Socially Situated Learning

The CLAHRC collaboratives were conceived and implemented under the conceptualization of the challenges of EBP and CPG implementation as a “know-do” gap; a mismatch between what is known about the processes of care that lead to improved patient outcomes, and the actions that actually take place in practice (D'Andreta et al., 2013; Rycroft-Malone et al., 2016). Collaboration among researchers and health decision-makers and providers was seen as key to mobilizing knowledge more effectively and that learning,

particularly collaborative learning, is essential to addressing the know-do gap (Rycroft-Malone et al., 2013; Sinfield et al., 2012; Soper et al., 2013).

Several researchers studying the CLAHRC collaboratives framed their studies with a view that learning processes related to EBP and CPG implementation are strongly situated in day-to-day social activity or practice (Rowley et al., 2012; Sinfield et al., 2012). In contrast to a didactic model of learning based on information transfer from teacher to learner, situated learning is dependent on context (D'Andreta et al., 2013; Rycroft-Malone et al., 2013); it is a social and political process among people as they continually negotiate to establish meaning and identity that influences, and is influenced by, the actions they take (Rowley et al., 2012).

In a synthesis of CLAHRC evaluations, Kislov et al. (2018) note that most evaluations focused on structures and activities that were formed between participants of the collaborating research and health delivery organizations, and a limited focus on the processes and practices that affected knowledge mobilization or the outcomes achieved. This overarching focus on inter-organizational relationships and the limited examination of intra-organizational practice limited the ability to gain insights about situated learning within the health organization itself. Instead, researchers learned more about the inter-organizational (e.g., university and health organization) and interprofessional (e.g., academic and practicing clinicians) aspects of collaboration that were visible to them (Kislov et al., 2018). The CLAHRC studies suggest that much could be gained by further considering EBP implementation with a focus on socially situated learning, but with more emphasis on understanding relationships among practices within the organization along with those between organizations.

Recognizing Differing Perspectives and Power Dynamics

A significant implication of the situated, practice-based nature of learning described by researchers investigating CLAHRC collaborations, is that people who practice in different social contexts developed and held different perspectives about knowledge and its use (D'Andreta et al., 2013; Fitzgerald & Harvey, 2015). Like Cammer et al. (2014), researchers studying the CLAHRC collaborations describe various different groups of people engaged in collaboration as presenting different perspectives. Rycroft-Malone et al. (2016) described "professional and epistemic differences between higher education and practice."

D'Andreta et al. (2013) describe underlying philosophical differences between professional groups, specifically noting that these differences lead to different interpretations of knowledge and how that knowledge is acted upon, indicating a potential for mismatch of action among the collaboration's participants. Several CLAHRC researchers observe that the differences among groups of people who need to work together in collaboration toward the mobilization of knowledge create challenging power dynamics. Fitzgerald and Gill (2015) note these dynamics as different disciplinary and/or organization groups come together to negotiate the use of knowledge. Currie (2014) describes differing perspectives and resulting power dynamics and concomitant behaviours including conflict, subordination, and ambivalence, of different categories of researchers including health service researchers and organizational scientists.

Most CLAHRC researchers identifying differing perspectives among collaboration participants highlighted the importance of relationship-building amongst participants, toward the negotiation of a shared vision of the objectives and pathways for knowledge mobilization (Currie et al., 2013; Kislov et al., 2018; Martin et al., 2013). In designing collaborative structures and processes, power dynamics and social position must be recognized (Currie et

al., 2013; Racko, 2018) and structures must be power-balanced (Fitzgerald & Harvey, 2015). The concept of power-balanced structure is consistent with the concept of horizontal structure described by Greenhalgh (2004). McGivern et al. (2016) have pointed to the importance of the manager's open "stance" toward facilitating better relationships among participants holding different perspectives.

Given the focus of most CLAHRC researchers on inter-organizational relations, structures, and activities, there is little clarity regarding how they apply practically toward knowledge mobilization within the health care organization ultimately responsible for taking relevant clinical actions. A more granular view of group or perspectives and their implications extending deeper into the health care organization would be beneficial to a robust understanding of knowledge mobilization.

Spanning Boundaries Between Groups and Organizations

Given the focus of CLAHRC researchers on the collaborative efforts between participants from two types of organization (universities and health care organizations) it is not surprising that most describe organizational or group boundaries and each organization's efforts to work across them (Kislov et al., 2018; Rycroft-Malone et al., 2016; Sinfield et al., 2012). CLAHRC researchers described a variety of roles that were established to work across two organizations or groups to improve communication and shared activity as part of the NIHR-funded collaborations. These boundary spanning (Star & Griesemer, 1989; Wenger, 1998) roles differed in their positioning within and/or between the participating organizations. Coordinators and knowledge brokers worked between the collaborating organizations to promote collaboration activities including the transfer of knowledge from researchers to providers (Racko, 2018; Sinfield et al., 2012). Diffusion fellows were attached to research teams to prepare and promote research for use by clinicians within the health care

organization (Rowley et al., 2012). Hybrid roles work legitimately within multiple groups and, so, might be able to support the interchange of information and meaning between them (Currie, Burgess, et al., 2014; Kislov et al., 2018).

The CLAHRC research, usefully, draws attention to some different groups involved in EBP implementation, and the boundaries and interactions among them. Approaching CPG implementation as knowledge mobilization involving multiple groups with different perspectives that create boundaries among them offers great promise toward an understanding of how CPG implementation may be more effectively supported. The focus, however, of CLAHRC research on the boundaries between academia and health care largely overlooks important groups and perspectives, boundaries, and gaps within the academic and health care organizations themselves. Without this degree of granularity, the specific roles described appear to be overlapping and imprecisely defined. Lengnick-Hall et al. (2021) call for further research into factors that bridge inner and outer contexts. An opportunity exists to examine CPG implementation in more granular manner to better understand other groups and boundaries that may exist to make clearer the types of boundary spanning roles that might be necessary.

Designing Structures and Processes to Promote Participation

Some CLAHRC researchers have identified that a rich environment of interlinked structures, processes, and people must be in place to truly span boundaries to support effective mobilization of knowledge. Rycroft-Malone et al. (2013) describe the need to align organizational structure and cognitive processes over time to establish a shared history for knowledge mobilization collaboration to be effective. Kislov et al. (2018) add that an objective of structural alignment must be to establish shared vision and values between academic and health care organizational boundaries. D'Andreta et al. (2013) speak to the

need for clear, collaborative governance to guide engagement across organizational boundaries. With this collective, relational model of knowledge mobilization, Rycroft-Malone et al. (2016) highlight the important facilitative role that can be played by credible people in boundary spanning roles.

Martin et al. (2013) offer similar observations about the need for shared vision and aligned structures and processes to affect better knowledge mobilization. Importantly, Martin et al. (2013) note that because the barriers for success are so institutionalized, and since the health organization is ultimately responsible for mobilizing knowledge in a way that can affect outcome, much of the impetus and support for these activities and alignments must come from proactive effort by the health organization. If this is the case, there is a great need for research that looks more deeply at the practices and perspectives within, as well as beyond, the health organization to understand how structures, processes, and people/relationships can be better designed and supported to affect the mobilization of knowledge toward better CPG implementation.

Gaps in Knowledge About Implementation From an Organization Perspective

The CLAHRC research emphasized differences in perspectives among groups of people in practice within and across the collaborating organizations. The focus on practice and sensitivity to relationships helped to bring clarity to how processes, structures, and people came together in the CLAHRC collaborations. While promising to an organizational understanding of CPG implementation, the CLAHRC research focused on inter-organizational relationships, leaving much that remains to be understood about the relational dynamics within the health organization, and how they may relate to those between organizations.

Summary

The literature points to, but is sparse on information regarding, the importance of different group perspectives related to CPG and broader EBP implementation in determining success (Cammer et al., 2014). A better understanding is needed of relationships among, and activities of, stakeholders across and beyond the health organization – particularly those from different groups and decision-making purviews. Research on EBP implementation determinants suggests that academia, management and support, and clinical care might be important groups to consider.

An opportunity exists to greatly inform CPG and EBP implementation through organizational case study informed by known determinants of success, but oriented using an approach that builds on the unique organizational and relational insights of the CLAHRC studies, recognizing situated learning within and across groups and practices, and the importance of understanding perspective and power dynamics, spanning boundaries between groups and organizations, and a critical focus on designing and maintaining supportive organizational and inter-organization processes and structures. Such a study promises to offer new insights particularly for health organization decision-makers seeking to support better, more successful CPG implementation.

Chapter Three: Questions and Concepts Guiding the Research

This chapter presents an overview of the research questions, describes the theories and concepts guiding the research, with specific attention to those concepts that were sensitizing. Charmaz (2003) defines sensitizing concepts as "those background ideas that inform the overall research problem." (Charmaz, 2003). A final section offers a researcher positionality statement.

Research Questions

The study was guided by the following overarching research question:

How do individuals and teams with various functions and decision-making purviews come together to implement prioritized clinical guidelines in a Regional Health Authority?

Specific research questions were:

- *How do organizational leaders and support personnel, structures and processes interact (or not) to facilitate or inhibit successful guideline implementation at the clinical practice level where the change must occur to affect patient care?*
- *What does the guideline implementation process look like from the organization's various actors' and teams' perspectives? Who is involved? When are they involved? What do they do, or not do? Who wasn't involved and why?*

Conceptual Underpinnings for the Research

The research questions reflect an overall sensitivity to the gaps in knowledge identified through review of the literature:

- Understanding CPG implementation at the health organization - with a practical focus on informing health organization decision-makers how they might better support successful CPG implementation,

- A focus on process – in contrast to the extensive knowledge that already exists listing things (determinants and strategies) that can have an impact on success, and
- Examining perspectives and relationships among relevant groups within and across organizations, recognizing the importance of recognizing socially situated practice as highlighted by the UK CLAHRC studies. Potential groups identified in the EBP implementation literature include academics/policy-maker, and health organization decision-makers, managers, and clinicians.

The study was further informed by practice theory and the Consolidated Framework for Implementation Research (CFIR). The next sections provides a brief overview of the origins and key concepts underlying practice theory, followed by identification of several key concepts that were drawn from practice theory to sensitize the research.

Practice Theory

Practice theory is a term used to describe a relatively wide base of sociological and anthropological theory that avoids traditional dualisms such as subject/object, thinking/acting, by recognizing the inter-dependence between person and world (Østerlund & Carlile, 2005). As described by Ortner, practice theory seeks "to conceptualize the articulations between the practices of social actors "on the ground" and the big "structures" and "systems" that both constrain those practices and yet are ultimately susceptible to being transformed by them" (Ortner, 2006, p. 2). An understanding of the foundations of practice theory is important for exploration of organizational change as it offers a theoretical orientation for understanding the creation and flow of knowledge within social environments (Nicolini, 2017).

Practice theorists argue for a focus away from both individualist and universal structural explanations for social change (of which CPG implementation might be an example), toward a view that the day-to-day actions of people within their social contexts constitute the root of all phenomena of society (Schatzki, 1997). Many definitions of practice speak of "doing" – to highlight action within a social context. For instance, Wenger (1998) defines practice as "doing in a historical and social context that gives structure and meaning to what we do" (p. 47). Other definitions introduce, as important, concepts of routine and interaction with "the material elements that co-constitute the practice" (Spaargaren et al., 2016, p. 55). Practice is a salient concept within healthcare given the common reference to "clinical practice," yet for practice theorists, practice is something we all do, it is not the exclusive domain of the clinician.

Pierre Bourdieu is usually credited with the founding of practice theory. Bourdieu's comprehensive explication implicates agents within practice with the development, production and reproduction of that practice. Bourdieu describes practice as taking place at the nexus of multiple force fields – a unique expression of each actor's knowledge and experience. Each actor involved in practice is positioned within practice based on "habitus," that actor's internalized system of "dispositions" based on the totality of historical experience (Bourdieu, 1977, pp. 72-86).

Anthony Giddens drew upon Bourdieu to expand on aspects of practice theory. Giddens' work includes a focus on understanding how a practice-oriented view on sociology might shed new light on the establishment, production, and reproduction of large, stable entities he calls institutions (Giddens, 1984). Like Bourdieu, Giddens describes a fundamental duality (as opposed to dualism) between object and action. However, Giddens brings a degree of agency to his actors-in-practice that Bourdieu did not. Where action in

Bourdieu's duality related to the "dispositions" actualized within structures (Bourdieu, 1977), Giddens' duality flows between structure and agency (Giddens, 1984, pp. 25-29). Giddens coined the term "structuration" to reinforce his concept that structure and agency are not a dualism (opposites), but a duality (aspects of the same thing). Giddens describes an iterative cycle where individual agents assume certain structures (rules and resources) to be real and important, based on historical experience, and act in practice according to them. Through practice, groups re-create existing structures or create new ones that will, in turn, guide future practice. Giddens describes this cycle as iterative and re-productive over time and space. From a practice theory perspective, institutions (e.g., health organizations) are great, large, and enduring only because of the practices that make them so.

Building from Bourdieu and Giddens, a variety of writers have drawn from their own empirical work to build on the fundamentals of practice theory set out since Bourdieu. Most have served to synthesize, detail, and provide case study or ethnographic evidence to established theory. In the 1990's Jean Lave, and Etienne Wenger drew largely on the epistemological underpinnings of practice theory to challenge common learning models. The result of their work was not only a proposed revival and embellishment on concepts of apprenticeship as a critical learning modality they named "legitimate peripheral participation," but also a significant development in practice theory itself, namely the concept of "community of practice" (Lave & Wenger, 1991). Etienne Wenger built on his empirical work with insurance claims processing teams to expand on the philosophical framework he had developed with Lave. Wenger developed a framework he describes as a "social theory of learning" that is bounded by two dualities: theories of practice/theories of identity and theories of social structure/theories of situated experience (Wenger, 1998, p. 12). Into this framework he then positions other key sociological concepts: power, meaning, collectivity.

and subjectivity (Wenger, 1998, p. 14). The resulting theory yields the "community of practice" which builds significantly on the practice theory concepts described by other writers, but more clearly expresses the community of practice as a critical nexus for establishment of meaning, learning, knowing, identity development, and the interplay between social structures and practice described so clearly by Giddens.

Like Bourdieu's fields, Wenger's communities of practice are many, and any given social interaction is influenced by the confluence of predispositions stemming from each actor's current and past community of practice involvement. Unlike fields, Wenger's communities of practice have a more practical character. While it is not possible to perfectly see or define a particular practice community, it can be reasonably defined by its participants and seen by the scope of its activities (Wenger, 1998, p. 49). While defying perfect, objective definition and measurement, a community of practice is a reasonably intuitive concept; most people could describe a variety of communities within which they practice. Wenger's community differs somewhat from its colloquial meaning (e.g., a residential community) in that it relates to social collectives of:

a) Mutual engagement: actors in inter-relationship with diverse and constitutive roles
b) Joint enterprise: a collective, negotiated, emergent objective involving mutual accountabilities
c) Shared repertoire: sufficient collective history to establish internal explicit and tacit ways knowledge and practice (Wenger, 1998, pp. 72-85).

The concept of community of practice adds much to practice theory. Community of practice becomes a fluid but tangible site for learning, for the development of meaning, for the establishment of personal identify and the continual, interplay between structure and action. Recognizing the existence and ubiquity of communities of practice, Wenger and other

practice theorists draw attention to the boundaries, and interactions, among them. Wenger builds on earlier work by Star & Griesemer (1989) to incorporate the concepts of boundary and boundary spanning among various teams or communities of practice into his practice theory (Wenger, 1998). Given the fluid, interpersonal nature of communities of practice, they present significant overlaps and interconnections, described by some practice theorists as constellations of practices (Gherardi & Nicolini, 2002; Wenger, 1998, pp. 126-133).

Sensitizing Concepts From Practice Theory

Sensitizing concepts enable researchers to establish some structure and direction to research studies, while remaining highly inductive in their approach (Charmaz, 2003). Consistently, I did not undertake this research study to substantiate or apply practice theory. Instead, I was informed by the theory throughout the study and was sensitized at the outset to several key concepts: focus on practice, observing participants' situated interpretations, revealing tacit understanding, reflecting on people, structures, processes, and activity between groups, and zooming in and out.

Focus on Practice. Consistent with the findings of the UK CLAHRC studies, the concepts of practice and socially situated learning were sensitizing. Schmidt (2016) warns against over-defining a practice such that it might be seen as a fixed object; conceptually losing its loose, practical nature and tempting abstractions or reifications that obscure the people and their actions, or inactions, that construct, and re-construct them. For this organizational research I included, in the study design, several groups of individuals based largely on function as a means of identifying participants and to situate understanding of perspectives about CPG implementation and participants' associated day-to-day activity.

Wenger (1998) defines practice as "doing in a historical and social context that gives structure and meaning to what we do" (p. 47). Consistent with these views on practice, the

interview guide for this study facilitated inquiry into group and inter-group relations and actions. The analytic process involved investigation of each participant's understanding of a CPG implementation activity over time, the social interactions and relationships involved, and the people, structures, and processes that were, or were not, there to guide, and be affected by, the implementation activity.

Recognizing Participants' Situated Interpretations. Wenger (1998) highlights that practice involves not only day-to-day action (divorced of thought), but also ongoing learning, as negotiation of meaning and sense-making, among participants. Schmidt (2016) notes that researchers should be sensitive to the interpretations that participants make and to examine how those interpretations underpin their actions. This study's interview approach was designed to enable me to be sensitive to situated interpretation through open and loosely structured interview style, enabling participants to describe events in their own way, then encouraging them to relate back to actions taken. During analysis I reflected on commonalities and differences in the way participants from different practice settings recount the implementation process or describe its strengths, weaknesses, and outcomes.

Revealing Tacit Understanding. While situated interpretation and action is often described as socially "negotiated," the process of negotiation in practice is not always explicit. Schmidt (2016) warns researchers to be aware of, and draw out, where understanding may be implicit, or tacit. In day-to-day practice, people may, individually and collectively, act in a practice-appropriate manner without being fully able to see that, or explain why, they did so. In this study I sought to reveal instances of tacit understanding by identifying discontinuities between the actions, outcomes, and explanations described by, and among, participants. During analysis, such discontinuities were examined within the context

of the day-to-day practice described by various participants, seeking to reveal any internal logic within which the actions (or inactions) made sense.

Reflecting on People, Structures, and Processes Acting Between Groups. Consistent with observations of the CLAHRC researchers, practice theory's focus on practice raises the potential, at least conceptually, of boundaries between, and relations among, different groups in practice. Schmidt (2016) notes that researchers using a practice theory lens need to be sensitive to, and reflect on, situated and trans-situated activity. The activity to which Schmidt is referring is most commonly described as boundary activity or boundary spanning (Star & Griesemer, 1989; Wenger, 1998). To reflect boundary and boundary spanning activity, I organized this study to capture the perspectives of participants within broad functional groups within and outside the organization, and to compare and contrast their views about the people, structures, and processes that were important to the implementation.

Zooming In and Zooming Out. Latour (2005) and Schatzki (2016) describe practice theory as a flat ontology, explaining that all of human activity and accomplishment is attributable to the day-to-day social connections and activities of people in practice, not by some higher level organizing social laws. Practice theorists and researchers, then, must look to day-to-day, situated, social connections and action (or the lack thereof) to understand any phenomenon. The focus on everyday practice does not negate the ability of the practice theory researcher to consider large, complex phenomena such as CPG implementation in a regional health organization. Provided the theoretical orientation of practice as the root are maintained, the researcher can "zoom in" on individual people in practice, or "zoom out" to consider larger networks – interconnected individuals and practices - and their implications (Nicolini, 2011, 2012). I designed, conducted, and documented the research study to reflect

this approach, iteratively examining accounts and emerging themes from an individual, intra-group, and inter-group level.

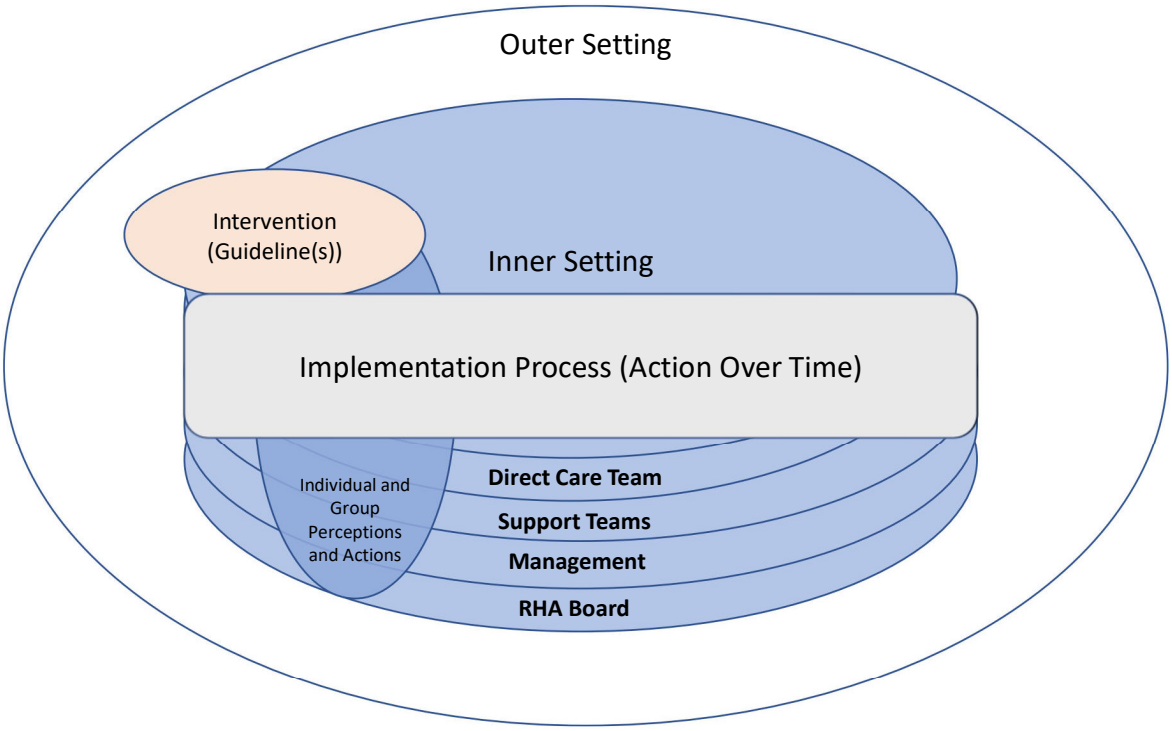
Consolidated Framework for Implementation Research

In addition to practice theory, the study was influenced by the Consolidated Framework for Implementation Research (CFIR). Within CFIR determinants of implementation success are organized in five major domains: intervention characteristics, inner setting, outer setting, characteristics of individuals and process (Damschroder et al., 2009). As described earlier, the five domains provided a guide to the kinds of issues that might arise and should be considered when examining a clinical guideline implementation. Additionally, I drew the five domains into a loose conceptual framework guiding my approach to the study. The domains were adapted somewhat to ensure consistency with practice theory and to reflect the study's focus on: process, health organization decision-making purviews (groups or teams), and the interactions and relationships that might be important among domains for successful CPG implementation.

A Loose Conceptual Framework

The tenets of practice theory and the five CFIR domains and the organizational levels/groups described above come together as depicted in Figure 3.1.

Figure 3.1: Conceptual Framework for CPG Implementation Research Study



In this framework the domains described by CFIR were helpful as organizing concepts but I reworked them to reflect the action/process orientation espoused by practice theory (Giddens, 1984; Wenger, 1998) and the dynamics among the multiple teams and decision-making purviews upon which this study is focused. From a practice theory informed perspective, the organization's multiple groups or teams simply reflect individuals in practice. Individuals situated in social groups are, in some way, the means through which all action takes place – from initial introduction of the intervention (in this case, a guideline or set of guidelines) into the organization through to its successful (or not) implementation.

Given the "how" question upon which the research is based, and its multi-group nature, the process and inner setting domains were a useful starting point from which to build and examine barriers and success factors for guideline implementation within an organization. The four constructs within the process domain - planning, engagement,

execution and reflection/evaluation (Damschroder et al., 2009) - sensitized me to what others have found to be important and served as useful probes in data collection. The five organizational groups or teams (4 inner and 1 outer) were established based largely on function within (and outside) the organization, reflecting: academia and policy (outer setting), clinical practice, management, governance, and clinical practice. The five groupings guided participant sampling and selection across the RHA. Participants were selected based on their participation in these broad groups. The groups were considered directly during data collection, analysis and reporting.

The intervention domain served as a guide in the selection and description of the study's clinical intervention focus – a Clinical Practice Guideline. Source, evidence strength, complexity and relative advantage, all CFIR constructs, are attributes that guided the selected focus on clinical guidelines and influenced the selection of a specific guideline or guideline set for the study (Consolidated Framework for Implementation Research, 2020; Damschroder et al., 2009). Having made the selection, however, these characteristics were viewed as constant throughout the study as the same guideline was studied across a Regional Health Authority. The intervention domain remained important, however, to ensure that I paid attention to how individual and group perspectives (perceptions, according to CFIR) about the intervention arose as factors within the implementation process and/or its eventual successful adoption (Greenhalgh et al., 2004; Rogers, 2003).

Finally, as practice theory points to the importance of the social groups to which individuals belong (Bourdieu, 1977; Giddens, 1984; Wenger, 1998), I have added groups to CFIR's individual domain. This addition was made to recognize the social groups in which individuals participate at work. The interdependency between individuals and their practice

group was important to the study's design and its implementation. Participant selection was influenced by group role and, in some instances, an assessment of the candidate's status and position within the group (Bourdieu, 1977; Wenger, 1998). The concept of action orientation (Giddens, 1984) served as a reminder during data collection and analysis to remain attuned to the way in which any potential success factors for KT manifest in action through individuals and groups. The framework served as a loose guide (Miles & Huberman, 1994) to qualitative investigation while in no way restricting inductive, data-driven learning arising from the experiences of study participants and demonstrated in organizational documentation.

Positionality Statement

I undertook this research study as part of my PhD studies in Health Sciences. The PhD was a continuous learning opportunity for me, as I continued my career of over 30 years in health services management. The study's focus on CPG implementation stemmed from an interest in quality improvement that extended throughout my career. The focus was also consistent with my position (at the time, and now) as a Regional Health Authority Vice-President with responsibilities in quality, planning, and information management.

With post-secondary training in economics and business, and a career in management consulting, government, and health organization senior management, I entered the study with a strong practical understanding of organization, bureaucracy, governance, and management. While I am intellectually drawn to constructivist philosophy, there is no doubt that I have been engaged in a lifetime of education, social, and employment worldview, norms, and activities that stem from more deductive, positivist leanings.

I embarked on PhD studies to learn and to challenge myself, so I decided to study CPG implementation qualitatively and inductively – allowing the participants, and the data they provide, to guide me. Practice theory's focus on socially situated learning underscored

this inductive approach by drawing my attention continually back to what participants said about what they thought, what they did, and with whom they related. My training and career had conditioned me to be well aware of, and potentially biased toward, the perspective of management; my research question and conceptual framework positioned me to see, and to try to process, CPG implementation from other points of view. In research, I sought to look at CPG implementation inductively, from different perspectives – to see what I might learn, and inform others, about management.

Over the course of the study my initial sense of how implementation within an organization happens (with executives and managers leading and managing the change) was challenged as accounts of participants outside of regional management roles differed considerably from those of managers. I had to trust the data when what I was seeing/hearing clashed with my preconceived notions about how implementation should happen in a RHA.

Chapter Four: Research Design

This chapter presents the methodology and methods used to conduct a retrospective, qualitative case study regarding CPG implementation. The chapter begins with a description of the research methodology and methods. The chapter ends by describing the strategies used within the study to ensure rigour, and a strong ethical foundation.

Qualitative Case Study

The research was conducted using retrospective, qualitative case study (Merriam, 2009) design undertaken at one British Columbia Regional Health Authority (RHA). A qualitative research approach was selected for this study as it is best suited for the study's focus on the perspectives of individuals and teams within and beyond the regional health organization, and how those perspectives might have influenced action. As noted by Merriam (2009), "qualitative researchers are interested in understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (p. 5). Case study design was selected for this study for its merits in gaining holistic understanding of complex phenomena (Merriam, 2009; Smith, 1978; Stake, 2008) such as CPG implementation within a regional health organization, and for its applicability for studies of "how" questions such as that described for this study (Yin, 2014). Case study is defined by Merriam (2009) as "an in-depth description and analysis of a bounded system" (p. 50) used when there is "a problem that we are interested in and we feel that an in-depth study of a particular instance or case will illuminate that interest" (p 81). Merriam's (2009) rigorous case study method guided study design, data collection and analysis methods, and report writing. Merriam's constructivist approach to case study was more consistent with this study's conceptual framing using practice theory, and with my worldview (if not my experience base as an executive), than Yin's (2014) realist approach. Merriam's detailed

approach provided more useful guidance than Stake (2008), particularly given my status as a novice researcher.

Data were collected for the study using individual and small group interviews, and by reviewing a wide range of documents and process/outcome measures relevant to the topic of guideline implementation. Participants were identified, with the assistance of a RHA project liaison, from a wide variety of relevant service areas and from multiple organizational decision-making levels to capture and describe the activity holistically and to enable analysis that reflected these multiple perspectives. Data were analyzed through a qualitative descriptive approach with theme development (Merriam, 2009). This case study presents quantitative data related to CPG process and outcome measures. Quantitative information, however, is presented and discussed only inasmuch as it was available and interpreted (or not) by study participants. Given the limited and specific use of quantitative information, the study does not fit common categories of mixed methods investigation (Tashakkori & Teddlie, 2010), and remains qualitative.

Merriam (2009) outlines several types of qualitative case study depending on the case and the researcher's needs. The study was conducted using retrospective, single case, design. The single case study was undertaken at one Regional Health Authority (RHA) in British Columbia, Canada.

The case study involved examination of a CPG implementation retrospectively, over a 7-year period (2011-2017). The retrospective approach offered a high degree of sensitivity to temporality and process (Langley, 1999; Pettigrew, 1990). The CPG implementation case study was undertaken to inform understanding generally, but with a specific interest in informing RHA decision-makers about how they can better support CPG implementation to be more successful.

Methods

This section provides a description of the case definition and site, CPG, and hospital selection, participant selection, attributes of participants, data collection, data management, and data analysis methods.

Defining the Case and Participant Groups

Given the intent of the study was to inform RHA decision-makers, the primary focus of the case study was on the inner setting of the RHA itself. However, attention was also paid to the people, processes and structures outside (outer to, using CFIR's terminology) the organization's boundaries interacted with RHA participants in CPG implementation. This outer participant group was named Academic, Advocacy and Policy (AAP) group for this study. With the focus of the research question on the interactions of "individuals and teams with various functions and decision-making purviews," the inner (RHA) setting was initially organized for study design into three broad, function-based practice groups (the first two were subsequently combined based on consistencies in the way participants described the CPG implementation):

- Regional Leadership comprised of a Regional Health Authority's governors, executive and senior managers, including individual hospital site leaders
- Regional Support functions comprised of middle managers and providers of departments that provide services that support direct patient care (e.g., laboratory services, information technology, quality improvement) and administration
- Direct Care comprised of localized clinicians, managers, and support staff organized as a unit toward the delivery of direct patient care.

While functional groupings do not necessarily correspond with the rich concepts of learning, meaning, and identity underpinning practice, they often promote the proximity and sense of purpose that underpins practice (Wenger, 1998).

Selecting the Regional Health Authority

The British Columbia healthcare system and regional health organizations (known as Regional Health Authorities) offered an ideal environment within which to study clinical guideline implementation due to proximity (to the researcher) and because the province's RHAs gained rich experience with CPG implementation resulting from a provincial CPG implementation initiative known as the Clinical Care Management (CCM) initiative, which ran between 2011 and 2017. The CCM initiative, overseen by the British Columbia Patient Safety and Quality Council (BCPSQC), established a provincial expectation and some provincial infrastructure for the implementation of several leading CPGs understood at the time to have a significant impact on healthcare quality and safety.

Of the province's five British Columbia RHAs, I purposefully selected Select Health for the study because it is not my place of employment, its executive team had expressed an explicit strategic commitment to evidence-based practice, it is comprised of many relatively large sites any of which would be likely to experience high patient volumes relative to any of the BCPSQC CPGs (the CPG was selected after the RHA) and the organization's Chief Executive Officer expressed to me a willingness to participate. To ensure confidentiality for participants engaged in the study, the name of the British Columbia RHA has been replaced with the pseudonym "Select Health."

Selecting the Clinical Practice Guideline Set

The British Columbia CCM initiative encompassed twelve sets of clinical guidelines, or guideline "sets" – collections of recommendations each reflecting specific clinical actions.

The study examined implementation of the Sepsis Guidelines (British Columbia Patient Safety and Quality Council, 2011), also referred to as the Sepsis Guideline Set, for four reasons. First, the Sepsis Guideline Set had been in existence as a CCM initiative since the inception of the provincial guideline initiative in 2011, so opportunities to study implementation over time were maximized. Second, most of the operational changes indicated by the recommendations of the Sepsis Guideline Set were well within the control of the RHA but they involved various departments and professions. This balance of scope and complexity presented a good opportunity for learning about multi-level implementation. Third, at the time, this CPG appeared to offer some of the most compelling research evidence linking process and outcome (Rivers, 2010) of all the CCM guidelines at the time of selection. Fourth, the Select Health liaison – a Select Health Executive appointed by the Chief Executive Officer to assist with CPG, site selection, and logistics - identified during an initial start-up interview that the sepsis CPG was one of the CCM guidelines upon which they had focused most, and the organization's low sepsis mortality rate indicated a high degree of success in managing sepsis patients.

Sepsis is a term referring to the "the systemic response to infection" (Bone et al., 1992). The underlying source (site and type) of infection is not specified; the term relates to the system responses and, ultimately, failures that can arise from escalating infections. According to a study conducted by the Canadian Institute for Health Information (Canadian Institute for Health Information, 2009), sepsis, which is detectable and preventable through the prescribed guidelines, results in 30,000 people being hospitalizations in Canada every year of whom 30% will die.

The Sepsis Guideline Set (British Columbia Patient Safety and Quality Council, 2012) incorporates several recommendations involving: rapid identification of at-risk patients

in the emergency department based on a variety of criteria (e.g., elevated heart rate, temperature, respiratory rate). The guidelines further specify key diagnostic and treatment responses including:

- Test of lactate within 30 minutes of presentation
- Blood culture followed by antibiotics within 1 hour of presentation
- Early initiation of IV fluid.

Appendix B includes further detail regarding the BCPSQC Sepsis Guideline Set. The selection of the Sepsis Guideline Set helped to specify the case study timeframe. Since this CCM guideline set was mandated in 2011, that date constituted the study's retrospective starting point. Although the Sepsis Guideline Set was updated in 2016 (Gotts & Matthay, 2016), the 2011 Sepsis Guideline Set was used as it was in force during the case study timeframe. Where relevant, participants were asked about subsequent changes to the guidelines during interviews.

Selecting the Hospital Site for Case Study

Select Health is comprised of several hospital sites spread across a large population base and a wide geographic area. Management and supports are organized into a multitude of regional departments. Given its organizational focus, this study investigated Sepsis Guideline Set implementation both from the perspective of those involved in regional leadership, management, and support services, and at one hospital site where the Sepsis Guideline Set was implemented by a group providing direct care. In collaboration with the Project Liaison, I selected City Hospital (pseudonym) for the study based on the following criteria:

- Size/volume. While one of the most common complications leading to death, sepsis and sepsis death remain relatively infrequent within a hospital's day-to-day caseload.

Based on sheer numbers a large site providing a high volume of emergency and inpatient service offered the most exposure to patients with sepsis and, hence, the greatest opportunity to experience and understand the effectiveness of their guideline implementation strategy. City Hospital is the largest site within Select Health, experiencing the highest volume within their Emergency Department, and the highest raw number of sepsis cases.

- Confirmation of guideline implementation activity. Early-stage interviews with regional quality improvement executives and managers led to the identification of Select Health sites most referenced as being perceived by the organization's leaders to have demonstrated leadership and activity in implementing the Sepsis Guideline Set, and opined to be the most successful. Among those early interview participants, City Hospital was identified consistently as the Select Health site most relevant for study based on this criterion.
- Sepsis outcomes. Select Health applied BCPSQC measurement criteria to assess sepsis outcomes defined by sepsis mortality rate (sepsis related deaths/sepsis cases x 100%). Averaging 6.4% over the study period (2011 – 2017) based on Select Health data and definitions, City Hospital sepsis outcomes were favourable both among Select Health hospitals and when compared to the rates of up to 30% described in the literature (Canadian Institute for Health Information, 2009).
- Willingness to participate. The hospital's management team expressed a willingness to participate. While the Select Health Chief Executive Officer provided organizational approval, the RHA's research operational review and approval processes required sign-off from the operational sites most affected.

Identifying Participants Relevant to Each Functional Group

Once the Sepsis Guideline Set was selected as the CPG for the research, it was possible to determine the most relevant inner and outer setting functional groups from which to recruit and select participants. The inner setting Direct Care (DC) group of interest for City Hospital was the Emergency Department team as the sepsis CPG related to emergency care. The DC group included clinicians (nurses and physicians), physician leaders, team managers, and clinical support team members including Clinical Nurse Educators and the Nurse Clinicians available to support newer staff in professional development and becoming comfortable in clinical practice.

Along with members of the Select Health Regional Leadership (RL) group comprised of members of the executive team and senior managers, the inner setting Regional Support (RS) group relevant to sepsis guideline implementation included:

- Regional Emergency Medicine Program/Service Network leads. Like many RHAs, Select Health provided regional quality networking and leadership/support activities for a variety of key services including emergency services. During the study timeframe, Select Health moved from a service program to a network model.
- Laboratory and Pharmacy Department managers and staff, as they had important clinical support functions integral to the detection and management of sepsis.
- Information Technology (IT), Health Information Management Services (HIMS), Clinical Education, Professional Practice, Research and Evaluation, and change support department (e.g., Quality Improvement and Healthcare Business Analytics) managers and staff, as these support department/service teams had roles in planning and supporting organizational change.

The most relevant outer setting group, Academic, Advocacy and Policy (AAP) participants related to this study of Select Health's Sepsis Guideline Set implementation were academic and quality leads who were involved in the development and provincial guidance for sepsis.

Selecting Participants for the Case Study

Participants were purposefully selected for interview based on their: RHA/hospital role, tenure with Select Health during the study timeframe, and willingness to participate. Interviews with people reflecting the outer setting included provincial academic and quality leads. Interviews with people reflecting the inner setting were conducted at the regional and hospital site level. Regional-level interviews included members of the Select Health executive team, the Emergency Medicine Program/Service Network clinical, and medical leadership, Quality, Education, Policy, Analytics, and Research team managers and staff, along with senior managers and staff from the organization's Information Technology, Health Information Management Services, Pharmacy, and Laboratory Departments. Due to attrition, no members of the Select Health Board of Directors had significant experience during the study timeframe, so Board members were not interviewed. Hospital site level interviews included representation from City Hospital's administrative and medical senior leaders, and relevant directors. For the perspectives of the group providing direct care, interviews were conducted with representation from the Emergency Department's management, educators, triage and care nurses, physician leadership and physicians.

Potential interview participants were approached initially by the Select Health Project Liaison. The Project Liaison provided each potential participant with an e-mail describing the study and noting that they would be contacted by the researcher through follow-up e-mail. Once contacted, e-mail was used to contact each candidate; again providing them with an

overview of the study, including a one-page study summary, and the ethics-approved interview consent form. During this contact, e-mail or telephone response was sought indicating interest or declining participation in the study. Where interest was indicated, participants were contected by e-mail or telephone to organize the interview location (Select Health site or telephone) and date/time. All but one candidate approached to participate in the study expressed interest and consented to participate.

Participants

In total, 38 individuals participated in the study. Consistent with the definition of "case" for the case study, and its organizational focus, most (36) of the participants fell within the three inner setting functional groups (RL, RS, and DC). Two participants from outside Select Health were interviewed as the most applicable aspect of outer setting AAP functional group given the research questions. Figure 4.1 presents the number of participants interviewed within each setting and functional group (AAP, RL, RS, and DC), along with their professional background.

Figure 4.1

Participants by Setting, Functional Group, and Profession

Setting/Functional Group	Number
Outer Setting (AAP):	2
Inner Setting:	
Regional Leadership (RL)	9
Regional Support (RS)	19
Direct Care Team (DCT)	8
Total	38

Inner Setting: Participant Profession	Number
Nurse	23
Physician	8
Respiratory Therapist	1
Physiotherapist	1
Management/Administration	5
Total	**38**

Note. Three inner setting functional groups were originally described (RL, RS, and DC). During analysis, based on consistency of perspective, the RL and RS groups were combined and described as a Regional Leadership and Support (RLS) group.

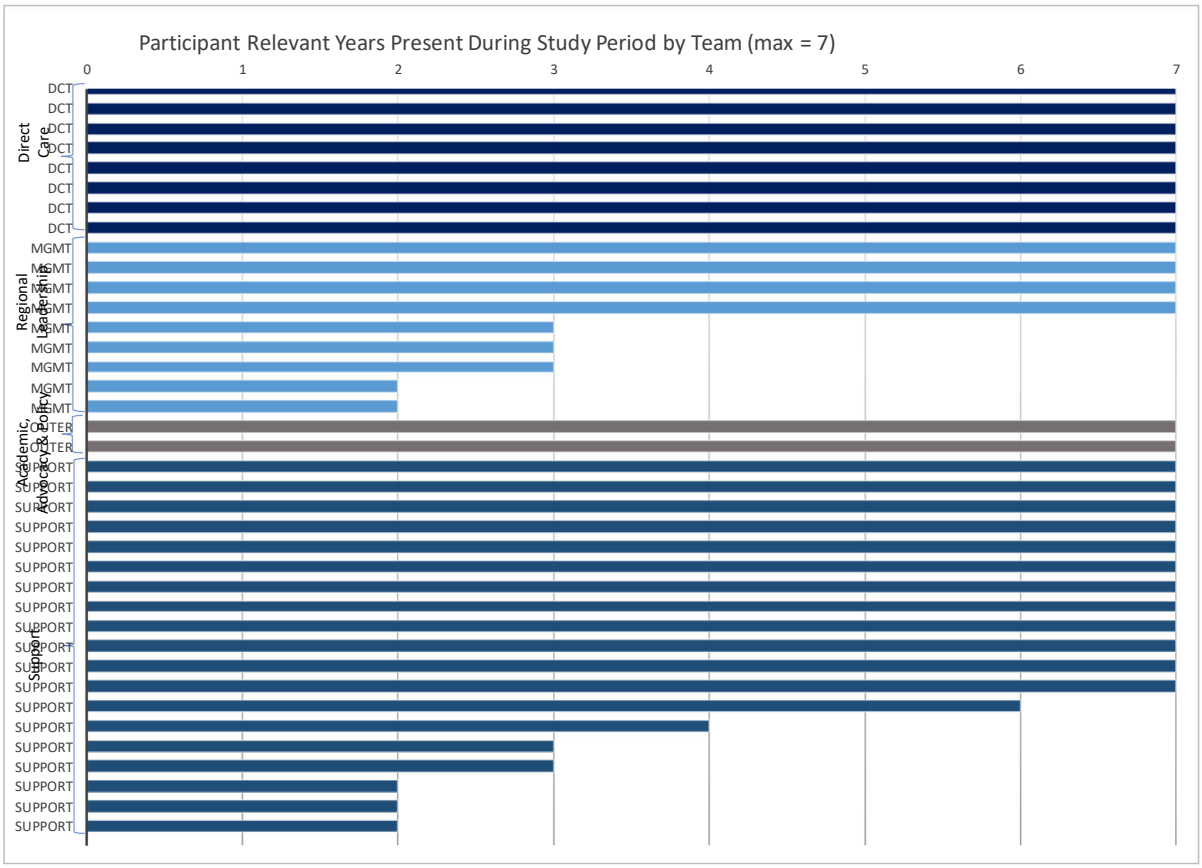
Nurses and physicians constituted the largest proportion of study participants, with others having backgrounds in allied health service or non-clinical, management professions. Within the study's inner setting, 22 individuals were interviewed whose positions were of a regional nature and 14 individuals who worked at City Hospital, a more site-specific level.

All interviews were conducted using one of three modalities: in-person individual (23 individuals), in-person group (5 individuals) or telephone interviews (10 individuals). 25 (65%) of the study participants were female, 13 (35%) were male.

Given the retrospective nature of the study, it was important to involve participants with direct experience with the sepsis guideline implementation during the study timeframe of 2011 to 2017. Figure 4.2 presents the number of years each of the study's 38 participants was present during the study period, arranged by organizational team affiliation.

Figure 4.2

Participant Relevant Years Present During Study Period 2011-2017 by Functional Group



Note. Each of the 38 study participants' years of experience with Sepsis Guideline Set implementation is plotted with seven years (the full study timeframe) being the maximum. Line colours delineate functional group.

Given the study timeframe was a seven-year period, the maximum "relevant" years present is seven. Relevant years were defined as the number of years the participant held a role that was defined in the study participant selection methods. This definition recognized that some participants may have changed roles during the study timeframe but still served in roles that were directly relevant (e.g., an Emergency Department (ED) physician who subsequently took an Emergency Medicine Program leadership role). Of the 38 study participants, 29 (76%) held relevant roles for the full seven years. The remaining nine participants either joined Select Health later during the study timeframe, or moved to

different, less directly applicable roles sometime during that time. Given the organization-wide, multi-level character of the study, it was important to ensure depth of experience not only overall, but within each of the functional groups defined (AAP, RL, RS, and DC). Figure 4.2 presents the relevant years' experience demonstrated by interview participant organized by team. For most teams there was relative stability; most participants had held their roles for the full seven years or nearly so. Proportionately, less stability was apparent among the management group as turnover was higher among that category.

Interviews

Most interviews were organized as person-to-person interviews with two interviews structured, with consent of the participants, as small group sessions. A semi-structured format was used for interviews (Merriam, 2009, p. 89). Appendix C presents the data collection tool and interview guide. The interview guide incorporated concepts of action over time, and relationship drawn from practice theory and was adapted with the advice of a Critical Care program lead from another British Columbia RHA. The interview guide was pilot tested with a BCPSQC informant and remained consistent throughout the study. Each interview included a brief structured component to capture elements of background from each participant (name, role within RHA, professional designation(s) and employment history over seven-year retrospective period), followed by the semi-structured interview. The interview was conducted to gain an understanding of the individual's own role in the clinical guideline implementation and their experience, knowledge and perceptions regarding the implementation process. The interviews ranged from 45 to 70 minutes. During each interview further input was sought about implementation success factors and barriers, people, structures, and processes involved, and relationships within and among groups.

At the beginning of each interview the study consent form was reviewed with the participant and consent was sought. Consent was provided in writing during in-person interviews or recorded verbally during telephone interviews (See Appendix D). Interviews were audio-recorded and transcribed by a professional transcriptionist to enable information retention and detailed analysis. During these interviews notes were taken to capture key points and to guide follow-up and probing. One participant declined consent to record. In this situation extensive notes were taken, with consent.

Follow-up was conducted by telephone and e-mail with one participant from each of the BCPSQC, the region, from City Hospital, to address details and developing themes – a research quality process known as member-checking (Merriam, 2009, p. 217). Selection of participants for follow-up was theoretically based; based on the topic and details required (Corbin & Strauss, 2008; Lincoln & Guba, 1985; Streubert & Carpenter, 2011). Participants confirmed interpretations and occasionally offered further elaborations.

Documents

Documents complemented interview data. Documents that may be relevant to Sepsis Guideline Set implementation were identified in collaboration with, and subsequently requested from, the Project Liaison who coordinated identification and collection within Selection Health. 365 documents were collected. All documents were obtained in electronic format, either from Select Health's or the BCPSQC's external websites, through the Project Liaison, or from individual regional or City Hospital informants.

Documents received included: Select Health strategic plans during the study period; Board minutes, Executive minutes, Board, regional management and City Hospital quality committee minutes; copies of provincial and Select Health sepsis guidelines and order sets; communiques and newsletters regarding the BCPSQC and Ministry of Health Clinical Care

Management initiative, including Sepsis Guideline Set implementation guidelines and directives. Documents spanned, or proved relevant to, the seven years 2011-2017, recognizing 2011 as the date the BCPSQC guideline set was established (British Columbia Patient Safety and Quality Council, 2011).

Three published studies were identified and acquired that drew from the province's experience with implementing Clinical Care Management (CCM) including the BCPSQC Sepsis Guideline Set. Best, et al. (2016) examined the CCM implementation from a provincial systems perspective. McKeown, Shergill and Sweet (2016), and Gorley et al. (2016) studied the Sepsis Guideline Set implementation provincially to understand the impact of gamification and networks respectively. None of these studies were specific to RHA organizational implementation, nor were they focused specifically on Select Health or City Hospital, however they were reviewed for insight with respect to sepsis guideline implementation and for relevant background.

Sepsis Guideline Set Implementation Performance Data

Electronic sepsis guideline performance monitoring information ("report cards") were obtained. The data were aggregated to fiscal period and quarter spanning from period 7 2013/14 to period 4 2016/17 (there are 13 periods per year beginning April 1 each year). The performance data were derived from Select Health's clinical management system and a chart audit process used by the organization. The report cards included information regarding sepsis case definitions, sepsis mortality and implementation performance data regarding adherence to guideline recommendations including time to: lactate measurement, fluids, blood culture and delivery of antibiotics.

Data Management

During field work on-site (at Select Health), documents and the voice recorder were held on-person at all times. These items were stored in a locked filing cabinet at a private location during all other times. Consent forms were filed in a locked filing cabinet. All hard copy documents will be destroyed upon completion of this dissertation. Interview recordings, transcripts, documents, and performance data have been stored electronically on a single secure server at the University of Northern British Columbia accessible only through a password protected laptop using secure VMware. In compliance with Research Ethics Board expectations, digital data will be destroyed five years after completion of the dissertation.

Data Analysis

The following sections outline the methods used for analyzing case study data. While the study was primarily qualitative, some process and outcome data were acquired and analyzed.

Data Analysis: Interview and Document Data.

Qualitative analysis of interview and document data began as soon as data were obtained. Analysis continued throughout the investigation with focused periods of intensive analytic activity occurring between study stages and during the finalization stage.

As an initial step prior to data analysis, each document collected was reviewed for material of topical relevance. This initial screen was for information mentioning: guidelines, CPGs, evidence, improvement priorities, improvement initiatives, sepsis, Select Health's relationship with the BCPSQC and Ministry of Health with respect to the Clinical Care Management initiative. Documents containing references of interest were flagged for analysis in the same manner as for interview transcripts described below.

Interviews and documents were analyzed using qualitative coding and the constant comparison method described as qualitative description by Merriam (2009). Merriam draws significantly from qualitative grounded theory analysis methods described by Corbin and Strauss (2008). Analysis was aided by the use of the NVivo 12 Pro™ qualitative data analysis software. Coding proceeded using the reviewed/corrected transcript. Two overlapping types of coding were conducted: open and analytical coding as referenced by Merriam (2009). An example of this coding approach is provided in Appendix E. With open coding, each element of data (e.g., each interview transcript or document) was divided into individual data units (sentences or paragraphs conveying unique concepts deemed relevant to the research questions) to which were attached short meaningful name or "category." This coding process involved the attachment of some degree of interpretation and meaning to individual data units through the names selected (Boyatzis, 1998; Merriam, 2009). This early coding is considered "open" coding because the meaning attached arises from the data itself rather than an over-arching theory. As analysis proceeded, the data units arising from new sources were assessed against those previously identified, to determine if a new category was warranted or if the new unit could be appropriately named with an existing category.

As codes were developed they were then compared to one-another (a process known as analytical coding): combining, re-organizing and re-naming to capture inter-relationships and to deepen meaning (Merriam, 2009; Corbin & Strauss, 2008). Through this process it was possible to develop key themes that were important to the organizational Sepsis Guideline Set implementation process; its enablers and its challenges.

Given the study's focus on implementation and its underpinning in practice theory, it was important to introduce an analytic strategy specific to the understanding of process. For this process orientation, visual mapping was used as an ongoing analytic tool using MS

PowerPoint. Visual mapping involves analysis and presentation of significant amounts of data into visual formats recognizing various dimensions including time (often the horizontal axis of a visual map) and organizational team/level (often addressed through sections along the map's vertical axis) (Langley, 1999; Miles & Huberman, 1994). Plotting and analyzing implementation decisions and activities over time provided rich, visual information in support of understanding the importance of timing and inter-relationship of activity. Information regarding individual roles or functions was often overlaid onto visual maps of process, providing an additional layer of information informing the study's "how" question – often paraphrased as "who did what to whom." Several such maps are included Chapters 5-7.

As a final analytic approach, themes emerging from open and analytical coding were reviewed against the sensitizing conceptual framework. Theme content was compared and contrasted by functional group, noting consistencies and differences within, and among, groups that might be indicative of unique perspectives established and reinforced in practice. This analysis helped in continually refining and deepening insight into Sepsis Guideline Set implementation.

Interview Content Sufficiency Analysis.

The number of interviews conducted was determined to ensure participation from the functional groups identified, and continually examined and compared to data collected to-date. A saturation analysis was conducted (Figure 4.3). Saturation involves a marginal assessment of the unique content gained through the conduct of one additional data collection activity – in this case, one additional interview. Saturation was reached when additional interviews provided little new knowledge/content (Streubert & Carpenter, 2011).

Upon completion of 35 interviews, the code set developed at that point was analyzed to determine the degree to which latter interviews were adding new content. The interviews

were organized into an Excel™ spreadsheet in order from the first to the 35th. On a vertical spreadsheet axis, were listed each of the 149 categories that had been developed. In the spreadsheet cells a counter (a "1") was used to note the interview through which the category was established. Where the category was applied in subsequent interviews it was noted with a "0" for visual reference. The counter indicated the number of new categories brought forward from each interview and a cumulative number and percentage of total categories identified. As demonstrated in the figure, fewer new categories were generated from the last few interviews. The 31st of 35 interviews had identified 99% of the full code set. The final 4 interviews resulted in a single new category. The new category was very specific to the participant's unique role and did not represent a new conceptual topic that could benefit from further investigation.

Figure 4.3

Interview Content Sufficiency Analysis

Interview #	1	2	3	4	5	6	7	8	9
Number of new categories	22	9	2	6	0	3	0	16	4
Cumulative new categories	22	31	33	39	39	42	42	58	62
% of total categories established to this point	15%	21%	22%	26%	26%	28%	28%	39%	42%
Interview #	10	11	12	13	14	15	16	17	18
Number of new categories	5	3	11	4	3	0	1	4	5
Cumulative new categories	67	70	81	85	88	88	89	93	98
% of total categories established to this point	45%	47%	54%	57%	59%	59%	60%	62%	66%
Interview #	19	20	21	22	23	24	25	26	27
Number of new categories	3	2	6	9	8	3	0	2	3
Cumulative new categories	101	103	109	118	126	129	129	131	134
% of total categories established to this point	68%	69%	73%	79%	85%	87%	87%	88%	90%
Interview #	28	29	30	31	32	33	34	35	Total
Number of new categories	4	4	2	4	0	0	0	1	149
Cumulative new categories	138	142	144	148	148	148	148	149	149
% of total categories established to this point	93%	95%	97%	99%	99%	99%	99%	100%	100%

A similar analysis was done at the functional group level. The 35 interviews were organized by setting and functional group – recognizing Academic, Advocacy & Policy; Direct Care; and Regional Leadership and Support groups. This analysis yielded similar

results to those presented in Figure 4.3. In all but one setting/service team saturation was reached by the final interview.

Data Analysis: Process and Outcome Data.

Analysis and display of process and outcome data was supported using Microsoft Excel™. Given the process/temporal focus for this study, run charts were used as the primary mode for organizing and analyzing Sepsis Guideline Set outcome and process data. Run charts, as described by Balestracci and Barlow (1996), plot performance over time with statistically calculated bands indicating the range within which variation is considered normal (not the result of unusual circumstances such as a focused change activity). Additionally, summary statistical measures (mean, median, variance) were developed to make general comparisons (e.g., Select Health measures vs. those reported in the literature).

Research Quality

This research study has incorporated approaches to address each of the dimensions of quality specific to qualitative research: consistency (reliability), credibility (internal validity), and transferability (external validity) (Lincoln & Guba, 1985; Merriam, 2009).

Consistency is defined by Merriam (2009) as "the extent to which research findings can be replicated" (p. 220). To address consistency, written analytic notes and memos were captured, organized and retained to document observations, ideas, and decisions related to the interpretation of data. In this way, a clear, reconstructable audit trail exists between data collection and findings/results. In addition, the findings chapters of this document were constructed in a manner that incorporates a high degree of a technique known as "signposting." Signposting involves the provision of sufficient description and flow to paint a logical path between data and conclusions (Koch & Harrington, 1998). As the study was executed by a PhD candidate, it was conducted with the guidance of a highly experienced,

credible supervisory committee. Opportunities were taken to obtain their assessment and guidance as to approaches to enhance research rigour and credibility. During the study the research Supervisor reviewed interview technique and initial analysis and provided feedback for ongoing development. Finally, this dissertation is written in compliance with published standards for reporting qualitative research (O'Brien et al., 2014).

Credibility, the degree to which "findings are credible given the data presented" (Merriam, 2009, p. 213), was addressed through the use of triangulation, member-checking, reflexivity, high researcher engagement with the data, and ongoing research committee review (Merriam, 2009). Triangulation was facilitated between data collected through interview and document review. Member-checking was conducted through e-mail and in-person follow-up to confirm details with interview participants as required. Near the final stage of data collection six individuals previously interviewed were contacted to fact-check and to validate and expand upon themes that had been developed.

Finally, transferability, defined by Merriam (2009) as "the extent to which the findings of one study can be applied to other situations" (p. 223) has been address through several steps to provide the reader with the level of detail needed to determine the degree to which findings might be applicable within his/her own context. The findings have been reported using rich description so the basis upon which any theming or abstractions are clear. The study's 35 interviews, 38 participants, and 365 reviewed documents, provided considerable variety in perspective, approach and context.

As noted in the researcher positionality statement at the end of Chapter 3, my race, position, and 30 years of progressively senior administrative roles in the health industry could lead to certain perspectives and biases. To counter potential conscious or unconscious biases I might have brought to the research, I used a reflexivity checklist that itemized a

variety of such potential biases (e.g., bias favouring or disfavouring certain professions or hierarchical levels) for ongoing reflection during data collection, analysis, and reporting activities. I also used memos extensively throughout the study to track ideas, observations, developing themes and changes. Memos were instrumental to analysis, and they serve as an audit trail for the study.

Variations From The Study Protocol

The study involved two significant variations from the original study protocol. First, the original protocol proposed that two case studies would be conducted, to enable comparison of sepsis guideline set implementation at two sites within Select Health. The cases studies were to be conducted sequentially. Following completion of the first study (City Hospital), I found the participation and data to be so voluminous and rich that I determined a second case to be unnecessary. Second, the original protocol proposed to conduct detailed process mapping of the sepsis guideline set implementation with a group of participants from across the Regional Health Authority. Following initial interviews with BCPSQC, regional, and site participants, I determined that a collective process mapping exercise would be unhelpful. At an early stage I realized that the different groups of participants were describing the implementation process very differently. This difference in group perspectives about CPG implementation became the substantive premise of my research.

Ethical Considerations

Throughout the study the student researcher's methods and behaviours reflected the highest ethical standards consistent with the policies set out by the Canadian Research Tri-Council policy statement on ethics (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada [Tri-Council], (2014). The study obtained harmonized ethical and

operational approval through University of Northern British Columbia and Select Health ethics/operational review prior to initiation (reference #2016-099). The Select Health CEO provided written organizational support and consent. Written invitations to participate were sent electronically (e-mail) to potential interview participants. The researcher followed a documented process to obtain informed consent. See Appendix D for a copy of the interview consent form used throughout the study. Participants were provided the opportunity to confirm or withdraw consent at each stage. For notes taken during interviews a coding system was applied to eliminate the use of individual names. This dissertation applies organization, site and individual pseudonyms to protect confidentiality.

Although an ethical review the study was assessed as low risk, it did involve some potential social risk to participants as they discussed matters that were related to the success or failure of the Sepsis Guideline Set implementation. For instance, anticipating that should it be known or suggested that an individual attributed, or admitted to, some blame for problems arising in implementation, the individual's social or professional standing could have been compromised. Few such instances arose. Where they did arise, the risk was minimized by:

- Ensuring anonymity and security of documentation through physical and electronic security measures, and
- Maintaining confidentiality of participants including avoidance of any identifying references in discussions, working documents or interim and final reporting.

Chapter Summary

This chapter set out the methodology and methods used to conduct a retrospective, qualitative case study of Sepsis Guideline Set implementation at Select Health in British Columbia, Canada. The next chapter is the first of three outlining the findings of the study,

beginning with the sepsis guideline evidence itself – how it came to be and how participants at Select Health came to know about it.

Chapter Five: Advancing Implementation

This chapter, the first of three chapters that offer findings, presents a description of the landscape of evolving research evidence and activism that proved relevant to advancing the implementation of the CPG intervention, the Sepsis Guideline Set, at Select Health. The chapter provides the perspective of, and about, participants of the outer (to Select Health) setting Academic, Advocacy and Policy (AAP) group. I characterize this perspective as one about "advancing implementation." The Sepsis Guideline Set did not originate at Select Health so the way the guidelines were developed and disseminated is germane to a study of their implementation at the Regional Health Authority. Participants holding AAP roles described their efforts to advance and influence implementation by the province's Regional Health Authorities, including Select Health. AAP participants described activities related to synthesizing and disseminating information about the Sepsis Guideline Set through electronic communications (website, e-mail), and through networking and ongoing performance measurement.

The AAP participants incited, and helped to shape, the Sepsis Guideline Set implementation at Select Health. To gain a rich understanding of the AAP roles, activities and structures that influenced Sepsis Guideline Set implementation, it was necessary to examine events that extended well beyond the planned study timeframe of 2011 to 2017. Figure 5.1 provides an overview of these factors from 1990 to 2017.

Figure 5.1

Aspects of Evidence, Advocacy, and Policy from 1990 to 2017

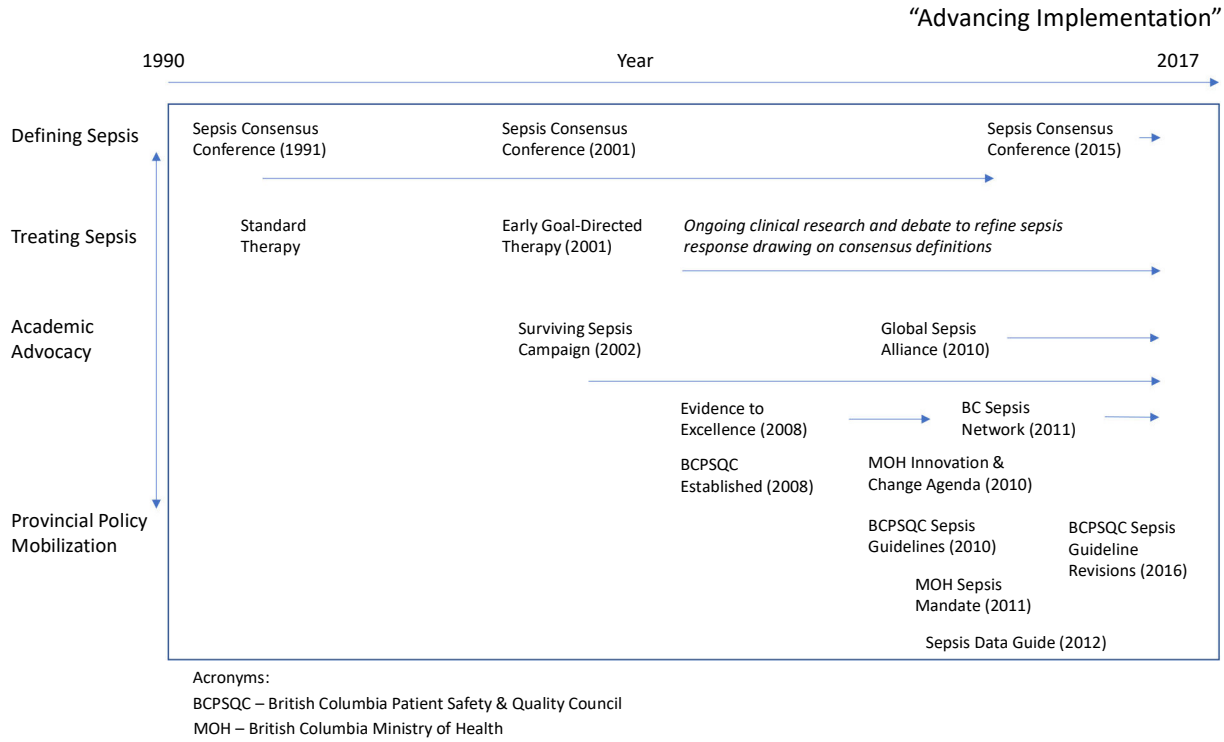


Figure 5.1 serves as a useful guide to the description of the dynamic evidence on sepsis, academic advocacy for sepsis management, and provincial policy mobilization that influenced the Sepsis Guideline Set implementation that ultimately took place within Select Health.

The Dynamic Evidence Informing the Sepsis Guidelines

While the formal implementation of the BCPSQC Sepsis Guideline Set in British Columbia and, specifically, Select Health, began in 2011 the clinical foundation for the implementation was established more than a decade earlier. Within the health industry, sepsis had long been a known clinical concern, best addressed through early identification and treatment. The late 1990's and early 2000's marked, however, a period of growing

recognition of sepsis as a focus for guideline-based care given its high mortality rate and a building clinical understanding of its preventability.

Defining Sepsis: Consensus Conferences

The first step in better addressing sepsis care was to refine the way it was identified in the clinical setting. By 1991, clinicians and researchers had begun to express concern about the proliferation of ambiguous terms with some relation to sepsis. “Infection, bacteremia, sepsis, septicemia, septic syndrome, and septic shock” were all used commonly but had unclear definitions (Bone et al., 1992). Without clear terminology and diagnostic criteria there was little hope of advancement in treatment of this disorder which was recognized as the most common cause of mortality in non-cardiac Intensive Care units (Bone et al., 1992). In 1991 the American College of Chest Physicians (ACCP) and the Society of Critical Care Medicine (SCCM) collaborated to hold a consensus conference aimed at establishing a common nomenclature for sepsis-like illness. International experts were brought together to review the available evidence and to provide recommendations regarding sepsis definitions (Levy et al., 2003).

In 2001 a second international consensus conference was held, based on a premise that since 1991 scientific advances may have led to better ways to define and diagnose sepsis-like illness. The conference reviewed many potential biomedical indicators but ultimately came to the conclusion that the 1991 definitions continued to be the most clinically relevant available at the time (Levy et al., 2003). The prevailing definitions revolved around two related indicators: infection and Systemic Inflammatory Response Syndrome (SIRS). As sepsis is defined as a response to infection, the first indicator is self-explanatory. The SIRS criteria were established in the 1991 consensus conference to better

inform clinical assessment of the escalating systemic response to the infection. The SIRS criteria were defined as:

- Temperature > 38 degrees or < 36 degrees Celsius,
- Heart rate > 90 beats per minute,
- Tachypnea (rapid breathing) > 20 breaths/minute, and
- White cell count > 12,000 or < 4,000 or > 10% immature neutrophils ("bands") (Bone et al., 1992).

A positive SIRS score was achieved when two or more of these criteria were met. The 1991 consensus conference went on to recommend discontinuation of a variety of terms deemed confusing or non-specific, and proposed the following clarifications:

- Severe sepsis: sepsis (infection + 2 or more SIRS criteria) plus organ dysfunction, and
- Septic shock: severe sepsis plus persistent hypotension (low blood pressure) where systolic blood pressure remains less than 90 mm Hg even when fluid resuscitation has been given (Bone et al., 1992).

The definitions provided in the 1991 conference and confirmed in 2001 set a direction for clinical treatment where various steps might be considered not only to address the underlying infection (standard therapy) but to also address the escalating systemic response by managing fluids and blood pressure, sometimes rather aggressively. Some such treatment regimens were outlined in the form of protocols or guidelines and were rigorously examined for effectiveness (Zhang et al., 2017).

Treating Sepsis: Early Goal-Directed Therapy and Beyond

Interest in guideline-based sepsis care culminated with the publication of Rivers et al. (2001), the results of a study regarding early goal-directed therapy for the treatment of severe sepsis and sepsis shock.

Rivers et al. (2001) gained international attention as it reported the compelling results of a single-centre randomized control trial (RCT) comparing what was then considered standard therapy for severe sepsis and septic shock against a proposed goal-directed therapy regimen aimed aggressively at hemodynamic resuscitation (Zhang et al., 2017). The widely cited article brought widespread attention and debate to its recommended therapy and to goal-directed therapy in general. Rivers et al. (2001) also served to further spark interest in the preventability of sepsis mortality through early identification in the Emergency Department. It prompted interest in the most appropriate indicators and definitions for sepsis, severe sepsis, and septic shock building from the SIRS (systemic inflammatory response) criteria (Dellinger et al., 2017; Levy et al., 2003; Shankar-Hari et al., 2016). It also prompted attention to the appropriateness and details of elements of resulting therapy including further elements of hemodynamic resuscitation and antibiotic administration (Zhang et al., 2017). The Rivers et al. (2001) study not only provided compelling evidence related to the goal-directed therapy espoused by the authors (a 16% drop in sepsis-related in-hospital mortality) but served as a stark call-to-action to reduce sepsis-related mortality overall, given the significant mortality rates being considered (sepsis mortality rates of 46.5% pre-intervention and 30.5% post-intervention).

The Rivers et al. (2001) study brought greater profile to sepsis and sepsis care. It was an inciting force for quality improvement in emergency care in British Columbia and within Select Health.

> I think this goes back to, so basically there is a study by a physician by the name of Dr. Rivers, the quintessential study with regards to goal-directed therapy and that's where that term came called goal-directed therapy. (RLS, Regional Quality Improvement Department Lead)

Revisiting the Treatment Evidence

While Rivers et al. (2001) did much to spur on interest in improving sepsis outcomes, subsequent clinical trials were yielding results that drew the effectiveness of the Rivers view of early goal-directed therapy for sepsis into question. By 2010, academic clinicians were questioning the practicality, value, and potential deleterious effects of aggressive hemodynamic control and the required invasiveness of central line insertion (Reade, 2010; Rowan et al., 2017; Sweet et al., 2012). The academic literature was moving toward a much more moderate view of early identification and intervention based on some key elements:

- Algorithm-based screening, triage and response
- Identifying and controlling the source of sepsis
- Fluid resuscitation
- Monitoring serum lactate clearance
- Antibiotic administration (Sweet et al., 2012)

Revisiting Definitions and Treatments, Again

In February 2016, the results from the third international consensus conference on sepsis and sepsis definitions were reported in the *Journal of the American Medical Association (JAMA).* The new definitions became known as Sepsis-3 (Seymour et al., 2016; Shankar-Hari et al., 2016). The Sepsis-3 definitions built from previous consensus definitions

but refined the definition of septic shock to be more specific and clinically relevant – as the earlier definition proved to work better for researchers than for clinicians (Sweet et al., 2012). The consensus definition of septic shock became:

- Severe sepsis as before plus hypotension requiring vasopressor therapy to keep systolic blood pressure above 65 mm Hg, and
- Serum lactate level greater than or equal to 2 mmol/L (Shankar-Hari et al., 2016).

The consensus conference reviewed tools/scales available to clinicians to assist in the identification of potential sepsis patients. Upon review of the available evidence, the consensus opinion moved to the use of the quick Sepsis-Related Organ Failure Assessment (qSOFA) scale in addition to SIRS criteria for identifying sepsis outside of the hospital's Intensive Care Unit (Seymour et al., 2016). Noting significant overlap between the symptoms of those with infections in general (not necessarily sepsis) and the SIRS criteria, Vincent, Martin, and Levy (2016) explained that the added qSOFA assessment facilitated greater accuracy of sepsis diagnosis in the busy clinical environment; reducing the potential for false positives which were found to distract and overwhelm clinicians in busy hospital environments.

Academic Advocacy for Sepsis Management

Given the growing attention to, and investigation of, sepsis in the late 1990's and early 2000's, clinicians and researchers were invested in seeking ways to raise awareness of sepsis clinically and publicly and in facilitating use of evidence-based care approaches through the implementation of sepsis guidelines.

The Surviving Sepsis Campaign

In 2002 the Society of Critical Care Medicine partnered with the European Society of Intensive Care Medicine (ESICM) to form and promote the Surviving Sepsis Campaign

(SSC). The objective of the SSC was to promote sepsis awareness and to establish and promote the implementation of evidence-based guidelines aimed at moving from standard therapy toward more aggressive mitigation of the related systemic responses. The SSC was established around a very clear mandate:

To reduce mortality from sepsis by 25% via a 7-point agenda including:

- Building awareness of sepsis
- Improving diagnosis
- Increasing the use of appropriate treatment
- Educating healthcare professionals
- Improving post-ICU care
- Developing guidelines of care
- Implementing a performance improvement program (Levy et al., 2010; Society of Critical Care Medicine, 2018).

The SSC gained a considerable following during the first decade of the second millennium through multi-media awareness efforts and continued efforts to build clinical knowledge about sepsis and to translate that knowledge into practice (Levy et al., 2010). The SSC has been credited for having a significant impact on the quality of sepsis care in the United States and beyond (Levy et al., 2010). The Surviving Sepsis Campaign also had an influence on clinicians and researchers in British Columbia's health system and on Select Health.

> My sense is that a lot of Sepsis Guidelines arose from post-Rivers trial and early goal-directed therapy and the Surviving Sepsis campaign that we sort of associated with that. (RLS, Regional Program/Service Network Lead)

> The Sepsis Guidelines generally came to my attention with the Surviving Sepsis campaign and through media during my residency training. (DC, Hospital Emergency Department Physician)

In 2010, the international Global Sepsis Alliance was formed as an alliance of many prominent provider and academic organization members from across the world. The mandate of the Alliance was, and is, to promote awareness of sepsis toward reduction in mortality worldwide. In 2012, the Global Sepsis Alliance established World Sepsis Day – September 13 of each year – to serve as a focal point for awareness activities.

The Global Sepsis Alliance has been influential in the creation and support of another academic advocacy group more specific to British Columbia: the "Evidence to Excellence" (E2E) initiative.

Evidence to Excellence: A British Columbia Grassroots Collaborative

The work of clinical researchers on sepsis definition and treatment and the Surviving Sepsis Campaign met fertile ground at the University of British Columbia (UBC), a research-intensive university with British Columbia's only accredited medical training program and related faculties and departments. As the SSC was building momentum, the UBC Department of Emergency Medicine began working with the British Columbia Ministry of Health ("Ministry") and Health Authority partners to form the Evidence to Excellence (E2E) initiative. With interested UBC academic clinicians in the lead, the E2E was aimed at improving quality in British Columbia emergency departments (University of British Columbia Department of Emergency Medicine, 2018).

> I think we were looking at best practices way back in the Evidence to Excellence initiative which actually started in 2008, and then I think these best practices were

> probably compared with the Surviving Sepsis guidelines and other sort of national and international best practices and evidence and literature. (AAP, Quality Lead)

E2E, founded with an overarching interest in redesigning emergency flow and quality, quickly picked up on the potential for improvement in the identification and treatment of sepsis.

With leadership from an engaging critical care specialist who was also a member of the UBC Department of Emergency Medicine holding practice privileges at multiple southern British Columbia hospitals, E2E established a grassroots[1] collaborative comprised of practitioners and decision-makers from large and medium-sized Emergency Departments from across the province aimed at improving sepsis care. The E2E collaborative drew from the SSC to establish a guideline set and supporting tools to promote evidence-base sepsis care. With support from the Ministry and from some Health Authority champions, they continued to broaden their informal network to 18 provincial Emergency Department teams and facilitated two in-person collaborative sessions between 2008 and 2011 that were attended by two Clinical Nurse Educators from Select Health (Sweet et al., 2012).

> And then there was a collaborative called the Evidence to Excellence collaborative that I want to say was 2008 to 2010ish where it was sort-of a provincially initiated Emergency Department collaborative where they'd tried to sort-of bridge the urban-rural divide and had different clinical topics they wanted to improve quality of care with. And so, Emergency Department sepsis was one of those. So, we ran two IHI-

[1] Grassroots is defined as "the basic level of society or of an organization especially as viewed in relation to higher or more centralized positions of power" (Merriam-Webster, 2019).

> style collaboratives[2] over that period of time to implement sepsis protocols in the province. I want to say I think there were 18 sites that were involved in and it was more ground-up and just personal contacts to get different departments involved in that. (AAP, Quality Lead)

Provincial Policy Mobilization

In 2011, as the E2E groups were coming together in grassroots collaboration, the British Columbia Ministry of Health was concerning itself with the challenge of quality improvement at the provincial policy level. Having formed the British Columbia Patient Safety & Quality Council (BCPSQC) in 2008 to "provide system-wide leadership to efforts designed to improve the quality of health care in British Columbia" (British Columbia Patient Safety and Quality Council, 2018), the Ministry was looking for ways to quickly show progress in quality improvement. To signal its interest in rapid quality improvement, the Ministry identified a key priority – "High Quality Hospital Services" – as a significant component of the their strategic "Innovation and Change Agenda" (British Columbia Ministry of Health, 2012). The Agenda established the Clinical Care Management (CCM) initiative, described as "a guideline-driven clinical care management system to improve the quality, safety, and consistency of key clinical services and improve patient experience of care" (British Columbia Ministry of Health, 2012, p. 4). CCM was a Ministry-directed initiative working through the BCPSQC to identify and prioritize leading practice guidelines in key clinical areas, and to guide implementation. The BCPSQC developed implementation support

[2] Follow this link for information related to the Institute for Healthcare Improvement (IHI) collaborative model. http://www.ihi.org/resources/Pages/IHIWhitePapers/TheBreakthroughSeriesIHIsCollaborativeModelforAchievingBreakthroughImprovement.aspx

strategies incorporating information exchange, collaboratives, and performance measurement.

The CCM initiative was guided by a Steering Committee comprised of members from the Ministry, BCPSQC and each of the province's Health Authorities. At the outset of the CCM initiative, a Steering Committee - the CCM Steering Committee – was established, comprised of Health Authority Quality Improvement executive leads and BCPSQC and Ministry leadership. The CCM Steering Committee decided that the best way to proceed would be to build upon improvement initiatives already taking place in the province. Given the potential benefit and the early success of the E2E collaborative, Sepsis Guideline Set implementation was an obvious candidate and was prioritized as one of CCM's twelve improvement initiatives. The collaborative network that had been established through the E2E initiative was formalized and expanded as the BC Sepsis Network under the BCPSQC to connect people across the province interested in improving sepsis care and to guide the ongoing refinement and monitoring of sepsis guideline sets and implementation supports.

By the time the BCPSQC was asked to lead the CCM initiative, the evidence with respect to sepsis management had evolved to a more moderate position than originally described by Rivers et al. (2001). In keeping with the prevailing literature of the time, the BCPSQC drew from the work of E2E and established a formal provincial Sepsis Guideline Set (British Columbia Patient Safety and Quality Council, 2012). A letter from the then Assistant Deputy Minister of Health to the Select Health Chief Executive Officer dated April 01, 2011 mandated the implementation of the

Sepsis Guideline Set. British Columbia Health Authorities, including Select Health, were to undertake implementation activities ensuring:

> "… Patients receiving antibiotics by time goal; Patients with blood cultures taken before IV antibiotics initiated; Patients with second litre of crystalloid initiated by time goal; and Patients with appropriate lactate measurement by time goal." (British Columbia Ministry of Health, 2011)

The British Columbia Patient Safety and Quality Council's Measurement Dilemma

In 2012 a Clinical Expert Group was struck comprised of Emergency and Critical Care clinicians from each Health Authority. The group was established to provide ongoing advice to the Steering Committee and Ministry regarding clinical aspects of sepsis management and improvement. A priority for the BCPSQC Steering Committee was the development of measures to align with the implementation of the Sepsis Guideline Set. The Clinical Expert Group was asked by the Steering Committee to advise the development in conjunction with a Data Working Group (including a blend of clinicians and analysts) and BCPSQC staff. While a measurement set was established and published, there was broad recognition that measurement of Sepsis Guideline Set implementation in British Columbia suffered from three substantial challenges. First, like many health organizations in Canada, British Columbia Health Authorities continue to work with a combination of paper and electronic records. Having only modest levels of clinical record automation, data collection to support Sepsis Guideline Set implementation measurements tended to be quite labour intensive. Second, the identification of sepsis patients through both electronic and paper records was challenging because sepsis develops as a result of a

variety of types of infection. Patients were often identified in their record by the underlying infection (e.g., pneumonia) rather than by sepsis.

> Measurement for sepsis was always very difficult. And it's difficult for many reasons. One of the reasons is that when you come into the emergency department with a condition that can lead to sepsis, such as an infection somewhere in your body, for example, pneumonia or some other type of respiratory infection, or whether you know it's sort of a localized infection that then spreads, it's often coded as the event that you come in with rather than coded as a definition of sepsis. (AAP, Quality Lead)

The third significant challenge for Sepsis Guideline Set measurement was the apparent need to meet two distinct measurement objectives – adherence monitoring and quality improvement. Measures were expected to be submitted on a regular basis to the Ministry for monitoring purposes. For adherence monitoring, the Ministry needed a set of measures that were comparable across Health Authorities and could be reported on a regular basis for statistical analysis. For quality improvement, local teams needed current information relevant to their own units and reflective of local changes and dynamics.

> We were using the data for dual purpose though. It was accountability data that was going back to the Ministry of Health through the CCM Steering Committee and Clinical Expert Group to inform feedback or inform quality improvement at a provincial level. And then we were also recommending that the sites measure locally and use their local data to look at results and test some change as they improved their systems. (AAP, Quality Lead)

In spite of the challenges, the BCPSQC and CCM Steering Committee developed and published a data guide for Sepsis Guideline Set implementation measurement in 2012. The guide provided detailed instructions for measuring Sepsis outcome and guideline implementation process measures as follows:

- In-hospital mortality rate for patients investigated for sepsis in the Emergency Department, stratified by level of risk,
- Percent of patients with antibiotic received by time goal specified in BC Sepsis Guidelines,
- Percent of patients with confirmed severe sepsis/septic shock or admitted for IV antibiotics with blood cultures taken before antibiotics,
- Percent of patients with confirmed severe sepsis/septic shock with 2nd litre of crystalloid initiated by time goal as specified in BC Sepsis Guidelines, and
- Percent of patients with appropriate lactate measurement by time specified in BC Sepsis Guidelines (British Columbia Patient Safety and Quality Council, 2012).

BCPSQC Sepsis Guideline Set definitions and measures, established in 2011 and 2012, remained consistent for a period of approximately four years – until 2016, when the Sepsis-3 Consensus Conference took place (Singer et al., 2016). As the industry became aware of the new definitions and assessments, the BCPSQC committed to refine the provincial guidelines. Refinements were underway when interviews for this research study were being conducted at Select Health. Many participants noted that a period of uncertainty had set in as the guidelines were being

revised and the Ministry announced that submission of adherence measures would no longer be required.

Advancing Implementation and the Practice of Academics and Advocates

Participants from the AAP group described a perspective of Sepsis Guideline Set implementation that reflected their efforts to advance implementation through influence and advocacy. AAP participants informed Regional Health Authority (RHA) clinicians and managers about the evidence supporting the guidelines and influenced action toward implementation by engaging RHA participants in peer networking and improvement collaboratives. AAP participants were successful in drawing attention to sepsis management among Select Health clinicians and managers, as information about the guidelines cascaded through large international groups of clinical researchers, including the Global Sepsis Alliance and the Surviving Sepsis Campaign, to a more localized group in British Columbia, the Evidence to Excellence (E2E) network. The E2E network stimulated a variety of grassroots improvement initiatives at British Columbia RHAs including Select Health, drawing on a common set of guidelines and support materials (e.g., pre-printed orders). The E2E and Sepsis Networks promoted a high degree of engagement in Sepsis Guideline Set implementation among those who participated. The BCPSQC Quality Leads worked across AAP, RLS, and DC group boundaries to the extent that time and resources allowed. With just two Quality Leads – one physician and one nurse – the BCPSQC was limited in the number of events, participants, site-specific dialogue, and supports they could provide. Participation, and, hence, engagement with Select Health RLS managers and DC clinicians was limited, as only two Clinical Nurse Educators participated directly in the network activities (e.g., collaborative sessions) and physicians were able to interact with the physician Quality Lead only sporadically.

The evidence informing Sepsis Guideline Set implementation proved compelling, yet insufficiently stable for Select Health participants. The Rivers et al (2001) study and subsequent dialogue and advocacy from academia, advocacy groups, and the Ministry of Health established strong awareness and a clear moral and policy imperative for Sepsis Guideline Set implementation. Yet, the continuing debate regarding sepsis definitions, case identification and measurement, and specifically what needed to be implemented to achieve what outcomes, led to questions among Select Health participants about the degree to which the guidelines were evidence-based or practically implementable. AAP advocacy and networking activities did not lead to resolution of these fundamental questions for Select Health participants.

In support of implementation, the E2E network and, later, the BCPSQC Sepsis Network, provided RHA participants with literature synthesis and summarized, and periodically facilitated discussion about, the sepsis guidelines among clinicians. The BCPSQC Quality Leads worked with an expert panel to develop and share templates for clinical decision support tools, and to develop and disseminate measures to monitor each RHA's and hospital's performance in implementing the guidelines. Sepsis Guideline Set implementation measurement proved challenging for the BCPSQC and for Select Health participants. The dual objectives of adherence monitoring and quality improvement emerged as an issue for BCPSQC and Select Health participants as the Ministry sought consistent, aggregate information with which to emulate the researchers' statistical analysis and to hold RHAs accountable for implementation, while clinical teams sought more timely, granular information with which to assess their own sepsis care. Difficulties in sepsis identification and data collection made measurement problematic and time-consuming for Select Health Leads and Analysts.

Chapter Summary

This chapter provided a description and interpretation of the Sepsis Guideline Set implementation from the perspective of participants from the Academic, Advocacy and Policy (AAP) group. Participants from this group sought to advance implementation of the guidelines by influencing the behaviour of various participants through advocacy and networking activities. These activities proved very effective at creating awareness about guidelines and generating engagement in implementation among network participants. Limitations in resources challenged the breadth of engagement within Select Health, with very little ability to support engagement of Direct Care clinicians directly. Repeated revisiting by academics of the evidence supporting the Sepsis Guideline Set, led Direct Care clinicians to hold uncertainties about the necessity and practicality of following the guidelines explicitly. These uncertainties remained unresolved throughout the 2011-2017 implementation timeframe. A directive from the Ministry of Health to Regional Health Authorities to implement the guidelines appears to have reduced the amount of clinical dialogue that could have enhanced engagement and helped participants to find solutions to address their significant practical concerns. Instead, the BCPSQC turned quickly from activities aimed at engaging and problem-solving, to efforts to align implementation provincially through performance measurement and support tool standardization.

The next two chapters present and discuss how Select Health's response was described, first from the perspective of participants from the organization's Regional Leadership and Support group, then from the perspective of participants involved in Direct Care at City Hospital.

Chapter Six: Managing Implementation

This chapter presents the Select Health Sepsis Guideline implementation as it was described by members of Regional Leadership and Support (RLS) participants, including those in Select Health regional and site executive and senior leadership roles, those involved in regional leadership for relevant clinical services (especially those for the Emergency Medicine Program/Service Network), and those involved with key regional support services such as quality improvement, professional practice, information management and diagnostics.

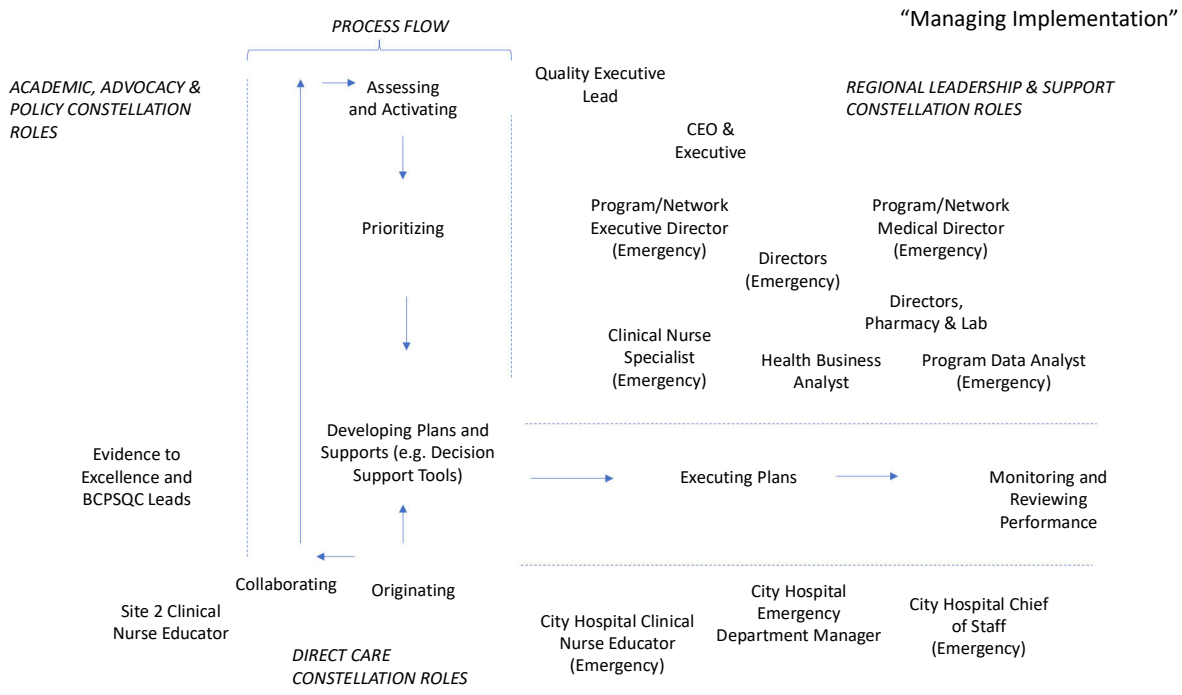
While a diverse group involving people with different organizational functions and roles, participants involved in Regional Leadership and Support provided a consistent, coherent perspective of Sepsis Guideline Set implementation. I characterize the RLS perspective as one of "managing implementation." Participants holding regional management and support positions described a managed implementation involving prioritizing the Guideline Set, activating work toward implementation, and communicating through established organization structure and interlocking committees, developing and implementing standardized processes and tools, and monitoring adherence using structured measurement scorecards. RLS leaders took a creative approach to enable measurement of outcome and process adherence and to provide this information as site-specific scorecards throughout the organization. At a broader regional level, efforts were made to further convey priorities to Select Health stakeholders and to reinforce the importance of individual accountability for safe, high-quality care.

Figure 6.1 depicts the implementation process as described by RLS participants. Figure 6.1 highlights the processual aspects of implementation described, above along with

an indication of the roles participants indicated were involved. The figure only includes those roles that were described as integral to the implementation, based on multiple and extensive reference.

Figure 6.1

Regional Leadership and Support Perspective



Note. Chronologically the figure is to be read beginning with Originating, working to Developing Plans and Supports (City Hospital specific) and Assessing and Activating (toward regional prioritization). Listed are the DC, RLS, and AAP roles most consistently identified by RLS participants as involved in the implementation.

Implementation was prioritized and managed through the region's program management structure following a structured process supported by the organization's Clinical Policy Office. Adherence was monitored using scorecards conveying site-specific process and outcome measures. The City Hospital Emergency Department Clinical Nurse Educator

(CNE), Manager, and the Chief of Staff were pivotal, acting as the primary, even exclusive, conduits between regional entities and the Direct Care Team.

Regional Structures Steering Clinical Practice Guideline Implementation

Almost invariably, participants from the Select Health Regional Leadership and Support Team began their accounts of Sepsis Guideline Set implementation by describing two structures that were in place between 2009 and 2015:

- A program management organization structure providing oversight for a variety of clinical programs, including the Emergency Medicine Program, and
- A Clinical Policy Office that guided development and support of Clinical Decision Support Tools – including those related to the Sepsis Guideline Set.

These structural aspects were important contextually to Sepsis Guideline Set implementation at Select Health – particularly from the perspective of Regional Leadership and Support (RLS) participants.

Program Management Structure

Between 2009 and 2015 Select Health was organized in a structure known as program management. Program management is an organizational structure where the primary management stream is along program or service lines. Programs cut across multiple sites with line authority (authority for operational units) rolling up to regional program leadership. Site/community leaders hold largely an integrative role; weaving the various programmatic units into an integrated whole at the site/community level. Most relevant to the Sepsis Guideline Set implementation was the Emergency Medicine program which had oversight for Select Health's 12 emergency departments. The Select Health program management organization structure was mirrored by the medical staff structure. Program medical directors held

authority for the activities of department chiefs in departments relevant to the program in each facility.

The Emergency Medicine Program of Select Health was established in 2009 as part of the organization's move to clarify responsibility for efficient, effective, and standardized operations of emergency services across the organization's twelve hospital facilities. From the perspective of RLS participants, it was instrumental in the Sepsis Guideline Set implementation. The program was led by an Executive Director, three Emergency Service Directors (each having oversight of emergency services in three or four facilities) and a Program Medical Director. A Clinical Nurse Specialist (CNS) was recruited to provide full time leadership and support to the program. Each facility's Emergency Department Manager reported to one of the Directors. Supervisory staff, operational staff and educators reported through the program line through the manager. Facility Emergency Department Chiefs (physician leaders) reported through to the Program Medical Director and upwards to the Vice President of Medicine. Site-specific leadership was provided at the time by site Executive Directors, each with oversight over multiple facilities, in partnership with physician Medical Coordinators.

The Clinical Policy Office

The Clinical Policy Office was a clinical practice support team that operated under the auspices of Select Health's Professional Practice Department. The team developed a variety of materials, technologies and processes, and a wide array of contacts across the organization, to assist clinicians in the development, approval and dissemination of Clinical Decision Support Tools such as policies guidelines and pre-printed orders:

- Guidelines are defined by the Clinical Policy Office as: “a systematically developed statement to assist practitioners and patients/residents/clients make decisions about appropriate intervention/treatment options in health care specific circumstances.
- Pre-printed orders or “order sets” are defined as: “a precise set of instructions detailing action(s) for prevention, care and/or treatment of a clinical condition.” Pre-printed orders often include medications and are “individualized to the person receiving care/treatment” (Clinical Policy Office, May 2017).

The Clinical Policy Office served as a guide and gatekeeper in the Clinical Decision Support Tool development process. The Clinical Policy Office sought to align most of its resources toward supporting Clinical Decision Support Tool development work that aimed at establishing regional practice standards. The Clinical Policy Office was central to the way in which the Sepsis Guideline Set was implemented at Select Health.

Implementation Process From the RLS Perspective

Having described the organization’s structural context for Sepsis Guideline Set implementation, the following sections describe several relatively discrete stages of activity identified through analysis of data from RLS participants.

Originating: Early Sepsis Care Improvement at Select Health

The origination of formal work on the Sepsis Guideline Set at Select Health can be traced to early participation of Select Health clinical nurse educators with the E2E collaborative in 2008/09, well before the Ministry of Health had contemplated a Clinical Care Management (CCM) initiative or the mandating of specific guidelines.

Evidence to Excellence (E2E), a network led by clinical academics in the University of British Columbia Department of Medicine, sought engagement through personal relationships with staff and physicians in British Columbia hospital Emergency and Critical Care Departments. Effort was made by the E2E organizers to involve sites from each of the province's RHAs with emphasis placed on site-level, operational, participants. The E2E Medical Lead, drawing on his extensive personal connections among the province's Emergency/Critical Care Departments, including those at Select Health and City Hospital, identified and recruited potential participants for the E2E sepsis collaborative. He made himself available to speak with hospital medical staff and other team members to build interest in collaborative improvement in sepsis care. Having contacts at Select Health hospitals, the E2E medical lead was able to bring several Select Health facilities into the E2E network, to begin work toward sepsis care improvement, beginning with the creation of a provincially consistent Sepsis Guideline Set.

Clinical Nurse Educators (CNEs) at two Select Health sites, including City Hospital (for anonymity, the second hospital will be referred to as "Site 2"), were particularly active in early work with E2E toward sepsis care improvement and Sepsis Guideline Set development. The leadership role taken by the two site CNEs in Sepsis Guideline Set implementation was not unusual for Select Health. The two were part of a group of CNEs with a longstanding tradition of multi-site information sharing. Since the early 2000's – when Select Health had just been established as a RHA – CNEs supporting emergency services came together monthly to network and share information, experiences and approaches. The tradition continues to this day though the regional CNE network meetings have taken on a somewhat more formal role with respect to regional standardization.

> We have forever – as far back as 20 years or so – all the educators from all of the emergency departments come together once a month to meet and part of that is to review what regional implications are ongoing, what practice standards are coming down the pipe, who's going to take the lead on developing so there's a new practice guideline for this, who's going to take the lead on that (DC, Hospital Emergency Department CNE).

It was at one of these regional network meetings that the Select Health Emergency Department CNEs decided that two CNEs, including a CNE from City Hospital, would work with the E2E collaborative to build from province-wide work on a Sepsis Guideline Set and further develop and standardize the guidelines and supports for sepsis management within Select Health. The E2E collaborative was used by the CNEs as a source of credible evidence, input and materials in support of what was considered a normal continuous quality improvement activity of the City Hospital, and other facility, CNEs.

> So, when you start out, you say we're noticing a gap between practice recommendations that are out there and the best practice and the evidence and that's something we do as educators, we're often looking. And that's part of what we, that's our job is to align evidence to practice. (DC, Hospital Emergency Department CNE)

The two CNEs worked together, attending the E2E collaborative meetings and working with E2E leaders and other RHA and academic participants to build from existing materials (which were widely available thanks to organizations like the Surviving Sepsis Campaign) to develop regionally standard Sepsis Guideline Set materials and supports for use in sites across Select Health. Together the two CNEs began working with the Select Health Clinical Policy Office staff to create and formalize the regional Sepsis Guideline Set, pre-printed

order, and nurse-initiated order – all of which are considered Clinical Decision Support Tools - following the Region's standard development process.

Developing Plans and Supports: Getting Ready for Implementation

As Figure 5.1 depicts, development activities – those oriented toward preparing materials and processes for implementation – began prior to the move to program management in 2009 and extended to 2011/12. The development work began in 2008 under the volunteer leadership of the two site CNEs described above - as a logical extension of their collaboration with E2E. When the Emergency Medicine Program was established in Select Health, the authority for Sepsis Guideline Set implementation fell under the program Medical Director and Clinical Nurse Specialist (CNS), though the two CNEs remained involved.

Standard Clinical Decision Support Tool Development Process. The Clinical Policy Office team members guided development of Clinical Decision Support Tools following process organized into three phases they named: develop, review, and publish. The various activities within each phase are summarized in Table 6.1.

Table 6.1

Clinical Decision Support Tool Development Process

Development Stage	Activities
Develop	• Register initiative • Conduct gap analysis – need for Clinical Decision Support Tool (CDST) • Develop Shared Work Team (SWT) • Review best practice • Develop content • Develop implementation plan • Draft CDST
Review	• Seek and obtain stakeholder feedback • Review feedback • Finalize content; confirm medications • Submit for approval, follow-up, approvals
Publish	• Establish go-live date • Finalize arrangement with Clinical Policy Office, Forms on Demand, Order-entry • Go-live, fan-out communication activities • Initiate implementation plan • Confirm implementation/review on 3-year basis

Note. Adapted from Clinical Policy Office materials November 2015.

The Clinical Decision Support Tool development process was triggered, either through management direction or voluntarily, by the establishment of a Shared Work Team – intended to be a multi-site, multi-disciplinary group with named individuals overseeing the clinical content of the developing Clinical Decision Support Tool.

> So, we take the guidelines on we go back and then we have to figure out, sort of, the scope of who is going to sign off on whatever we suggest. So, looking at what we have as best practice, develop a Shared Work Team, log the development of said team through the Clinical Policy Office to make sure somebody isn't also doing the same work. And then we go through - if there's medications involved, it has to go through pharmacy review. If there's a lab work involved it goes through a lab review - all that

> kind of stuff. But essentially it goes through a final sign off at the director level as well as the medical director and they approve what you've written, like yeah, that seems to be in line with what we know, and good practice and we can move forward with what's in there. And then it comes down to us to figure out how it rolls out. (DC, Hospital Emergency Department CNE)

Once the Shared Work Team had registered their initiative with the Clinical Policy Office, the office team drew together available information and evidence and initiated a development and review process to ensure rigour and help to create buy-in across the organization.

> It ensures that anyone that would be impacted by a tool could provide feedback on it. And that's really engaging the right people, getting the right people at the table, providing feedback, making changes if they're necessary and then from there, it goes back to the Shared Work Team to make those discussions about how they're going to be addressing the feedback. We've kind of got, it's almost like we're an octopus, we kind of, you know, reach out to a multitude of different groups and we work with them to get the tool finalized. (RLS, Clinical Policy Office Team Member)

Contacts, including relevant clinicians and support team members who might be impacted by the Clinical Decision Support Tool, were identified and accessed by the Clinical Policy Office based on a stakeholder impact assessment for the proposed Clinical Decision Support Tool. For pre-printed orders, formal involvement and sign-off was required from the region's pharmacy department. Clinical Decision Support Tools involving specific diagnostics and/or response times needed to have formal sign-off by the region's Laboratory and/or Diagnostic Imaging leaders.

The Clinical Policy Office operated an electronic portal and repository on Select Health's intranet to facilitate the Clinical Decision Support Tool development process and to enable access to Clinical Decision Support Tools once they are finalized. Templates were available for various types of decision support tools and the team assist the Shared Work Team with evidence collection and assessment, and with aspects of the development process including team development, stakeholder assessment and contact, formatting, communication and implementation planning and evaluation. A Clinical Decision Support Tool process guideline assisted developers through these various processes. While the Clinical Policy Office arranged and supported the elements of the Clinical Decision Support Tool development and dissemination, the process and content remained very much "developer-led." The members of the Shared Work Team did not delegate development to the Clinical Policy Office, they continued to own and lead the content and development process.

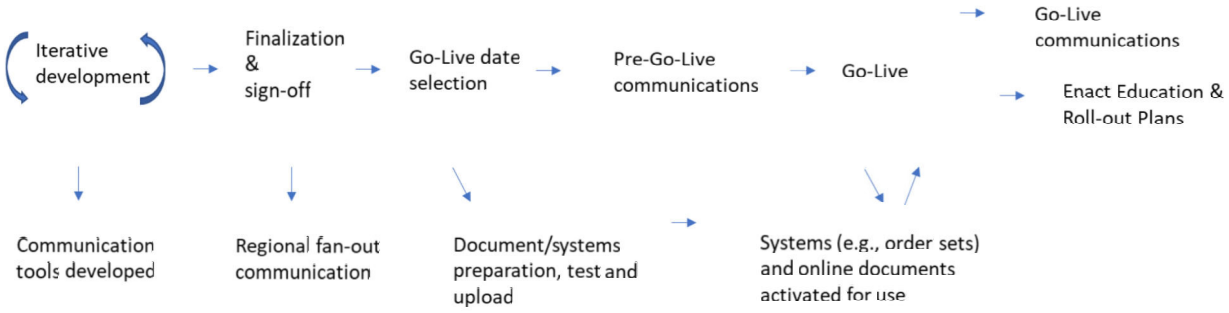
Select Health had achieved a modest degree of automation in processes related to Clinical Decision Support Tool use. Pharmacy order sets could be built in the organization's Clinical Information System to improve efficiency and reduce the chance of transcription error. The region's Health Information Management Services offered "Forms on Demand" which enabled a Clinical Decision Support Tool to be printed and attached to the patient's chart with appropriate patient information imprinted on the document. The Clinical Policy Office provided the Shared Work Team with required liaison services to enable these functions to be realized as appropriate.

The standard process of development, which could take anywhere from 3 months to over a year, (depending on priority, Shared Work Team involvement and degree of feedback) ended from the Clinical Policy Office's perspective when the Clinical Decision Support Tool was communicated, "fanned out," to relevant departments and stakeholders. The Clinical

Decision Support Tool was uploaded as final on the Clinical Policy Office's SharePoint™ site and order sets and Forms on Demand were activated. A depiction of the Clinical Policy Office's standard development and implementation process is provided in Figure 6.2.

Figure 6.2

Clinical Decision Support Tool Development and Implementation Process



For the Sepsis Guideline Set implementation process, a Shared Work Team was established that was initially comprised only of the two CNEs (from City Hospital and Site 2). When program management came into effect, the Shared Work Team was expanded to include one of three Emergency Medicine Program Directors, and the newly appointed program Clinical Nurse Specialist (CNS) and Medical Director. The Shared Work Team

True to the Clinical Policy Office process, considerable work was invested by the Shared Work Team, using templates available through the E2E collaborative, toward the development of regional Clinical Decision Support Tools. Clinical Decision Support Tools included a guideline statement in alignment with published directions at the time, and four supporting tools:

- An automated approach to identify patients who have sepsis-like illness,
- A pre-printed order meant to guide physician and nurse activities and orders for the suspected sepsis patient,

- A nurse-initiated order enabling nurses to authorize specified activities upon suspicion of sepsis, and
- Performance measures and scorecards to enable provincial, regional and local Sepsis Guideline Set implementation progress monitoring.

Sepsis Case Identification. Early in the development process, in 2008, the two CNEs recognized the need to be able to identify in "real time" and record potentially septic patients so that key actions could be triggered as quickly as possible, and to enable subsequent performance tracking. The process of tracking potentially septic patients was challenged by the fact that clinicians would often categorize patients based on the underlying infection they suspected, rather than the inflammatory response to the infection (sepsis). To overcome this challenge, the two CNEs worked with the Clinical Information Systems team to establish an emergency department diagnosis: "sepsis-like illness" that could be entered electronically. While this was somewhat unconventional as a diagnosis it was the best way the two CNEs could find at the time to trigger the early intervention response as the electronic entry could be programmed to automatically engage decision-support materials including nurse initiated orders. Sepsis-like illness was identified based on the Systemic Inflammatory Response Syndrome (SIRS) criteria – a set of evidence/consensus-based criteria that were best known for sepsis identification at the time (Levy et al., 2003; Shankar-Hari et al., 2016).

> Select Health kind-of illegally added to our [clinical information] system. We added sepsis-like illness as a chief complaint and basically started looking at sepsis as a disease – or at least in the emergency department as a disease unto itself. We ask at triage whether this patient could be septic and, if so, we do stat bloodwork. Over the years, this kind-of got entrenched as more hospitals started doing it. If you make a

> change for one hospital, you make a change for all the hospitals in terms of the way the computer system works. We developed nurse-initiated orders, but those came later. (DC, Hospital Emergency Department CNE)

Pre-Printed Order. The two lead Select Health CNEs worked with the Clinical Policy Office to iteratively develop a regional sepsis guideline set and a pre-printed order meant to standardize and simplify sepsis care and orders in the region's emergency departments. The Guideline Set described the clinical decision-making flow for sepsis care while the pre-printed order enabled nurses and physicians to quickly signal the patient for sepsis care while ensuring evidence-based orders for laboratory testing, medications and fluid management.

There was no shortage of materials from which to build. Several sites across Select Health had done initial work on sepsis care and the E2E initiative drew extensively from documents available through advocacy organizations like the Surviving Sepsis Campaign. For the most part, the development process went positively, though the developers faced modest frustration with Clinical Policy Office feedback and sign-off processes as a plethora of input arrived from Pharmacy Department stakeholders. At the time, the leaders of the regional Pharmacy Department promoted widespread involvement of local Pharmacy Leads in the development of pre-printed orders. Unfortunately, the process offered little direction as to how developers might move toward a final solution when contention arose, as it did when working with the region's local Pharmacy leads to determine the most appropriate antibiotic choices for the pre-printed order.

> This caused a great debate. You got 12 very divergent opinions. Then I have to go and look up what the references were for these opinions. Right now we're on something like version H of the protocol. I don't know how many million drafts there

> were. Each pharmacist would give a different opinion. They wouldn't necessarily tell the other pharmacist in the other sites what their opinion was. The local Pharmacy committees at one end were saying "no, no, no, we should have this, this, and this." And then at the other end they're saying "no, no, no, we should have that, that, and that." And the guys in the middle are, like "well, you can do this or this, we could put them both down." So, we struggled getting consensus opinion from them. But they seemed to have come back with something that they're alright with. (DC, Hospital Emergency Department CNE)

From the perspective of the two CNEs, Clinical Decision Support Tool development interaction with the region's Laboratory Department was less problematic. Meeting response time standards became an improvement issue later in the implementation process, but the standards expressed in the guidelines themselves were consistent with normal Laboratory Department operations and were not contentious. While the region's Laboratory Department was not supportive of the CNE's first proposal for "point-of-care" lactate testing to help meet the guideline-based turnaround times, they did work to automate the ordering process and to ensure quick specimen-collection response. This response was satisfactory to the CNEs and was more in keeping with the Laboratory's mandate and quality assurance practices as they had generally found point-of-care testing to be difficult to assess and monitor for reliability.

In 2009/10 the finalization and movement toward implementation of the regional Sepsis Guideline Set and pre-printed order was reinforced by the formalization of implementing the sepsis guideline as a quality improvement priority under the organization's new Emergency Medicine Program and, soon thereafter, as the provincial Ministry of Health pursued a new Clinical Care Management (CCM) strategy.

Nurse-Initiated Orders. In 2012, the establishment and support of nurse-initiated orders derived from the pre-printed order, was a critical element of facilitating a practical, timely response toward fulfilment of the sepsis guidelines. The nurse-initiated orders presented a set of activities, treatments or diagnostics that could be started by nurses prior to physician involvement. Nurse-initiated orders enabled clinical teams to quicken response times -particularly in cases, like sepsis, where evidence suggests the time to treatment matters.

Since Select Health had long implemented a system of triage by nurses within their emergency departments, considerable focus was placed on early identification of potentially septic patients during triage and the quick, systematic response initiated by the triage nurse staff to meet key elements of the guidelines. A checklist was developed by the Shared Work Team and automated regarding the following guideline elements:

- Triage rating (Canadian Triage and Acuity Scale (CTAS) of 1 or 2 depending on severity),
- Monitoring of vital signs,
- Lactate measurement,
- Blood culture to assess and type infection in advance of antibiotics, and
- Initial application of fluids.

> The other big piece of work was standardizing it in our electronic system, so we had an order-entry of the labs and diagnostics that needed to be ordered as a set. So, a nurse didn't have to pick every single lab or diagnostic that was required. It was in what we called an "order set." They just had to pick the sepsis order set, "sepsis-like illness" we called it. (RLS, Regional Program/Service Network Lead)

The nurse-initiated orders established a quick, standard response triggered by identification of someone as potentially septic. The orders were automated so that they became available automatically within the Select Health clinical information system when sepsis-like illness was entered at triage as an emergency department diagnostic code.

Performance Measures and Scorecards. In 2012, the BCPSQC was able to publish a data guide for Sepsis Guideline Set implementation monitoring comprised of five indicators:

- In-hospital mortality rate for patients investigated for sepsis in the emergency department (ED), stratified by level of risk,
- Percentage of patients with antibiotic received by time goal specified in Sepsis Guidelines,
- Percent of patients with confirmed severe sepsis/septic shock or admitted for Intravenous (IV) antibiotics with blood cultures taken before antibiotics,
- Percent of patients with confirmed severe sepsis/septic shock with 2nd litre of crystalloid initiated by time goal as specified in Sepsis Guidelines, and
- Percent of patients with appropriate lactate measurement by time specified in Sepsis Guidelines (British Columbia Patient Safety and Quality Council, 2012).

Select Health took an early interest in moving forward with Sepsis Guideline Set measurement. In fact, participants from the BCPSQC considered Select Health to be a leader among the province's RHAs in measurement. The organization's level of automation, while not considered ideal, offered sufficient information to apply the SIRS criteria to identify potential sepsis patients.

> We did a lot of work so that at least at triage we could identify patients who were hypertensive, or tachycardic, or febrile, and match it to some of their laboratory data so if they're lactate high and so that was helpful in terms of us only evaluating data that was truly sepsis. (RLS, Regional Program/Service Network Lead)

While automation enabled a listing of potential sepsis patient candidates, verification and follow-up was conducted manually through chart audit, a labour-intensive data-gathering approach where each patient's chart had to be pulled and reviewed manually. Data elements were found in a variety of locations within the chart and sometimes required clinical knowledge to find and/or interpret. Fortunately for Select Health, a registered nurse became available and was interested in conducting this review just at the time the Program Leads and Director were deliberating how best to manually collect the information required for monitoring BCPSQC Sepsis Guideline Set implementation. Resources from the Emergency Medicine Program were identified in 2012 to enable a Nurse Analyst to take on this role – a role she continues to fulfill today.

The Nurse Analyst worked closely with the Program Medical Director, and the Program Clinical Nurse Specialist (CNS) to develop the logic and approach for data collection. They worked with the organization's analytics team - Healthcare Business and Analytics – to establish a mechanism for drawing potential sepsis charts, for pre-loading data that was available electronically, and for receiving and processing data input by the nurse analyst.

According to an AAP quality lead, Select Health gained a reputation on the CCM Steering Committee as the most effective and timely reporter of ongoing provincial monitoring measures. The measurement work also proved helpful in informing the organization's ongoing facility-by-facility implementation of the guidelines. Again, with the

help of the Select Health Healthcare Business and Analytics team, the data collected was effectively transformed into a report card format for each Select Health facility. On a fiscal-period basis (a fiscal quarter is divided into 3-4 periods – totalling 13 periods per year) each of the 12 emergency departments received their sepsis outcome (mortality rate) and performance (antibiotic timing, blood culture before antibiotics, lactate timing, administration of 2nd litre of crystalloid) measures for the prior period. The report card came with confidential identification of patient codes, so it was possible, for quality improvement purposes, to refer retrospectively to individual patients and their charts to better understand factors affecting performance. Due to the time required to produce the report card, retrospective review lagged the actual incident by several weeks. The report cards were circulated each period to each facility's Emergency Department Director, Manager and Clinical Nurse Educator (CNE) for review and follow-up as part of Select Health's implementation and quality assurance process.

Assessing and Activating: Communicating Through Organization Structure

As program management was initiated in 2009, the new Emergency Medicine Program slowly acquired a regional leadership team who reinforced the importance of sepsis management improvement and worked alongside the CNEs to finalize and implement the guidelines and supporting tools.

> The provincial Sepsis Network, they got started, I believe, in 2011 and 2012. It kind-of tied nicely with the beginning of my role as a quality standardization person for Select Health. I had the time finally and the span of control in my role to actually link into what the province was doing. We were in the new program structure at the time, so we had a regional medical director who very strongly advocated to implement the

> sepsis guidelines that the province was promoting, in our twelve emergency departments. (RLS, Regional Program/Service Network Lead)

With its new mandate to lead Sepsis Guideline Set development and implementation provincially, the BCPSQC appreciated Select Health's Emergency Medicine Program regional leadership and their apparent direct-to-site authority.

> So, for example, there's an Emergency Medicine Program, right? There's one person who's head of that program for all of Select Health and each hospital had representation from their hospitals to this central program. So, it seemed like, for example, within Select Health, dissemination and buy-in was easier. If whoever was in-charge of that program said this is going to happen, it's going to happen." (AAP, Quality Lead)

The Sepsis Guideline Set implementation initiative was, indeed, taken up as a priority by the Select Health Emergency Medicine Program leadership. In 2011 the program Executive Director, Emergency Department Directors and Medical Director all recognized that the Sepsis Guideline Set was to be implemented and began to put the processes and supports in place to move it forward.

> It was somewhat mandated by the Minister of Health that we would implement sepsis guidelines. Not that we wouldn't want to, but as you can imagine, there's a lot of competing priorities. Basically, we took the information from the BC Patient Safety Council and there already were sepsis guidelines around. Plus, the Ministry mandated that there would be reporting on sepsis data that was collected on outcomes, on times, etc., etc., which everybody in the province was supposed to do. So that was also an important incentive for us to

> try and comply with those initiatives. (RLS, Regional Program/Service Network Lead)

The program management structure placed operational authority with the program leaders (Emergency Medicine Executive Director, Medical Director, Directors, Managers, supported by the CNS) with operational responsibility for Sepsis Guideline Set implementation.

Most participants described the structure as positive in ensuring focus on quality improvement through achievement of standards, including the Sepsis Guideline Set. A Select Health executive team member, for instance, described the program management structure as having been good for "recruitment, standardization, and quality." Other participants had similar views.

> There were some things that programs did very well. Programs, for example, standardized a lot of things like the pre-printed orders. "These are the pre-printed orders that need to be used in all of the sites." It brought some of these specialist groups closer together, particularly some groups like surgery. By doing that you cause some standardization of procedures, techniques, policy, processes. It allowed, I think, people to see variations in care. (RLS, Regional Quality Improvement Department Lead)

Communicating Through Structure. In addition to providing a mechanism for decision-making with respect to priorities, Select Health's structures enabled paths for clear and consistent communication about the Sepsis Guideline Set as a priority for implementation. The program's reporting relationships, accountabilities and committee structures provided mechanisms for communication across the organization in two-way fashion – "from up above" (flowing from senior leaders to front line leaders) or "down

below" (flowing "up" to senior leaders from front line leaders). It was notable that participants could consistently describe the program's role relationships and how information was to flow among them.

> All of these things would, for argument sake, whether it comes from "down below" or from "up above", they would go through various committees such as Health Authority Medical Advisory Committee, local department meetings, regional department meetings, etc. My view of the most important role for leadership, whether it's local or regional, is the dissemination of information above and below. And so, the local department heads feed up to the regional department input from their members and, conversely, notify their members of information coming from higher up the food chain. (RLS, Select Health Executive Team Member)

In 2009 Select Health created a committee structure to complement the organization structure, enabling appropriate involvement and collaboration in communication and decision-making. Figure 6.3 provides a summary of some of Select Health's most relevant committee structure that pertained most directly to the Emergency Medicine program and Sepsis Guideline Set implementation.

Figure 6.3

Program Standing Committee Structure 2011-2015

Each of the committees or groups met monthly with broad involvement to ensure that leaders were connect to support:

- Administrative decision-making and action, through the Emergency Department (ED) site managers
- Clinical decision-making and action, through the ED CNEs
- Medical decision-making and action, through the ED Chiefs

The Select Health Executive intentionally built considerable overlap in participation among the various program committees with clear, connecting roles identified for the CNS and the Program Medical Director.

> We have monthly meetings with our operational team which is the managers and directors from all the emergency departments. We have monthly meetings with our emergency physician heads, chiefs. We have monthly meetings with our educators. I attend almost all of them. The physician ones I attend ad hoc. [The program medical

> director] is kind-of the lead of that, our physician, so I only attend if I need to talk about a certain initiative we're doing. But all the other ones, I'm kind-of the link, the glue between them all, and making sure that things are developed in a very standardized approach. (RLS, Regional Program/Service Network Lead)

Participants pointed to their respective committee(s) as the key conduits through which they came to understand about Sepsis Guideline Set prioritization and about its subsequent implementation expectations, processes and tools. While participants recognized that meeting time was significant, most indicated that they were important to ensuring strong working relationships and information flow across the region and among various roles and functional streams.

Change in Structure, But Not Focus. In 2015 a new Chief Executive Officer moved the organization back to a structure oriented toward site/community autonomy and integration. While the new structure strengthened site/community authority, Select Health retained a region-wide Emergency Medicine structure. The Emergency Medicine Program was renamed the Emergency Medicine Network. While no longer having operational authority, the Emergency Medicine Network continued to steward standards and quality improvement and to guide implementation. Some participants saw this change as a diminution of the authority of the program and program leaders. However, most participants were reconciled to the importance of greater site/community authority for leadership, culture development, and service integration. Most participants were positive about the change, indicating that little momentum had been lost in Sepsis Guideline Set implementation as a result.

With consistent staffing and retention of a variety of structures including regular regional committee meetings, the Emergency Medicine Network was able to maintain

momentum and continues to be seen broadly today as the organization's most functional network.

> And, in all fairness, those systems were in place prior to reorg so they were in place with the program management structure and I think we leveraged that as a network and really begged participation across the system that we didn't throw it all away because it was a place for us to support knowledge transfer. In the absence of that, we didn't have a place for that to occur. (RLS, Regional Program/Service Network Lead)

Promoting Inclusiveness and Relationship. The previous sections highlight the importance attributed to structure by Regional Leadership and Support Team participants. But some participants emphasized other aspects with a tendency toward flexibility, greater inclusiveness, and relationship. City Hospital site leaders, particularly, recognized the importance of the Program/Service Network structure but highlighted the importance of deeper relationships and integration, particularly at the site.

> I spent the past two-and-a-half years [timespan of roughly 2015-2017] trying to establish a community of physicians and operational partners that would be able to discuss problems with each other and create a sense of community in the hospital. (RLS, Hospital Medical Leader)

Participants noted that relationships build over time, and that trust among team members is critical. Several clinician participants noted that relationships and trust are often strained among clinicians and management due to frequent turnover of the operational managers with whom they work.

> The most important thing you need at an institution is the belief that everyone is rowing in the same direction. I mean it's very simple, trust between colleagues that you're trying to achieve the same endpoint and that your silos are actually aligned.

> Trust is built through relationship, people need to know who their colleague is. Docs are lifers. Wherever a doc goes they end up staying for the rest of their lives. But operational leaders are more transient. When a person is shuffled the relationship gets shattered, and there's a bit of grieving that goes on. So, you know, that breeds mistrust of the senior leadership team. (RLS, Hospital Medical Leader)

Study participants, particularly those at the site and DC levels, described the importance of having a shared vision of what improvement could be made in sepsis outcomes, and relationships sufficient to enable all teams to work through differences and to know that, once agreed, each participant and team could be trusted to do their part.

Prioritizing: Deciding and Resourcing a Regional Priority

The prioritization of Sepsis Guideline Set implementation by Select Health was formalized during the executive's Program Quality Performance Committee in June of 2012. The importance of executive prioritization was a tone set explicitly by a Select Health executive member, as they explained that a select number of priorities must be "driven from the top." RLS members concurred that explicit prioritization – ideally in alignment with government direction - was critically important, particularly to ensure focus and to obtain resources to support implementation.

> The best success, I think, the reason why this has worked so far, is because we've had the senior executive support, right. So, this has been mandated, that we implement this tool and then they put the resources into it, right. Having that makes so much difference. When you go to the units or you go to the sites, everybody's aware that this is coming and where it's coming from and it's not just like, "hey, what do you think? Would you like to try this?" There's just more buy-in. (RLS, Regional Quality Improvement Department Lead)

Participants felt that a government mandate helped to reinforce a synergistic relationship between the profile of the issue and its implementation and success, and the broader provincial and public context.

> If it's not a priority Ministry of Health-wise, no one's going to give you resources to do those. So, it really needs to come as a priority from a very strategic place. And the reason for it being a priority needs to be really clear. (RLS, Regional Program/Service Network Lead)

The concept of drawing and maintaining attention in the face of ongoing workload and other competing priorities was a common theme among interview participants in favour of clear prioritization.

Executing Plans: Following Standard Implementation Process

By 2012, two Select Health CNEs had worked with E2E to originate interest in sepsis care improvement and to undertake early development work toward a regionally standard Sepsis Guideline Set and supporting Clinical Decision Support Tools. Program management had also taken root and the work of the CNEs was aligned, prioritized, and activated/communicated under the auspices of the Emergency Medicine Program. Following Clinical Policy Office process, the Decision Support Tools were finalized. The Shared Work Team, now fortified with Program leadership, was prepared to move to the second stage of the Clinical Policy Office process, Implementation.

Standard Implementation Process. The Clinical Policy Office did not oversee the implementation of the Clinical Decision Support Tool beyond initial fan-out communication. The Clinical Policy Office did, however, require the completion of an implementation plan as part of the Clinical Decision Support Tool development process. The implementation plan fell under the auspices of the Shared Work Team and is comprised of four sub-plans:

- Resource plan
- Education plan for practice change
- Access and roll-out plan
- Communication plan (Clinical Policy Office, August 2016)

The process involved a variety of group and individual activities surrounding and following a selected regional go-live date. There was recognized variation among the various Select Health sites but, in principle, all sites proceeded with implementation at the same time.

> We set a timeline, we put an implementation date and then typically we'll have regular connection and huddles during that period. Lots of prompts, lots of reminders. Here's how we're doing; this is what we need you to do. We check in with places that are being challenged. (RLS, Regional Program/Service Network Lead)

The organization of implementation around a go-live date was largely driven by the need to align communication and training activities with availability of new forms and order sets that are automated; they needed to be uploaded or turned on at a specific time. The go-live date was established by agreement among Shared Work Team members, taking into consideration other local and regional activities and priorities and in conjunction with the Clinical Policy Office and Information Technology departments who needed to be involved.

> All our forms are in an electronic filing cabinet on the computer, so we'll tell them that this form number is being replaced by this draft and they'll tell us we can upload it on this day and then we distribute out to say on Wednesday – it always happens on Wednesday – whatever date, you'll find your new order set. Go-live is then. (DC, Hospital Emergency Department CNE)

By mid-2012, the Sepsis Guideline Set and related tools were published and communicated according to Clinical Policy Office standard. Communications about the upcoming change and go-live date began well prior to the actual go-live date as efforts took place to ensure that clinicians were not taken by surprise. A month prior to go-live the City Hospital Emergency Department CNE and Emergency Department physician Chief of Staff began communicating with Direct Care participants (nurses and Emergency Department physicians involved in providing direct care in the Emergency Department). The CNE joined the Chief of Staff at a physician emergency department meeting to review the Sepsis Guideline Set and related expectations, the pre-printed order, the nurse-initiated orders, and the systems supporting their use. The CNE undertook similar activities with the Emergency Department nurses but given the large number of nurses (approximately 500), the busyness of the department, and the realities of 24/7 operation the strategies were briefer, more varied, and exercised over a longer time frame.

On the go-live date, and for a period thereafter, the CNE undertook an educative strategy involving in-service huddles, increased personal support "on the floor," and communication reinforcement through the *Weekly Rant,* the department's weekly newsletter. For the Sepsis Guideline Set implementation huddles of approximately 15 minutes were held beginning between 6:30-6:45 am. Repeated sessions would be held – first to involve staff finishing a night shift, then to involve staff beginning their day shift. "For sepsis, it would've been a 15-minuter. We'd bring the actual order set down and discuss what's on there" (DC, Hospital Emergency Department CNE).

In-services were opportunistic, engaging staff members who were able to free themselves for the 15-minute session. Because City Hospital's busy Emergency Department sees little down-time, the process of in-service was carried on over approximately a two-

week period. During the same time the emergency department CNEs made themselves available to guide staff members in the use of the new materials and to respond to questions or issues that arose.

Collaborating: Working with the Quality Council. For the British Columbia Patient Safety and Quality Council, 2012 was a formative time as the Clinical Care Management (CCM) initiative got underway. Steering, expert advisory, and measurement groups were established to oversee and advise all twelve of the CCM improvement priorities including implementation of the Sepsis Guideline Set initiated earlier by E2E. Given the work that had already been done, the BCPSQC primarily needed to revise and brand the early Sepsis Guideline Set, develop outcome and process performance measures for period-by-period reporting, and migrate the E2E collaborative into a renamed province-wide "Sepsis Network." The BCPSQC Sepsis Network was a provincial collaborative and was different from the Select Health Emergency Medicine Network that formed from the Emergency Medicine Program during the 2015 reorganization. The *Sepsis Guide* document that communicated important information about the Sepsis Guideline Set and measurement processes was released on April 27, 2012. The BCPSQC Sepsis Network was kicked off in June 2012.

With the finalization and dissemination of the BCPSQC guidelines early in 2012, the BCPSQC Sepsis Network first focused on ways to promote the work and to encourage participation. The Global Sepsis Alliance (GSA) World Sepsis Day was a natural opportunity for the BCPSQC to organize around for its promotional and improvement activities. In 2012, BCPSQC began with a poster campaign – providing informative and creative posters regarding sepsis to be posted in Emergency Departments across the province. Select Health and City Hospital participated in the campaign.

> We sent posters out to every Emergency Department around the province and a funny anecdote is that even today whenever I have a friend or a colleague who ends up in Emergency department for a personal visit, they often will send me a picture of some of our resources and tools that they see still on the walls today. (AAP, Quality Lead)

By 2013, the BCPSQC Sepsis Network was well underway and drawing from the supports available through the BCPSQC to develop communications and implementation support materials, while continuing to refine the guidelines and tools based on feedback and emerging evidence. As results and feedback began flowing to the BCPSQC through the Sepsis Network, a clear line of concern began to arise. Consistent with feedback from other initiatives and the literature, facilities were finding through their audits that the pre-printed orders were not being used as much as anticipated given estimates of likely sepsis volumes.

> But we had a challenge with how does the frontline clinician remember to use the pre-printed order and how do they actually complete it? Because, again, in that initial phase, often a physician doesn't want to actually use it because they're still not exactly sure the patient has sepsis. They don't want to go down that path. But that takes up time. So how do we get more buy-in, get more people to use the pre-printed order? I was part of the provincial network team, and we strategized how we could get more people to use pre-printed orders for sepsis? One of the ideas was this 150 Lives challenge. (RLS, Regional Program/Service Network Lead)

To address Sepsis Guideline Set awareness and use, including the use of the pre-printed order, the BCPSQC designed and executed an initiative entitled "150 Lives in 150 Days" announced on World Sepsis Day - September 13, 2013. The initiative is well described by McKeown, Krause, Shergill, Siu, and Sweet (2016). The initiative drew from evidence-based sepsis morbidity and mortality estimates to establish a benchmark that one

life is saved by every four times patients are appropriately assessed using the sepsis protocol. Over a 5-month period (150 days) participating Emergency Departments tracked and reported a variety of metrics related to sepsis guideline use. The objective was, based on the benchmark, to "save" a target of 150 lives through sepsis protocol use during that time. BCPSQC monitored progress and introduced a variety of gamification principles to enlist, encourage and celebrate participation and results. The provincial 150 Lives target was reached by March 2014. Positive qualitative and quantitative findings were reported (McKeown et al., 2016).

Select Health took on the 150 Lives in 150 Days challenge, with participation across larger Emergency Departments, including City Hospital's. The initiative was seen as a success by the regional leadership.

> The 150 Challenge pitted sites against each-other and we used Select Health as a whole in terms of every time you actually use a pre-printed order for sepsis, you filled in this card and completed the challenge. We collected cards for the challenges as part of the game. We had some pizza and stuff like that. We actually did really well in Select Health. I think we were one of the top for the province. We had increased awareness. It encouraged people to understand: this is sepsis, this is what we're doing, and if you show you used a pre-printed order, we could win a pizza party. Little things like that help increase awareness. It was a strategy and it did help us use more pre-printed orders. (RLS, Regional Program/Service Network Lead)

The BCPSQC continued sepsis awareness activities and Sepsis Guideline Set promotion during 2013 and in subsequent years. 2013 and 2014 saw a variety of learning sessions in webinar format that were referenced by Select Health staff and members of the City Hospital Direct Care team.

> I know between 2013 and 2014 there were six different learning sessions and so these would be available to anyone in the network or beyond who was interested. They were typically done on sort-of a WebEx type of platform. (AAP, Quality Lead)

In the years following, a sepsis "quick reference card" (2014) and a "cinemagraph" (2015) were released by the BCPSQC. These items were not specifically referenced by study participants, suggesting that they had not been particularly influential for Select Health.

Throughout 2015 the BCPSQC and members of its Sepsis Network turned their attention to the admitted inpatient as a new focus for sepsis management improvement. For years, sepsis had been a significant focus for Emergency Department physicians and clinicians and they were of the impression that sepsis management had been significantly improved. Concern was being raised within and beyond Select Health, however, that worrisome, preventable sepsis morbidity and mortality continued to be seen, not in the emergency department, but in the hospital's own inpatient services.

> We're still catching these people at the front door, but then you start to see this other group of individuals. And you're, like, "okay, that's weird, that guy is really sick. He looks like sepsis, feels like sepsis, but he came from the ward. What's going on?" Now we have this group of individuals inside our facilities who had surgery. They came out and, for the first eight hours, they were doing okay. But now they're not so well anymore. And it was weird. We saw lots of sepsis in ED practice in the 90's and now were seeing it again and the nurses didn't quite know what it was. (RLS, Regional Quality Improvement Department Lead)

In keeping with this shift in focus, the BCPSQC team developed guidelines and a toolkit for the management of sepsis on inpatient wards. The guidelines and toolkit were launched on September 13, 2016.

> And 2016, we launched the inpatient sepsis toolkit. So, a resource that we had put together that included updated guidelines for people to recognize and treat sepsis on hospital wards. That was part of a year-long collaborative pilot project where we worked with seven or eight teams from around the province and helped them test different ways to recognize and treat sepsis on inpatient wards. And then we took the tools and resources developed through that pilot project and launched them on World Sepsis Day in 2016. (AAP, Quality Lead)

In February 2016, the results from the third international consensus conference on sepsis and sepsis definitions were reported as Sepsis-3 (Shankar-Hari et al., 2016). The BCPSQC began work to assess the impact of new definitions and evidence to update the guidelines for Emergency Department sepsis management. Updates were made through the subsequent year and were released on September 13, 2017.

One participant noted that by 2017 the Emergency Department Sepsis Guideline Set implementation had lost much of its original focus and attention. Changes were impending given the Sepsis-3 consensus conference, and the Ministry of Health rescinded its directive regarding mandatory reporting. New priorities came to the fore, including mandatory response to significant morbidity and mortality resulting from opioid overuse.

> R: Did you just say the regional network currently doesn't seem to have put a lot of focus on revising and moving forward more on the sepsis?
>
> I: No. So, the overdoses kind of have taken the front for a lot of people. (DC, Hospital Emergency Department CNE)

While refocusing Select Health Emergency Departments on opioid overdose response made sense, this reality affecting Sepsis Guideline Set implementation speaks to the dynamic nature of CPG evidence and the organization's often-changing priorities.

Monitoring and Reviewing Performance: What Happened?

Once site CNEs and Chiefs of Staff had taken on the education and implementation of the Sepsis Guideline Set, the regional leaders – the Program Director, Medical Lead and Clinical Nurse Specialist, focused on support efforts related to ongoing communication, monitoring, and reporting using the Sepsis measurement scorecards. Scorecards were circulated on a period-by-period basis providing outcome and process performance metrics for each Select Health site and for the region as-a-whole. BCPSQC and Ministry of Health Leads, Select Health Executives, site Executive Directors and Medical Directors, Emergency Department Directors, site Emergency Department Managers and Chiefs of Staff, and Clinical Nurse Educators all received the scorecard information for review at relevant internal and external (e.g., BCPSQC Clinical Care Management) committee meetings. Site leaders were free to follow-up as they deemed appropriate.

Regional support was provided largely through the program committee structures described earlier. On rare occasions either the Medical Lead or the Clinical Nurse Specialist (or both) joined their Chief of Staff and CNE counterparts at individual sites – including City Hospital – to reinforce the importance of the Sepsis Guideline Set and to help with follow-up with individual clinicians when individual cases were reviewed. For the most part, while site Managers received adherence scorecard information and discussed progress at the Program Operations Committee, site CNEs were seen by the region's leaders as the primary implementer at the site level. As described in the Select Health Program Quality Performance Committee minutes for August 2014: "Sepsis orders have been revised to identify and prioritize fluid resuscitation and antibiotic administration. CNE's will continue to highlight this population of patients as one to focus education and improvements."

When asked about Sepsis Guideline Set implementation performance, Regional Leadership and Support Team (RLS) participants offered two categories of response:

- Quantitative assessment based on their overall interpretation of the scorecard measures of sepsis mortality outcome and guideline adherence measures; and
- Experiential reflection related to the process of Sepsis Guideline Set Clinical Decision Support Tool development and implementation through site CNEs and physician Chiefs of Staff.

Based on scorecard measures, participants in RLS roles were well aware of a consistent, perplexing result: Select Health and individual site (including City Hospital) sepsis mortality measures were comparatively strong – even modestly improving – while measures were in place (period 7 2013/14 to period 4 2016/17), while individual guideline adherence measures were disappointing. Table 6.2 provides a summary of scorecard results for the region overall and for City Hospital. The Analytics team provided the same summary level of statistical analysis to Select Health teams through the period scorecards.

Table 6.2

Summary of Scorecard Measures for Select Health and City Hospital 2013-2017

Key Performance Indicator	High	Low	Average	Target
Select Health Regional*				
Sepsis 1: In-hospital mortality rate for patients investigated for sepsis in the Emergency Department (ED), stratified by level of risk	35%	0%	8%	N/A
Sepsis 2: Percentage of patients with antibiotic received by time goal specified in Sepsis Guidelines	45%	5%	26%	80%
Sepsis 3: Percent of patients with confirmed severe sepsis/septic shock or admitted for IV antibiotics with blood cultures taken before antibiotics	94%	59%	75%	90%
Sepsis 4: Percent of patients with confirmed severe sepsis/septic shock with 2nd litre of crystalloid initiated by time goal as specified in Sepsis Guidelines	33%	0%	15%	80%
Sepsis 5: Percent of patients with appropriate lactate measurement by time specified in Sepsis Guidelines	41%	8%	35%	80%
City Hospital*				
Sepsis 1: In-hospital mortality rate for patients investigated for sepsis in the Emergency Department (ED), stratified by level of risk	67%	0%	6%	N/A
Sepsis 2: Percentage of patients with antibiotic received by time goal specified in Sepsis Guidelines	67%	0%	24%	80%
Sepsis 3: Percent of patients with confirmed severe sepsis/septic shock or admitted for IV antibiotics with blood cultures taken before antibiotics	100%	33%	79%	90%
Sepsis 4: Percent of patients with confirmed severe sepsis/septic shock with 2nd litre of crystalloid initiated by time goal as specified in Sepsis Guidelines	50%	0%	15%	80%
Sepsis 5: Percent of patients with appropriate lactate measurement by time specified in Sepsis Guidelines	57%	0%	41%	80%

Note: wide data ranges are often indicative of small sample sizes. City Hospital sepsis volumes varied between 6 to 18 per period. Regional volumes varied between 16 to 53.

RLS participants widely held what appeared to be an accurate perception that Select Health and City Hospital sepsis mortality rates were favourable. While measurement methodologies differ, Select Health average mortality rates ranging in single digits and teens compared very positively considering Canadian national averages and Rivers et al. (2001) discussion of figures in the 30-40% range.

> We noticed that when you look at our overall mortality for sepsis, we do really well, compared to the national average. I think the national average is up to 30 and ours is consistent. When you look at it, it's in the teens. So, we do really well. (RLS, Regional Program/Service Network Lead)

Paradoxically participants recognized that the remaining four key performance indicators (KPIs), the adherence measures, were not positive. While reasonably strong (though usually below-target) performance was recognized for KPI 3 (ordering blood cultures prior to antibiotics) due to the automated Nurse Initiated Order available, the remainder of the KPIs remained consistently well below target.

> R: How did the sites feel they were doing over the time?
>
> I: Terrible. We never met any targets. We weren't even close. Ever. (RLS, Regional Program/Service Network Lead)

RLS participants were able to look past paradoxical scorecard results to find a positive interpretation. Low sepsis mortality rates confirmed a general sense that Select Health was providing good sepsis care. While participants were concerned about poorer adherence measures, they recognized that these adherence measures suffered from definitional and collection challenges.

> A lot of them were difficult to collect because they're based on a hand-written note because we don't have electronic for all of our things. So, we found throughout the

> years that some of the data is much more pertinent to collect than others. (RLS, Regional Program/Service Network Lead)

Seeing that sepsis outcomes were favourable in spite of apparently poor adherence to many of the Sepsis Guideline Set expectations, many DC participants questioned the value of rigorously interpreting the Sepsis Guideline Set's clinical implications. While the research supporting the guidelines was not in doubt, participants recognized a difference between measurement and activity within a controlled, statistically oriented research environment and a busy clinical setting where sepsis is one of many clinical concerns to be addressed at any given time. Given Select Health's positive mortality results it was believed that the Sepsis Guideline Set had led to a sufficient level of attention and action to ensure that good care was provided.

> What was interesting though – and I think that it's not hard to understand – our mortality was very good, and our mortality went way down, even though time to antibiotics, to fluids, etc. continue to be awful. But because you, even though you're not meeting those timelines, you are giving the patient better care than you would've without thinking about it at all. Our mortality stats were good but our times were always dreadful. (RLS, Regional Program/Service Network Lead)

For many RLS participants, the paradoxical results led to some ongoing questioning as to just what Sepsis Guideline Set elements were most important; what needed to be implemented and how. Experientially, participants in RLS positions expressed positive feedback about the Sepsis Guideline Set implementation at Select Health. All feedback was positive about the development and implementation process, including the way:

- The Emergency Medicine Program structure and related committee structures enabled strong clinical and medical leadership, prioritization, accountabilities and communication,
- Regionally standard Clinical Decision Support Tools were developed with broad input from a variety of support departments, and communicated, and
- Scorecards were developed and distributed – providing useful information to inform outcome and adherence monitoring to the site level, even if the value and validity of many of the adherence measures were in question.

In retrospect, while some positive interaction and work among AAP, RLS, and DC participants at times throughout the implementation process, members from these three practice domains never did engage together long enough to establish a shared understanding of the goals of the CPG implementation, or how success would be achieved or assessed. As a result, participants, including those from the RLS group, were free to establish their own definitions of success and to draw their own conclusions.

Managing Implementation and the Practice of Managers

Participants from the RLS group described a perspective of Sepsis Guideline Set implementation that reflected their efforts to manage implementation largely through standard process, regional roles, structures, and tools, and hierarchical authority. Participants holding regional management and support positions tended to describe a managed approach to implementation of the Sepsis Guideline Set that built on early originating work led by Direct Care group Clinical Nurse Educators, but that moved on to involve more regionally guided activities that could be organized into activity groups. Activity groups included: developing plans and supports using standardized development and implementation

processes and tools, assessing and activating through established organization structure and interlocking committees, prioritizing, executing plans, and monitoring and reviewing performance using structured measurement scorecards. Aspects of Select Health's implementation efforts, including the Program/Service Network, management organization structure, and adherence measurement approaches, were described as provincial exemplars by AAP Quality Leads. The Emergency Medicine Program/Service Network leadership team, including a Program Executive Director, a Medical Director, a Director, and a Clinical Nurse Specialist directed regional implementation activities.

Study participants in RLS roles consistently spoke of the important roles played by site/department Clinical Nurse Educators (CNEs) and Chiefs of Staff. These individuals were referred to as critical development partners and conduits between RLS participants and the DC participants themselves. Individuals in these roles, particularly CNEs, were strongly involved with early Select Health originating activities toward Sepsis Guideline Set implementation, in collaboration with the provincial improvement network – Evidence to Excellence (E2E). The CNEs' and, to a lesser extent, Chiefs' activities extended not only temporally - throughout the implementation process timeframe - but also spanned boundaries of the DC, RLS and AAP groups.

Between 2013 and 2017 scorecard measures were widely monitored by RLS participants at Program/Service Network meetings to assess statistics about outcome and Sepsis Guideline Set adherence performance. Paradoxically, good outcomes were reported in spite of generally poor adherence to externally set adherence standards. Participants from the RLS group were positive about the clinical decision support tools and measures they had worked to develop. However, RLS participants expressed frustration about the poor adherence to the guidelines as indicated by process measures, and the DC clinicians' limited

use of the decision support tools that had been developed. RLS participants held a perspective about implementation success that focused primarily on achieving guideline adherence (process indicators), though they were able to achieve implementation "wins" as tools were developed and approved, and as communication and training was delivered. The Policy Office served to coordinate implementation activities initiated by DC and RLS participants, though their efforts to facilitate broad regional engagement and decision-making frustrated some DC participants who wanted expeditious decisions. Through this account of the Sepsis Guideline Set implementation, it is clear that the there was some discordance between what the RLS participants and those from other groups thought was important for implementation, and the actions they took in response (e.g., RLS participants celebrated development of a pre-printed order to which clinicians, particularly physicians, appeared uncommitted). These differences in perspective resulted in some evident frustration.

While RLS participants consistently described a logical implementation process and aligned supports, there were discrepancies between the implementation standard and what actually took place. Significant limitations to the implementation process were apparent. The DC Emergency Department Managers were not engaged in the implementation work even though they were described by many RLS participants as a critical component of the Program/Service Network structure. The Shared Work Team, comprised, initially, of two CNEs, with some subsequent additions, only minimally met the expectation of multi-site, inter-professional participation established by the Policy Office and few mechanisms for interprofessional engagement of DC clinicians were available generally as part of the organization's ongoing activities, or specifically in support of Sepsis Guideline Set implementation. Reference to evidence review was sparse, and concerns expressed about the practicality of implementing the guidelines were not directly addressed by any participants.

Ultimately, what RLS participants described as strong structure, prioritization by senior leadership, robust communication and in-service education, some engaging reinforcement through the Sepsis Network, and well-developed approved clinical support tools, failed to generate the actions on-the-ground required for guideline adherence. DC participants ultimately did not align with the expectations of the AAP or RLS leaders. While RLS participants were positive about these strategies and the organization's actual sepsis outcomes, most remained uncertain as to why adherence remained a challenge.

Chapter Summary

This chapter provided a description and interpretation of the Sepsis Guideline Set implementation from the perspective of participants from the Regional Leadership and Support (RLS) practice group. Participants from this broad but coherent group sought to manage implementation of the guidelines, directing the behaviour of various participants through hierarchical authority, guided by structure and process. A small group of people holding specific roles (CNS, Medical Lead, Chiefs of Staff, and CNEs) worked across the boundaries of AAP, RLS, and DC groups to communicate, develop tools, educate, and monitor the implementation. These activities and actors proved very effective at creating awareness about guidelines and establishing regionally standard clinical decision support tools that could have been used to guide Sepsis Guideline Set implementation. Unfortunately, these activities and actors proved insufficient to affect the change required to make significant progress in guideline adherence. Compromises were made in the implementation process imagined by RLS leaders. Managers were not engaged meaningfully. The Shared Work Team and subsequent implementation involved few DC clinicians who would be called upon to enact the guidelines, and concerns raised about the need or practicality of the guidelines were not addressed. The existing workflow, workload, and degree of automation

in the City Hospital Emergency Department clearly did not support full adherence to the guidelines. In spite of a commitment made by the region's Executive Team to implement the guidelines, there was a mismatch between the resources required to fully implement the guidelines and those invested. While the managing implementation perspective of RLS participants translated to effort toward many positive aspects of implementation, the result was insufficient to support the changes required for full Sepsis Guideline Set adherence by DC clinicians.

The next chapter describes another perspective on the Sepsis Guideline Set implementation at Select Health – the perspective of participants of the City Hospital Direct Care group.

Chapter Seven: Learning, Becoming Competent

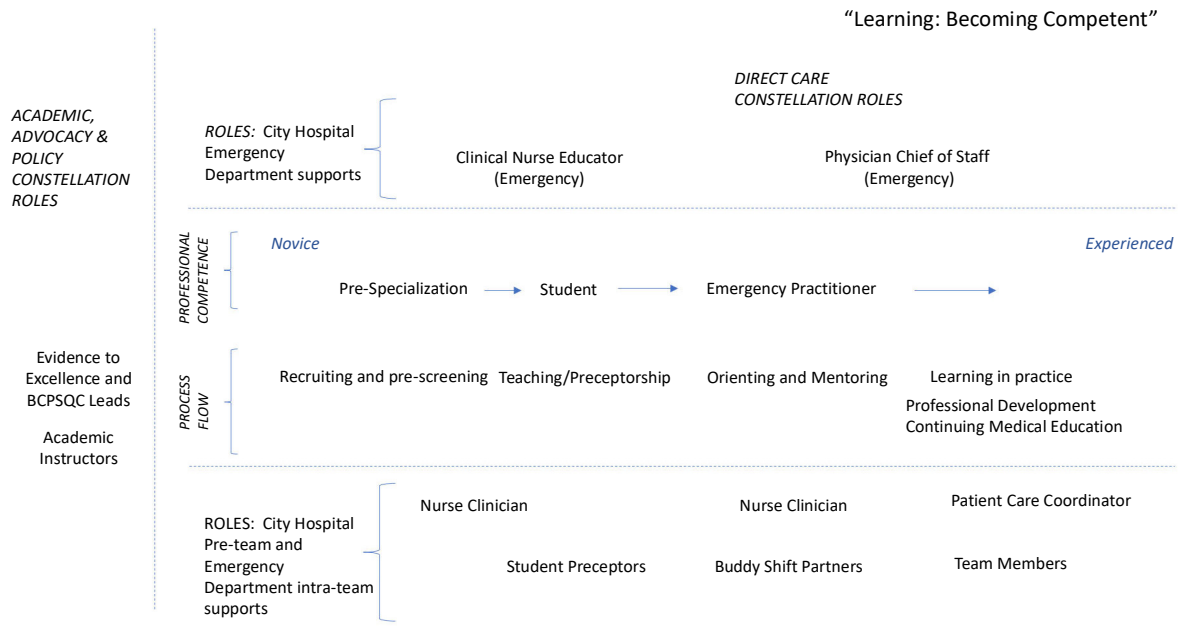
In this chapter, the Select Health Sepsis Guideline Set implementation is presented as it was described from the perspective of a Direct Care (DC) group – the Managers, Educators, Clinical Leaders, and Clinicians at the City Hospital Emergency Department. The Direct Care group is the nexus for implementation in the case of the Sepsis Guideline Set.

Study participants from the Direct Care (DC) group described a process which I characterized as a process of learning – building on a strong interest among DC participants to build and reflect clinical competence regarding sepsis management. Competence was paramount for the members of this clinical group of doctors and nurses - as they described a development process building from general knowledge gained as a student and during early orientation or implementation activities, through to the point where knowledge is reflected naturally as ingrained behaviour. In these accounts of the implementation process, the leadership and support provided by the Clinical Nurse Educator (CNE) within the Emergency Department specifically for Sepsis Guideline Set implementation was seen to be transitory, to be further woven into a more enduring process of individual and group competency development. Participants described this more foundational process as a natural progression of professional development where new department employees (or physicians) built on what they learned, including what they learned about sepsis care, as students, to incorporate new knowledge that they incorporate into practice. Through continued experience and in conjunction with department supports and other DC participants, clinicians move from what they described as novice to experienced – and toward the expression of knowledge into normal, ingrained practice. Figure 7.1 depicts the implementation process as described by participants of the DC group. The figure highlights the processual aspects of implementation

described above along with an indication of roles involved. Roles are those that were described as important by members of the DC.

Figure 7.1

Direct Care Participant Perspective



Note. Direct Care participants described Sepsis Guideline Set implementation primarily as a learning process, as clinicians gain competence from novice to experienced. Listed are the DC, RLS, and AAP roles most consistently identified by DC participants as involved in the implementation.

City Hospital and the Local Context

City Hospital is a large urban community hospital providing primary, secondary and tertiary inpatient and ambulatory care for a large and rapidly growing community. By the early 2000's, the hospital's Emergency Department had outgrown its useful life and a new Emergency Department had been developed – expanding the unit's floor space significantly, and necessitating significant staff grown and workflow redesign.

> There will probably be a lot of themes based on the timing of this. We were opening a new Emergency Department. We were probably more than doubling our workforce in this time preparing for the new Emergency opening. So, our staffing increased just humongously, and currently we have about, in-total, maybe close to 500-550 staff. Not all nursing staff, but nursing staff would probably be over 300-350. (DC, Hospital Emergency Department Manager)

The Emergency Department's size, busy-ness and redevelopment proved to be contextually relevant to the Sepsis Guideline Set implementation that took place at City Hospital between 2011 and 2017.

Back "In the Early Days"

Members of the Direct Care (DC) group described a time beginning in 2012 when a significant focus was placed on sepsis and Sepsis Guideline Set implementation, championed largely by one of the department's CNEs and by the department's physician Chief of Staff. Sepsis had always been a significant concern in emergency care, so the DC clinicians were careful not to leave the impression that this work was the beginning of sepsis awareness and care. It was, however, described as a period of consolidation and documentation of knowledge and focused action prior to which care was individual clinician-driven, focused primarily on diagnosis and treatment of the underlying infection rather than rapid, aggressive action to address the systemic response of sepsis. City Hospital Emergency Department nursing staff described the primary role of the CNE in leading the CPG implementation.

Implementation is Delegated to the Clinical Nurse Educators

The Emergency Department's CNEs (including the CNE who was involved in initial Sepsis Guideline Set development) acted to implement the Sepsis Guideline Set prompted by the regional Emergency Medicine Program Clinical Nurse Specialist (CNS) and with the

delegated authority of the City Hospital Emergency Department managers. As one Emergency Department manager described the CNE role:

> My perspective when I see a new initiative coming up, like Sepsis, is to connect with the educators and say "you guys got this?" And our educators are good. There are different ones, like [CNE Name], for example, leads sepsis and our other educator, she would lead stroke. So, I would know who to go to, and my role as their supervisor is just to make sure that they're going to roll it out and they do. That's their job. (DC, Hospital Emergency Department Manager)

The delegation of the Sepsis Guideline Set implementation to the CNEs seemed like a logical step to the Emergency Department management at the time. Sepsis Guideline Set implementation proceeded in 2011 - just prior to a move to a new Emergency Department and the coincident need to expand the department's staff. With the move, the managers (manager and coordinators) at the City Hospital Emergency Department had many other priorities. Management of the site relocation and subsequent stabilization required ongoing management focus. Meanwhile, the day-to-day obligations of managing a busy Emergency Department with over 30 staff on during any given shift and about 500 patient visits per day continued to be significant. Additionally, the Emergency Medicine Program had a concurrent priority regarding enhancement of patient flow through the Emergency Department which also required the time of managers. As noted by a City Hospital Emergency Department manager: "I did the patient flow stuff, our educators did the sepsis stuff." While not specifically aimed at sepsis care, some participants recognized an important synergy between the two priorities – as better Emergency Department flow could lead to quicker responses and more time for clinical care, both being clear success factors for Sepsis Guideline Set implementation.

Educating and Communicating About the Sepsis Guidelines

Participants of the DC group, particularly the nursing staff, experienced a variety of activities as the City Hospital CNEs prepared for and delivered Sepsis Guideline Set implementation education on the unit.

> I'm remembering a couple years ago the clinical educators came down and said there was some new guidelines being set. They'd found out that a lot of people, a lot of patients, we weren't meeting their needs and the demands of treating a septic patient. So, they brought out criteria and a set of guidelines that we, as bedside nurses, could initiate without having a doctor's order. The timeframe for this was one hour, two litres bolus, and then, to at least speak to a physician and get one dose of antibiotics. (DC, Hospital Emergency Department Nurse)

Introductory information was provided primarily through e-mail and the Department's newsletter, the *Weekly RANT*. The Weekly *RANT* was, and remains, a weekly newsletter created by the City Hospital Emergency Department CNEs as a regular, reliable communication vehicle to overcome the complexities of communicating with a large team working in various roles, locations, and shifts. The *Weekly RANT* was circulated to all ED staff by e-mail every Friday. It was a go-to device for City Hospital ED nursing staff for ongoing communications, information dissemination, and as a catch-up device for staff with irregular shifts or for those returning from vacation or other absences.

> I think personally, the e-mails are sent out, we do have these e-mails that are sent by the CNE's every week. They're called the *Weekly RANT* and the in the *Weekly RANTs* we do get notifications of new guidelines, new protocols, new skillsets, any new tools or things that we're going to be using, that are going to be new on the unit. So that's a really excellent way to communicate, for me anyways. Because we get a lot of e-

> mails so that's usually my go-to. The *RANT*, that's where it'll tell us, okay, starting next week we're going to implement this. (DC, Hospital Emergency Department Nurse)

About a month before go-live, the CNE prepared City Hospital Emergency Department staff for the upcoming in-service and initiation of Sepsis Guideline Set implementation.

> Going live the first of October, so in September we start and say "did you know that the latest Sepsis Guidelines include this? Did you know they also include this?" So, each week you'd get a tidbit so I kind-of say it's like planting a seed and then we bring the in-services and culminate and say "here you go, this is what we're going to talk about now" and they're all, like, "oh ya, you talked about that in the *RANT*, right?" (DC, Hospital Emergency Department CNE)

This foreshadowing of the go-live through the *Weekly RANT* and through e-mail, built preparedness and recognition among staff before on-unit, in-service activities.

> I know we had in-services on them and a bunch of e-mails. I remember getting a bunch of e-mails. We'll be doing in-service on these dates. And I know we had an in-service on them. Like the educators upstairs came down, showed us the paperwork of it all and it was like a few pages long and everything like that and just told us when the start-date was going to be. (DC, Hospital Emergency Department Nurse)

On the go-live date and for a period thereafter, the CNE undertook an educative strategy involving in-service huddles, increased personal support on the floor, and communication reinforcement through the *Weekly RANT*. For the sepsis guideline, in-service huddles of approximately 15 minutes were held beginning between 6:30-6:45 am. In-services were opportunistic, engaging staff members who were able to free themselves for the 15-

minute session. Because City Hospital's busy Emergency Department saw little down-time, the process of in-service was carried on over approximately a two-week period. During the same time the Emergency Department CNEs made themselves available to guide staff members in the use of the new materials and to respond to questions or issues that arose.

Direct Care physicians also experienced a period of heightened activity in the early years of Sepsis Guideline Set implementation, though different paths and processes were followed than the nursing staff. City Hospital Emergency Department physicians often practice in more than one hospital and are reimbursed on a fee-for-service basis – limiting the time available for unremunerated team learning activities. Given these constraints, the Emergency Department physician leadership relied on monthly staff meetings and e-mail reminders for disseminating knowledge about the Select Health Sepsis Guideline Set.

Collaborating with the British Columbia Patient Safety and Quality Council

In 2013, subsequent to the initial Sepsis Guideline Set implementation by the CNEs, the City Hospital Direct Care (DC) group participated in the BCPSQC's 150 Lives in 150 Days campaign.

> There was also a competition run throughout Select Health about the treatment of septic patients and I know that there were some posters that were put up as well about who was winning and the volume of patients come in that met the septic criteria and how we would treat them and how well we were treating them in terms of the one-hour guideline. (DC, Hospital Emergency Department Nurse)

Nurses within the City Hospital Emergency Department recall the campaign as a time of increased promotion and focus on sepsis.

> Well, it's definitely like kind-of playing medical bingo and it's just, like, okay, so I mean we've lost a lot of senior staff over the years so we have a lot of new, willing

> junior staff that come here to work that are fresh out of the program, the [British Columbia Institute of Technology (BCIT)] Emergency Nursing Program, and so it's just a matter of when you see that on, I think we had it on the glass window for the medication room, when you see that, it kind-of just prompted you. And then the clinical educators would also send us e-mails as well. (DC, Hospital Emergency Department Nurse)

The BCPSQC continued sepsis and sepsis guideline awareness promotion and, in 2013 and 2014, conducted several online learning sessions in webinar format that were referenced by members of the City Hospital DC.

Performance Monitoring: Summary Metrics and Case Review

While there was no evidence that performance measures were posted or discussed regularly, between 2013 and 2017 City Hospital CNEs occasionally referenced the department's Sepsis Guideline Set performance (report card) metrics in the *Weekly RANT*, nurse in-service sessions, and physician rounds.

> So, there's a dashboard [report card] and it says across the sites, this is your incidents, this is your numbers, these are your results and there's certain things that they have pulled as your sort-of sentinel events that need to have happened, they look at timings of so like time to identify them as septic, time to get their bloodwork drawn, were the blood cultures drawn before the antibiotics, were your fluids within 60 minutes? (DC, Hospital Emergency Department CNE)

Report card data provided useful reminders about aspects of Sepsis Guideline Set implementation during early regular in-service and *RANT* updates. More focused learning opportunities were described by DC clinicians when specific patient experiences were

identified for review. The CNEs occasionally identified areas of concern through the scorecard (e.g., a period where the mortality rate was higher than usual) and pulled the actual patient charts for review with the nurse staff involved to see if opportunities to learn and reinforce good sepsis care practices existed.

> It's helpful. It tells us where our gaps are. Just sometimes I look at it and find outliers that are, like, way out. I ask them [Health Business Analytics] to unveil the data so I can pull the chart and go back and look at why that happened. So, I do use it for quality improvement purposes. I'm looking to see whether a particular nurse has a knowledge gap that I need to work with? Is this a process thing that's not working? (DC, Hospital Emergency Department CNE)

Also occasionally, the CNE held an in-service huddle with nursing staff to review specific incidents as a learning opportunity.

> There was a patient who was septic but somehow it was missed between triage and when the patient got seen by the doctor. The patient ended up getting treated and cured but I remember one of the staff, I think it was a CNE, she came in to the care and treatment zone and just gave us an alert to keep an eye out for septic patients. She said this was because a septic patient was missed and the patient turned sour pretty quickly. We were able to resolve that situation and the patient was treated but that was when our antennas came back on again to be like, okay, let's keep an eye out for sepsis. (DC, Hospital Emergency Department Nurse)

Participants noted limited review of data and a lack of interprofessional work related to performance improvement. The approaches used by the CNEs and Chief of Staff were oriented toward clinical learning. Initial intensive communication and teaching of the

attributes of, and support tools for the Sepsis Guideline Set, followed by communication reminders and case review.

Not So Much Lately

Participants noted a significant drop-off in implementation strategy activity after 2015, and a reliance primarily on the knowledge embedded in practice that had been achieved by the team and its more experienced practitioners.

> I don't remember when we last had a follow-up or feedback on how we treat the septic patients. The focus right now is working with patients receiving TPA [tissue plasminogen activator, a thrombolytic medicine] and doing better with stroke. That seems to be the thing that we need to work on right now. So, the sepsis patient seems to have taken a back seat. I don't know whether that's because we're doing okay and we're meeting the criteria and the numbers of it, or if this is just the new thing to talk about. (DC, Hospital Emergency Department Nurse)

Participants noted that, as with Sepsis Guideline Set implementation, this was often the way when individual guidelines or improvement initiatives were undertaken. Priorities change and the focus moves on to something else.

Building Competence

The previous section describes from the perspective of the DC, activities that took place particularly between 2012-2015 to raise awareness and promote practice change specifically with respect to the Sepsis Guideline Set. DC participants, however, described these activities as a transitory part of a broader process of building competence in emergency practice beginning from their time as a student through to a point where, as an experienced clinician, practice is ingrained.

When describing Sepsis Guideline Set implementation, members of the City Hospital DC participants consistently and naturally moved into discussing competence or "knowing what to do." Given this perspective, DC participants seemed to initially consider the discussion as an examination of their individual knowledge or competence and how that knowledge came to be – how it was built over time. Building competence was described as a progression of learning and experiential reinforcement gained through basic and specialty training, pre-qualification, orientation, and ongoing education and development. Many aspects of this progression fell within the purview of City Hospital's Emergency Department CNE and Chief of Staff. Another role, however, bears introduction – the Nurse Clinician – for its relevance to the in-practice development of nurses within the Emergency Department.

Continuous Development of Competence and the Nurse Clinician

City Hospital offered a variety of mechanisms to build competence among junior nurses. Much of the effort was placed on the transitional points between which a student nurse becomes a practicing nurse in the City Hospital Emergency Department. To help new nurses to make the transition from student to practitioner, City Hospital, and Select Health more broadly, developed a supportive Nurse Clinician role. The Nurse Clinician was a senior practicing nurse who had a formal responsibility with respect to recruit preparation, student orientation and ongoing at-the-elbow coaching. The Nurse Clinician focused primarily on student and novice nurses but was available as a member of the clinical team to reinforce good practice for all.

The Nurse Clinicians worked daily from 9:30 am to 8:45 pm. They shared a work area with the City Hospital Emergency Department CNEs and so there was a natural tendency to work together to align the Nurse Clinician's at-the-elbow activities with the CNE's learning priorities.

> So, it's a support, it's at the frontline. So, I guess, to compare, the educators are up dealing with regional stuff. The clinicians deal with bedside support so we're almost like, they're the brains and we're the brawn, almost! We kind-of reinforce what has already been taught. Considering that we would've had that education as well. (DC, Hospital Emergency Department Nurse Clinician)

In performing all their support functions, nurse clinicians sought to foster critical thinking among practitioners, using leading practice case studies – including cases involving sepsis – as practical guides. The work of the Nurse Clinician began with encouraging promising new nurses to take further training in emergency nursing.

Pre-Specialization: Selecting for Potential

From the perspective of the DC participants, competence in emergency care – including good sepsis management – began with the identification, assessment, and support of novice nurses with an interest in emergency nursing and demonstrating the critical thinking skills believed necessary. The City Hospital Emergency Department leadership team had exposure to many junior medical/surgical nurses, as they provided general nursing care in the department's lower acuity unit, the Care and Treatment Zone (CATZ). Through this exposure, Emergency Department Managers identified strong potential candidates and asked the nurse clinician to work with them to provide both assessment and encouragement.

> The ED Coordinators are the ones who decide when the nurses, well they ask for feedback, so they pull these names, the nurses who have mentioned that they're interested in going to the [British Columbia Institute of Technology (BCIT) Emergency Nursing] program, what do you think? And then I focus on these nurses to complete their CAPE [Competence Assessment, Planning, Evaluation] tools, to have

> the case studies and then to provide information whether they still need to strengthen certain areas of their practice. (DC, Hospital Emergency Department Nurse Clinician)

The Nurse Clinician worked with promising graduate nurses to conduct a competency assessment using a standardized CAPE tool developed by the College of Registered Nurses of British Columbia. The Nurse Clinicians supplemented the assessment with a case study tool they developed themselves. Case studies were discussed with the candidate to help assess and nurture critical thinking skills needed for success in the Emergency Nursing training program and for emergency nursing practice.

> That's my role. That is my baby. I hope for the nurses to practice well and not just be task-oriented. And I gear them so they're ready for the [BCIT] emergency program to be successful in the program and so we have these discussions. (DC, Hospital Emergency Department Nurse Clinician)

As an important and relatively common presentation in the City Hospital Emergency Department, a sepsis case was established as one of the studies used by the Nurse Clinicians.

> I make sure clinical presentation stuff I know are common in emergency are covered and then after that I have another piece of paper that is eight case studies with common presentations [one of the cases relates to sepsis]. So, a patient comes in, with recent chemo, was febrile, now tachy, what do you think is happening? Name three things that could be happening. (DC, Hospital Emergency Department Nurse Clinician)

From "When I Was a Student"

Both nurses and physicians related the Sepsis Guideline Set implementation back to an expression of clinical knowledge, and to competencies they had gained during their respective professional training, particularly the part of their specialty training focused on emergency care. As noted by a City Hospital Emergency Department physician "It came to my attention probably like 2009, 2010 during my residency."

> I wouldn't say the in-services. I guess it's just nursing theory as well. I'm sure that we learned this in the emergency course as well. Maybe that's something I should've mentioned before. It's a big focus when we do our emergency training. (DC, Hospital Emergency Department Nurse)

Physician emergency specialty training is organized through a variety of university specialty training programs in alignment with accredited teaching hospitals. Similarly, emergency nurse training involves delivery of specialist training where students receive didactic training through an academic institution (typically the British Columbia Institute of Technology (BCIT) in British Columbia) and clinical practicum placements. Because City Hospital provides practicum placement opportunities, Nurse Clinicians and the CNEs had some input into ensuring that the curriculum addressed any important knowledge gaps, including those related to Clinical Practice Guidelines such as those for sepsis care.

The training received by new recruits to the City Hospital Emergency Department during the emergency training program was foundational, then, to Sepsis Guideline Set implementation from the perspective of the DC. In the BCIT curriculum, sepsis is addressed as part of Emergency Nursing Theory 3 – as they explore the care of the critically ill patients.

> You have people coming back from the emergency program, "hey, this guy looks septic." It's taught right at the ground level with the baby emerg nurses that "hey this is a big thing." You know, there's protocols. (DC, Hospital Emergency Department Nurse)

Clinicians referred to the skills they gained themselves, and they recognized the skills with which new trainees were arriving in new positions within the Emergency Department. Upon graduation the CNEs provided "re-orientation" to the Emergency Department "to share things that are new in scope to them (compared to before the left) and to ensure they are practicing in a manner consistent with our Select Health and site standards of practice" (DC, City Hospital Emergency Department CNE). Two days of re-orientation was provided to new specialty-trained nurses, who would have already had general orientation to the unit before as Care and Treatment Zone general duty nurses.

Orientation: Learning the Ropes at City Hospital

Orientation at the City Hospital Emergency Department was another transition point during which professional competencies – including sepsis management per the Sepsis Guideline Set – are assessed and reinforced. New staff members were provided a series of seminars to review practice standards, including sepsis management.

> If I remember correctly when I was transitioning from becoming a student nurse to a full-time staff, there was a series of classes. We had seminars about certain topics and sepsis was one. (DC, Hospital Emergency Department Nurse)

While physicians new to the City Hospital Emergency Department were expected to practice self-sufficiently from the outset, they also undertook an orientation with the Chief of Staff – guided by an orientation package which includes introduction to key clinical standards and tools, including those related to the Sepsis Guideline Set.

> Certainly all the new docs, probably since we opened the new department and we hired a lot of new docs at once. We put together an orientation package for docs. It has evolved since then, but certainly a key feature of it then and now is what are the pre-printed orders that are available and important? And so, they get a copy of those prior to starting in the department. Then, I go through and show them the pre-printed orders. Sepsis would be a common one for sure. (DC, Hospital Emergency Department Physician Leader)

Along with eight orientation seminars, nurses new to the City Hospital Emergency Department had eight "buddy-shifts" during which they were partnered with a senior nurse to become progressively more and more independent (DC, City Hospital Emergency Department Nurse). At the same time the Nurse Clinician worked with new staff members to provide at-the-elbow orientation and coaching.

> They're doing check-ins with our new staff and making sure that they're doing okay. They're having them speak about their patients to see what level they're at. If they're feeling comfortable. And a lot of review. They do a lot of review with staff. They go through their tools, their CAPE tools. It's just basically a self-evaluation and our educators help them with that. Self-reflection on what they needed to work on in the future. (DC, Hospital Emergency Department Nurse)

Orientation was a key time during which the nurse clinician worked with new staff members to conduct self-assessment and competency development planning using the British Columbia standard CAPE tool.

Keeping current: communication and professional development.

Following specialized training and orientation, City Hospital DC participants, including physicians and nurses, worked to keep current through ongoing departmental communications and through formal and informal professional development activities. These activities appeared to differ somewhat between nurses and physicians. For nurses in the City Hospital Emergency Department, the *Weekly RANT* continued to serve a vital function.

Communicating Through the *"Weekly RANT."*

The newsletter was described by every member of the department's nursing staff interviewed as a critical means through which they acquire information to enable them to keep up-to-date with department activities and priorities.

> We do read the weekly e-mails and it is a part of the culture here that you need to know. Like, if you say, oh, I didn't know about this, and they say it was in *the RANT*, then it's on you. It's your fault. Which I agree with. I think if they're going to summarize what we need to know week by week and e-mail with a lot of comics and jokes, it's great, I'll read it. They do a pretty good job with it. (DC, Hospital Emergency Department Nurse)

Members of the department nursing staff described this locally constructed and distributed newsletter as a "part of the culture" – mandatory reading for team members for which they hold each other accountable in a serious, yet good natured way.

> I: So, it's kind-of a touch point and now you have to go back and if you missed that e-mail, can you send it to me or whatever the case is. Now you go back and read it.
>
> R: Oh, excellent.

> I: I know it's happened to me twice, actually in the last maybe two years. They're, like, oh, didn't you read your *Weekly RANT*? We hit each other with that. Go read your *Weekly RANT!* And that's how I knew about it. The *Weekly RANT* I find is a really, really good way. (DC, Hospital Emergency Department Nurse)

There was no evidence that the Emergency Department physicians engaged with the *Weekly RANT*. Instead, physicians referred to the monthly department meetings and e-mails from the chief of staff as their primary source of information for keeping current about important department priorities and activities. Physicians also described a tendency to access sources external to City Hospital and Select Health for learning and competency development. Rounds of a teaching hospital outside of Select Health and well packaged, highly credible online sources (e.g., University of California in Los Angeles (UCLA)) were cited by one physician respondent as his primary sources of professional development information.

Competency Checklist. Many nurse members of the DC spoke of a checklist that had been established by the organization's Emergency Medicine Program CNEs.

> And as far as keeping up-to-date with our clinical skills, we've got, there's a checklist that we have that we need to have done. You can see exactly what is required of you and what you need to be up-to-date. (DC, Hospital Emergency Department Nurse)

The Competency Checklist was developed between 2012 and 2015 by the CNEs within the Emergency Medicine Program and has been retained as an important tool for education within the ongoing Emergency Medicine Network. The checklist included education regarding the Sepsis Guideline Set. In collaboration with management, the CNEs developed a scheme for ensuring a reasonable degree of adherence – aligning completion of all checklist modules with payment and with admission to valued programs like Advanced

Cardiovascular Life Support (ACLS). “Unless you finish the whole list, you don’t get paid (DC, Hospital Emergency Department Nurse).

Reinforcing Practice: The Importance of Team

With Nurse Clinicians available for most shifts and many other clinical, education and management staff the nurses of the DC group described a rich environment for learning and ongoing clinical support. Nurse clinicians focused their efforts on novice nurses in the City Hospital Emergency Department, but they made themselves available for all – filling in when clinical demands peaked and coaching staff through specific issues when necessary.

> So, they’re basically supports for our staff. Our new staff, old staff, they’re there in terms of just any issues like somebody is not feeling comfortable with a specific intervention, or they’re not really understanding what’s happening with a patient, or there’s a change in patient status. (DC, Hospital Emergency Department Nurse)

While DC participants recognized the availability and importance of formal support through the nurse clinicians and, Emergency Department coordinators, they were also quick to recognize the supportive nature of the other Emergency Department team members themselves. Participants from the City Hospital DC spoke of the critical importance of teamwork in ensuring mutual support and shared responsibility.

> In City Hospital, we have a very strong sense of shared responsibility between us and we work well together on the nurse management side, operations side, and the medical side (DC, Hospital Emergency Department Physician).

R: Is there anything that supports that teamwork? How do you learn to be a team?

I: Each other. It’s all about each other. We have a mandate here. We just have to. If I was to take you for the entire day and just plopped you in one spot in

> the CATZ area, and you just watched and listened and watched, you would see that if we didn't do it altogether, one, two, three people would just be drowning. You can't be here as a nurse if you don't. There have been people who have not fitted. They don't fit, so they've done what they need to do, and they're gone. You either like being here or you don't. (DC, Hospital Emergency Department Nurse)

Participants noted a lack of formal mechanisms to engage team members interprofessionally, particularly physicians with nurses. While they recognized that such engagement would be beneficial, barriers of time and physician remuneration were identified as obstacles. The teamwork that developed and affected Sepsis Guideline Set implementation was described as having developed out of necessity based on the hectic and often emotional needs faced by team members in the Emergency Department day after day. Key senior team members were described by some Emergency Department nurses as having a memorable role in promoting the work ethic and rules of mutual support that enable the team to provide quality services in spite of the ever-increasing demands of the busy department.

> It's just a culture we've always had. Even when I came, when I started here, I remember my orientation. The lady that was orientating me said "if you're sitting there doing nothing and you see someone who's busy, you get off your behind and you get up and you help." It's become an expectation and it's just sort of passed on. (DC, Hospital Emergency Department Nurse)

Teamwork within the DC was described as a matter of "survival" – a cultural expectation shared by Emergency Department team members contained to the clinical team members but cutting across team professional boundaries.

> Teamwork here is the culture and it's very, it's how we can, what's the word? It's how we can cope with the volume and with the tragedies. Honestly, it sounds so gushy, but we really do support each other. From the doctors – the doctors support the nurses, the nurses support the doctors. It's quite impressive. (DC, Hospital Emergency Department Nurse)

The DC participants' lack of reference to other site or regional levels of activity was quite striking. Asked specifically about changes that took place regionally, one City Hospital Emergency Department nurse responded indifferently:

> I can't speak to any of the upper stuff, like, I can't speak to any of that. That's not my thing. As for changes in how we, management and stuff up top, I don't think that would trickle down to affect our day-to-day practice for our patients. I didn't notice anything that would affect how well I follow guidelines or how I would treat a patient. (DC, Hospital Emergency Department Nurse)

Now it's "Just What We Do"

From the perspective of participants of the DC, interview conversations about Sepsis Guideline Set implementation moved consistently and naturally into conversations about competence. Given this perspective, DC participants seemed to initially consider the discussion as an examination of their individual knowledge or competence. Study DC participants described a trajectory of competency-building from students learning about the guidelines explicitly to a point at which they considered the practice to be ingrained – a natural response to the situation in front of them.

> For a lot of us who are Emerg trained, I feel like it's almost automatic. Like, you've got your patient, you've got their history and everything like that. You look at it and

> it's just, kind-of, there. I don't know how else to say it. "They look septic. I think they might be septic. We should start a protocol." (DC, Hospital Emergency Department Nurse)

Becoming Ingrained

The idea that the Sepsis Guideline Set practices had become incorporated into individual and team practice to the extent that the behaviours had become innate, "just what we do," was raised by all participants of the DC group – physicians and nurses. Many participants noted explicitly that they don't think specifically about the guidelines in practice but that they inherently act in a manner that is consistent with them, for reasons which they are hard-pressed to describe. "I think that we follow the guidelines and I think we're probably meeting all the criteria, what needs to be done and I think all the nurses are onboard" (DC, Hospital Emergency Department Nurse).

Competence was reflected as a part of the clinician's identity as a clinician or professional. Among DC participants, the experience was not always described as a purely personal journey. While skills and knowledge were ascribed to individuals, participants allude to other team members, including other nurses and physicians, as part of a collective journey toward innate or normalized behaviour. There was a consistent use of the term "we" rather than "I" when sharing perspectives on competence and action with respect to Sepsis Guideline Set implementation.

While participants spoke of the ingrained behaviour that has been achieved in the City Hospital Emergency Department with respect to Sepsis Guideline Set implementation, they recognized that there was a point where this was not the case – that the team had come to this level of ingrained behaviour through education and practice experiences gained over time. This normal, ingrained behaviour was always described as a positive professional

achievement resulting from experience – and was often contrasted to rigid use of Sepsis Guideline Set tools.

> The form might not necessarily get put on the chart at triage, and we don't necessarily always print the paperwork out anymore because we all kind-of, like the majority of us and especially the docs know, like it's just, 'cause it's an old guideline, you know you get a lot of the experienced docs, a lot of the experienced nurses and it's just "this guy sounds septic, I've started the two-litre bolus on him." We've started it without printing off the paperwork because we just know, it's just ingrained. I don't know how to explain it, it's just there. (DC, Hospital Emergency Department Nurse)

Sepsis and the Busy Emergency Department

Just as naturally and consistently as DC participants described the Sepsis Guideline Set implementation as a matter of competency building and learning, they related it as an individual and team balance between doing what is best for a given patient within the practical realities of their daily work lives. Ultimately, DC participants reported that they reached a point where they believed the implementation was successful in that they were able to achieve a balance between perfect care for the individual, and coping - within the time and resources available, with the needs of all patients within a given day.

Motivation: "Why" Matters

Some DC participants described a personal process through which they assessed the practical value of the Sepsis Guideline Set. Both nurses and physicians looked at the guidelines with a view to understand and evaluate how "truly useful" they were to help meet the clinical needs of patients particularly within the high-pressure work environment of the Emergency Department.

> I got the feeling for myself personally and the people that I've worked with is this [following the Sepsis Guideline Set] is how we can treat patients and make them better quicker. (DC - Hospital Emergency Department Nurse)

> I think you have to think that the guidelines are useful. That the flow developed in the guidelines is extremely what you want for your patient in a situation. And you don't do something that's so obvious that it doesn't contribute to it or it imposes, like, unnecessary onerous requirements. (DC, Hospital Emergency Department Physician)

Some clinicians expressed skepticism that some guidelines, including the Sepsis Guideline Set, are administratively rather than clinically motivated, meant to reduce risk or comply with government mandates on behalf of the organization, rather than patients and providers. While managers – even those with clinical backgrounds - describe a logical path between risk or utilization management and good patient care, some clinicians among the DC used powerful clichés like "ticking boxes," and "filling out pieces of paper" and questioned the true motivation of management in pursuing Sepsis Guideline Set implementation.

> A lot of times the guidelines are not changing what we do, because mostly we do relatively good septic care downstairs. You don't want to be just filling out more pieces of paper for the sake of filling out more pieces of paper. (DC, Hospital Emergency Department Physician)

Physicians and nurses took different paths to determine the applicability and appropriateness of the Sepsis Guideline Set. There were no forums for broad, interprofessional examination or discussion of opportunities for improvement or performance. Physicians described early discussions amongst one-another and drawing on sources outside of Select Health to understand and interpret the science. One City Hospital Emergency Department Physician noted that he favoured the emergency rounds at another

teaching hospital as an in-person learning activity, while depending on published abstracts and a paid online service from the University of California in Los Angeles (UCLA) for broader continuing medical education. Nurses were as eager to understand the underlying evidence – as one nurse described as the "theory to practice" - but most indicated that they had not assessed the evidence themselves, but that they trusted the department CNE to conduct and convey that assessment.

Missing Research Culture Amongst the Direct Care Group

There was a sense among some physician and nurse participants of the DC group that other, more academically oriented hospitals better supported and championed a culture that facilitates the implementation of guidelines such as the Sepsis Guideline Set.

> When I was at [another British Columbia Teaching Hospital] I definitely felt this sensation of people really wanting to be dedicated to research. If someone came in with a study, people did the study. If they said, "you need to fill out this check box for every patient with these symptoms," people did it. I think, for whatever reason, there's a difference in the health authorities about commitment to research and improvement. And I don't really know why Select Health seems to lack it compared to other places. (DC, Hospital Emergency Department Nurse)

Workload and Workflow

From the outset there was an apparent acceptance of "the science" behind the Sepsis Guideline Set, but a concern about the degree to which they were fully implementable at City Hospital given its size and volume of patients each day. Workload and workflows had not been sufficiently adjusted to meet the significant expectations of the Sepsis Guideline Set.

> I think the sepsis one was generally very well accepted and understood and the science was very convincing. So, I would say it was unanimous acceptance. The

> [twelve Select Health Emergency Department] Chiefs wondered a lot about how implementation would go ahead and how to best implement the science. It's very different, obviously, in Emerg if you're waiting for a patient to arrive with Sepsis, and it's the only patient you're seeing. It's pretty easy to, obviously, meet the standards 100% of the time. But when you have all those patients, and sick patients, then how do you streamline that to make sure you're as close to the target as you can be? (DC, Hospital Emergency Department Physician Leader)

Concerns expressed by a City Hospital physician leader about the practicality of implementing the Sepsis Guideline Set proved prophetic. The Sepsis Guideline Set was comprised of a variety of activities that needed to be achieved within specific timelines. Challenges in meeting these timelines arose and persisted as time and physical constraints took hold. Especially on days when the Emergency Department was busy, even those patients identified for quick response experienced delays as staff time was constrained and physical space became congested.

> Say [for instance] at triage, you've done a set of vitals on somebody, you've listened to their story [you think] "oh, this person sounds septic." We'll bump them up. Well, even if you've bumped them up on the [patient chart] rack to be seen, they still might be two hours getting to CATZ [Care and Treatment Zone]. Or [you might think] "hey, I know CATZ is on hold, I'd like to send this patient down." [to a higher acuity unit. You ask:] "I think they're septic, they're unwell, can we send them down?" Well, great, you can send them down, but they still might be two hours, three hours before they see a doctor. Right, like we have no rooms, you can send them down, we can assess them, we can maybe start an IV and put them back in the waiting room or when we have a congestion issue, do we have a lag in time of things starting? For

> sure. But that's across the board on everything unless it's super acute, where, "hey, this guy needs a bed!" right? Like the septic guidelines is one that we might not be able to start, if they're mildly meeting the criteria or moderately meeting the criteria, they might have a lag in time. (DC, Hospital Emergency Department Nurse)

Given the relatively broad clinical triggers for suspecting sepsis (SIRS criteria reflect symptoms that apply to many conditions, many of which are not related to sepsis) clinicians questioned the appropriateness of the more aggressive aspects of the Sepsis Guideline Set, including aggressive administration of fluids and more invasive approaches to physiological monitoring.

In addition to recognizing the need to achieve a practical balance between the Sepsis Guideline Set expectations and department workload, during the move to a new City Hospital Emergency Department site in 2013, efforts were made to reorganize the Department's triage roles and workflow to improve the Department's responsiveness and to expedite early decision-making. Changes were made to triage nursing duties to reduce the amount of work performed by them for each patient – to more quickly assign each to the appropriate emergency department resources. While participants believed this workflow change achieved the desired benefit of quicker initial patient movement to the "right" service area of the department, this change challenged performance of key aspects of the Sepsis Guideline Set workflow.

> But the volume we have leads to significant congestion at triage and people wait a long time before attention – which is a bad idea. So, we changed the triage process to be quicker. A quick look at triage allowed us to usually get people into the right place, whether acute or less acute areas quickly. But the downside was it really impacted our ability to identify patients at the very first contact, and to use nurse

> initiated order sets. There was no time to say "hey, I think this is sepsis, I'm going to take the time to go into the computer and print up the sepsis protocol for this patient's chart." So that was a concern. The assessment nurse in a different area [of the emergency department] then needs to take the time that the triage nurse used to, and orders sepsis protocol bloodwork or will pre-print that order set for us. (DC, Hospital Emergency Department Physician)

Triage nurses indicated that, when busy, they would tend to flag the patient as potentially septic to the receiving nurse and order the sepsis bloodwork. Other aspects of the Sepsis Guideline Set, particularly the printing of the pre-printed order for inclusion in the chart (a step which is believed to increase the probability that physicians will follow the Sepsis Guideline Set), were left to the subsequent care team, with the assumption that they would be taken up by the receiving nurse and/or physician.

> The sheets I find sometimes it's done at triage. Other times it might not be done. I don't see it being done because it's almost something that is kind-of stuck in your head, so you enter the sepsis bloodwork right away and then let the nurse who's going to be receiving that patient know. So, they are aware but the sheets, I want to say that's kind of half-and-half. It depends on how busy it is. (DC, Hospital Emergency Department Nurse)

Some participants described a tendency among nurses to become task oriented when workload is high, and resources constrained. A task orientation was seen as a significant impediment to a clinician's ability to interpret and respond appropriately to a clinical situation, hence an impediment to building competence.

> It's just that sometimes it gets so busy that people become so task oriented. This is one of the things I've discussed in the last few weeks, is the nurses here are so good at

> completing tasks but then it becomes task-focused because it's so busy. Even for the new nurses which they are thrown into this kind of scenario. They learn very quickly but it becomes task-oriented and then you forget to think, oh yes, there's this protocol and I need to give antibiotics because it's, you know, it's important, shouldn't be delayed. (DC, Hospital Emergency Department Nurse)

While all DC clinicians expressed a belief that the Sepsis Guideline Set was well known and embedded as ingrained practice in the Emergency Department, the use of the Sepsis Guideline Set pre-printed order often became a fatality of workload challenges and attitudes. Most clinicians admitted to a feeling that use of the pre-printed order was inordinately time-consuming and did not confer enough value for the patient to justify the additional workload in the context of the needs of the many patients in the department.

Bundling for Focus and Communication

Some DC participants noted that, in addition to a limited focus on practical workload and workflow assessment, priorities seemed to come to the Emergency Department as transitory, single initiatives – soon to be replaced by others. Opportunities were believed to exist to bundle initiatives in such a way as to align supports for a variety of priorities at the same time, if proper consideration was given. One CNE described an effort to improve effectiveness by grouping Sepsis Guideline Set implementation with other interventions that require immediate response.

> At that time anyways, I was thinking, there were three things that you had to react to quickly to save people when the arrive in your emergency. There were strokes, sepsis, and STEMIs [ST-Elevation Myocardial Infarctions (heart attacks)]. The 3 S's. And those you had to move on. Everything else, mostly, you could take your time. (DC, Hospital Emergency Department CNE)

There was little evidence that this type of bundling was considered formally for emergency department Sepsis Guideline Set implementation among other sites or in alignment with consideration of the workflows involved. The 3 S's had not come to the attention of City Hospital DC participants. The potential effectiveness of considering the interactions among improvement initiatives together was raised by one participant in regard to later efforts to improve inpatient sepsis rates.

> It's improving, it's improving. What has changed is the urinary tract infections and the hospital acquired infections. They have plummeted and because of those two, our sepsis rates have come down. (RLS, Regional Quality Improvement Department Lead)

Sepsis Care in the Emergency Department: How Did It Go?

Participants from the City Hospital DC group did not describe the scorecard or its key performance indicators (KPIs) when asked about the degree to which the implementation was successful. Those who mentioned the measures at all simply made passing reference to a belief that the CNEs monitored such things. DC participants were much more inclined to assess implementation success by the degree of general knowledge obtained and the reflection of that knowledge in practice as experienced anecdotally.

> My understanding from when I started here as a new nurse, basically as a brand-new nurse to now, I feel the transition has actually been really good in terms of the implementation of it. Because I feel as though more of the staff are more aware of it so as soon as, for example, you get a patient with a heart rate of 120 and they're febrile, you just order the bloodwork. So, if anything, the bloodwork is always ordered. From the triage point of view anyways. So, for the most part that is, I feel like that has been addressed for the most part. I would say on a scale of ten being

> really good at it and zero, being we're not, I would say we're roughly 8 or 9. That's how I feel anyways. Because I do triage, so I do know a lot of my colleagues, once you do, hit two or three of those criteria, you, the sepsis protocol is already initiated in terms of the bloodwork. (DC, Hospital Emergency Department Nurse)

While clinicians recognized and respected the pre-printed order on a conceptual level, they believed the compromises made were largely administrative – "ticking boxes" and "filling out paperwork." Similarly, while respectful of the research and science behind the Sepsis Guideline Set, the DC clinicians – doctors and nurses - had drawn the conclusion that the expectations of the Sepsis Guideline Set were overly aggressive and impractical. The consensus among both DC physicians and nurses was that they represented a combination of case identification (SIRS criteria) and clinical actions that were helpful only in that they pointed in the direction of an appropriate approach to care – guidelines to be considered, not necessarily followed to the letter.

Given all this practical context, physicians and nurses consistently expressed a belief that an effective balance had been reached – that good care was being provided in the face of high workload and an inability to change workflow enough to enable the Sepsis Guideline Set to be followed more stringently. A single physician who was aware of the hospital's relatively low sepsis mortality rates held these up as evidence that, on-the-whole, good sepsis care was being provided. More of the DC clinicians lacked knowledge of these data but also asserted a belief, that proved consistent with the evidence presented by outcome data, that the Emergency Department's sepsis care was good, citing a lack of evidence to the contrary such as sepsis-related adverse events.

> I think patients that I encounter who are septic, I don't have a lot of moral dilemmas about it, that I can think of. Or that we've missed something huge or anything. (DC, Hospital Emergency Department Nurse)

In summary, participants of the DC group reported positively on the success of the implementation as they believed they and their colleagues were well aware of the guidelines and incorporated them naturally into practice. They recognized a widespread lack of use of the pre-printed order. While they conceded that more consistent use of the pre-printed order would be a good thing, they did not consider this to be clinically necessary as the orders represented "paperwork" reflecting practice that was happening naturally. All DC participants interviewed differentiated in some way between ideal sepsis care as might be reflected in the academic research and good sepsis care as can be practically achieved given the workflows and workload of the busy City Hospital Emergency Department.

Becoming Competent and the Practice of Direct Care Providers

Participants from the DC group described a perspective of Sepsis Guideline Set implementation that reflected their efforts to learn toward becoming competent, with brief educative activities focused specifically on the Sepsis Guideline Set, supported by embedding sepsis management into broader efforts to recruit, orient, and continuously develop clinical staff who would demonstrate professionalism, expertise, and teamwork on a day-to-day basis in the busy Emergency Department. DC participants tended to describe a learning approach to implementation of the Sepsis Guideline Set that, like the implementation process described by the RLS participants, built on early originating work led by Direct Care group Clinical Nurse Educators. From the DC perspective, however, the early work was only part of an ongoing effort to build and reflect clinical competence

amongst team members. Competence was paramount for the members of the clinical team – as they described a professional development process building from general knowledge gained as a student and during early orientation or implementation activities, through to the point of expertise, where knowledge is reflected naturally as innate behaviour. There were many indications that competence was considered not only to be an individual attribute but as one that is achieved and recognized among the team.

Within the DC group, the process of Sepsis Guideline Set implementation was supported initially by a variety of time-limited education and communication activities (in-service and discussions in the newsletter "the Weekly RANT") that then fed into, and were supported by, ongoing processes of individual and team competency development and support including staff selection, orientation, and ongoing professional development. These ongoing processes reflected, but were much broader than, Sepsis Guideline Set implementation, incorporating sepsis management as part of an ongoing context of active human resource management, professional development, and peer support/mentorship, particularly for nurses. For these processes, the expertise and professional credibility of the Clinical Nurse Educator (CNE), Nurse Clinician, and the physician Chief of Staff were critical. Nurses looked almost exclusively to the CNEs to assess and introduce new practices like the Sepsis Guideline Set. Physicians were more likely to consider sources outside of Select Health for information to assess new practices, though they looked to the Chief to understand the organization's priorities. For physicians, time efficiency was critical so they sought sources that synthesized what they deemed highly credible information into small, consumable packages (e.g., written briefs or short podcasts).

DC clinicians perceived Sepsis Guideline Set implementation, and their assessment of the degree to which the implementation was successful, within the realities of their day-to-

day work and team activities. The City Hospital Emergency Department workload was such that they were seldom able to follow the guidelines precisely. Aspects of the Sepsis Guideline Set – including use of the pre-printed order itself and some of the more aggressive elements of care – were largely forsaken as they were deemed of dubious clinical necessity, or even administrative in nature. Overall, however, they felt they had achieved a balance where good clinical care was being provided in a way that would not compromise the team's ability to effectively and efficiently meet the needs of the many sick patients arriving at the department throughout the day. DC participants defined success largely as the lack of evidence to the contrary – as participants had experienced few sepsis-related adverse events. Evidently the DC participants had established their own priorities and goals for sepsis management, different from the adherence focus of the RLS and AAP participants.

From the perspective of DC participants, the challenges arising from the dynamic nature of the evidence regarding sepsis described in Chapter Four became evident. While, as discussed in the previous chapter, RLS participants seemed comfortable with implementation based on the process specifications of the guidelines, clinicians, particularly physicians, appeared to resist adherence and use of the approved support tools without clearer evidence that their local outcomes could be improved.

Chapter Summary

This chapter presented a description and interpretation of the Sepsis Guideline Set implementation from the perspective of participants from the Direct Care group. Participants of this group sought to implement the guidelines as a process of learning, toward becoming competent. They reorganized behaviours of various providers through learning in practice, as part of their professional responsibility. With an important delegation of implementation leadership responsibility away from the DC Manager, only two people from the DC group

(CNE and Chiefs of Staff) worked substantially across the boundaries of AAP, RLS, and DC groups to engage with, and align implementation activities regionally. Along with their regional Program/Service Network counterparts and the Policy Office, these activities and actors proved very effective at creating awareness about guidelines and establishing regionally standard clinical decision support tools that could have been used to guide Sepsis Guideline Set implementation. Within the DC group, the participants involved in Sepsis Guideline Set implementation expanded, particularly for nurses, to include student preceptors, orientation buddies and Nurse Clinicians. These individuals worked to incorporate the guidelines and sepsis awareness and management into their day-to-day support for training, orienting, and developing clinicians to become competent practitioners within the team. Unfortunately, these activities and actors proved insufficient to effect the change required to make significant progress in guideline adherence. The existing workflow, workload, and degree of automation in the City Hospital Emergency Department did not support full adherence to the guidelines. Engagement within the DC group was limited as the group lacked forums for significant conversation and coordination of improvement work within and among the professions (nurses, physicians, managers); limitations in time and resources prohibited such activity. While adherence was poor, the DC participants had established a positive view of the implementation's success. From their situated, practical perspective, sepsis management was not a significant improvement concern based on the outcomes they experienced and what they knew of sepsis mortality rates.

The next chapter provides a discussion and interpretation of the findings from the Select Health case study findings presented in this and the previous two chapters, highlighting an important link between the perspectives of people engaged in different groups and the actions they take toward Clinical Practice Guidelines. Failure to share and align these perspectives

led to implementation process weaknesses that compromised the effectiveness of the Sepsis Guideline Set implementation at Select Health.

Chapter Eight: Understanding the Roots of Discordance in CPG Implementation

This chapter begins with a discussion about the discordance that was evident in Select Health between the perspectives and actions of academics, regional managers and support staff, and clinicians. While academics, regional managers and support staff, and clinicians each, as a group, offered a relatively consistent, coherent description of the implementation that took place, the perspectives differed considerably across the groups. The different perspectives led to actions that were insufficiently aligned for the CPG implementation to be successful. The CPG implementation literature, including the Consolidated Framework for Implementation Research (CFIR), and practice theory, together, offer a useful lens for understanding the relationship between discordance and perspectives. In this chapter, I examine academics, managers and support staff, and clinicians as three important communities of practice as described in the practice theory literature. By considering the relationships between and within the three communities of practice, the chapter illuminates the strengths and weaknesses of the Select Health Sepsis Guideline Set implementation process. At the end of the chapter, I discuss the need for a process to address discordance, offering a way for Regional Health Authority decision-makers to support CPG implementation to be more successful.

Discordance in CPG Implementation

The Sepsis Guideline Set implementation process unfolded as a complex flow of activity involving academics, regional managers and support staff, and clinicians, incited and informed intermittently by the activities of a provincial quality network. Interested Clinical Nurse Educators (CNEs) guided early originating activity toward uptake of the CPG, that was taken up more formally by regional managers and support staff for activation, prioritization, and planning and support development.

At times, alignment existed between the CPG implementation actions of individuals from each of the three groups: academics, regional managers and support staff, and clinicians. In this study, alignment is reflected by convergence in how various study participants described the implementation process. Participants from each of the groups, for instance, described the individuals and actions involved in the CPG rollout (in-service and tool deployment) consistently.

Overall, however, I characterize the implementation process by its discordance, the misalignment or lack of harmony of perspective and action among individuals involved in the process. Most evident was a discordance amongst the three groups, in their perspectives about CPG implementation and the actions they took. Most participants described the implementation process in positive terms but there was a difference between how participants from each of the three groups described success. Academics spoke positively of the growing interest and activity they were able to generate among provincial Regional Health Authorities in sepsis management and the Sepsis Guideline Set specifically. Academics and regional managers and support staff spoke favourably about the measures they had created to monitor clinical practice adherence and outcome and the scorecards they designed to convey them. Regional managers and support staff highlighted, as a success milestone, that clinical Decision Support Tools such as pre-printed orders and nurse-initiated orders were developed and approved by the organization's decision-making bodies including the program leadership and the Medical Advisory Committee. Regional managers and support staff believed that organization structure and the Decision Support Tools that had been developed positioned Select Health for success in implementing the Sepsis Guideline Set.

Clinicians indicated that education and clinical support/mentoring promoted widespread understanding of the guidelines, which they felt aligned with their daily clinical

experience to enhance clinical competence. Clinicians believed that they provided good sepsis care because, as competent practitioners, they did the right things at the right times, though their decisions and actions were not always fully adherent to the guidelines. They noted that this tacit competence was reinforced on a day-to-day basis through strong teamwork and demonstrated in their perceived success in catching and averting critical outcomes for deteriorating sepsis patients. Clinicians rationalized that full adherence was impractical within their day-to-day environment, and likely unnecessary.

Academics, regional managers and support staff, and clinicians had established their own interpretation of what a successful implementation would look like, and acted accordingly. While clinicians had clearly acquired explicit knowledge of the guidelines (most were able to recite the guidelines accurately), their actions were focused on something other than meeting the CPG's requirements with full adherence or fidelity. Assessment of the clinical merits of the clinicians' actions was beyond the scope of this study. Perhaps clinicians had settled on the best implementation solution possible given the organization's realities and constraints. The essential point about discordance for this dissertation is that individuals from other groups were clearly expending effort (e.g., developing and monitoring the use of pre-printed orders, monitoring adherence data that required significant time and resources) under a belief that full adherence was the objective.

Given the degree of discordance evident in the CPG implementation process, it is not surprising that, at the end of the day, few of the specific requirements of the CPG – a guideline to which all had ostensibly committed – were met.

The Consequences of Discordance in CPG Implementation

At Select Health, a discordant implementation process resulted in a technically unsuccessful CPG implementation; the expectations of the CPG were not achieved.

Further, even though overall relationships were described by study participants as positive, the discordance led to unresolved tensions among individuals within and across the three groups. In some instances, frustration accompanied assumptions or rationalizations. Some regional managers and support staff, for instance, described non-adherence to the guidelines by clinicians as resistance to change or as clinicians acting in their own self interest. Some City Hospital clinicians assumed that senior leaders pursued guideline adherence only to manage risk to the organization. Other clinicians described the activities of managers and support staff with disinterest – viewing them as irrelevant to their day-to-day lives. As a highly collaborative endeavour, CPG implementation success can be increasingly challenged if interpersonal tensions and untested assumptions prevail as they influence perspectives and the scope and nature of actions taken. Unresolved tensions and assumptions appear likely to build, making subsequent CPG and other change implementations more difficult.

Perspectives Underlying Discordance

Discordance appeared to stem from deeply rooted differences in the perspectives held about CPG implementation between academics, managers and support staff, and clinicians, and the actions that those perspectives promoted. The three perspectives regarding the Sepsis Guideline Set implementation process had some similarities, and many differences along several dimensions including:

- Why they implemented the CPG, the outcomes they anticipated,
- For whom they implemented the CPG, the patients/people they targeted,
- How they perceived and approached the CPG implementation:
    - The way they talked about the Sepsis CPG in relation to other priorities

    - The source of power motivating action and the process(es) through which that power it was enacted
    - The activities they undertook
    - The objective of the activities they undertook, and
- How they evaluated their progress.

Table 8.1 presents a comparison of the perspectives based on how academics, regional managers and support staff, and clinicians each predominantly described the implementation along these dimensions.

Table 8.1

Dimensions of Different Perspectives Regarding CPG Implementation

Dimension	Academics: Advancing CPG Implementation	Regional Managers and Support Staff: Managing CPG Implementation	Clinicians: Becoming Competent in Sepsis Care
Objective of implementation	Improved safety and better health outcomes for patients	Improved safety and better health outcomes for patients	Improved safety and better health outcomes for patients
For whom?	Emergency Department patients (collective) – provincial, national, international	Emergency Department patients (collective) – regional and site	Patients in Emergency Department (individual) Deteriorating patients in Emergency Department (individual)
Relationship to other priorities	Singular – Sepsis Guideline Set implementation	Singular – Sepsis Guideline Set implementation	Holistic and contextual – provide good sepsis care within the context of the busy Emergency Department
Power and process	Expert Influence, advocating and networking	Authority, managing	Professionalism, competent practice and learning
Implementation strategies	Synthesizing evidence Communicating Developing guidelines Developing and monitoring performance scorecards Facilitating professional dialogue Collaborating - sharing of knowledge and supports Advocating; exerting social pressure	Creating standard organization structures and processes Coordinating Prioritizing and allocating resources – financial and other supports Identifying and monitoring accountabilities Communicating Developing clinical decision tools; aligning supports Educating Developing and monitoring performance scorecards	Communicating Developing clinical decision support tools Automation (testing) Staff recruiting & pre-screening Preceptorship Orientating & mentoring Educating/professional development Discussing cases/incidents Teamwork
Objective of activities	Spread – sharing and growing interest and understanding Adherence to provincial standards	Adherence to regional standards	Competence – ingrained practice in response to patient needs
How progress is evaluated	Statistical analysis Milestones – growth in collaborative participation, guideline and data methodology and tools	Statistical analysis – sepsis rates/outcomes Milestones - formal prioritization and approval of support tools	Case review; story telling Milestones – Delivery of in-service, demonstrable knowledge of standards

The perspectives described in Table 8.1 are not meant to imply that all academics, regional managers and support staff, or clinicians spoke of CPG implementation uniformly. Physicians, for instance, described the implementation in some ways that were different from nurses, though they are both captured in this discussion as clinicians. Together as clinicians, however, nurses and physicians presented a perspective that offered some common dimensions that could be contrasted with those of academics or regional managers and support staff.

The three perspectives built upon similar stated objectives: ensuring safety and improved patient care. Differences appeared, however, when considering the target population for whom those describing each perspective directed their focus. Regional managers and support staff, and academics considered large patient populations – many patients, multiple sites, with a singular focus on improving sepsis care. This perspective and its focus on a large population of patients, was conducive to using statistical methods of analysis to evaluate progress. Regional managers and support staff described implementation activities that tended toward authority-based direction, management, standardization and performance monitoring/evaluation activities. Academics described implementation activities that tended toward influence-based advocacy and networking.

The clinicians' perspective focused on a smaller set of, or individual, patients. Clinicians considered case review to be more meaningful than statistical analysis to assess Sepsis Guideline Set adherence and outcomes as learning from the case review can be incorporated into the clinician's competent practice. From the perspective of clinicians, sepsis care was certainly an important focus, but they tended to view it more holistically – always within the context of the complex realities of the patient, all patients, and the

department itself. Clinicians also spoke more specifically of deteriorating sepsis patients as a subgroup towards which they focused much of their implementation activity.

The three groups, however, differed regarding the source of power motivating action and the process(es) through which that power was enacted. In advancing implementation, academics sought to influence health service providers and decision-makers with expert knowledge - through knowledge synthesis and sharing, as well as through networking activities (e.g., the BCPSQC Sepsis Network sought to influence health providers in this manner). Within Select Health, in managing implementation, regional managers and support staff sought to organize and embed required activities in organization structure and formal implementation process, established by the Policy Office, and reinforced by authority and reporting relationships. Clinicians appeared to have been driven by professionalism, a pursuit of competence through more practical, contextualized learning and professional development activities (Nurse Clinicians, for instance, sought to reinforce good sepsis care through mentoring activities on a day-to-day basis). Differences in power and power imbalances in social situations have been described in other research focusing on inter-group dynamics (Currie et al., 2013; Fitzgerald & Harvey, 2015; Racko, 2018). While no studies appear to describe power dynamics of all three groups considered in this study, Currie et al. (2014) describe power dynamics between academics and clinicians, including tensions between expertise and practicality, similar to those seen here.

While participants seldom referred specifically to strategies, Select Health Sepsis Guideline Set implementation activities were consistent with some of the implementation strategies outlined in the Expert Recommendations for Implementing Change (ERIC) compilation of discrete implementation strategies (Powell et al., 2015), the Cochrane Effective Practice and Organization of Care (EPOC) framework (Cochrane Effective Practice

and Organization of Care, 2015), and a variety of research syntheses including Spoon et al. (2020), Ebben et al. (2018), Sarkies et al. (2017), and Sungkar et al. (2018). Strategies reflected by Select Health activity included: communication and education, audit and feedback, including evaluation through measurement and scorecards, structure/management accountability, networks and collaboration, case review, professional dialogue, and automation and support tool strategies.

Many known strategies were reflected in some way during the CPG implementation but few appeared to have been purposefully selected or agreed upon by academics, regional managers and support staff, and clinicians. Implementation scientists promote a more methodical and purposeful identification of barriers and tailoring of strategies to barriers than was evident at Select Health (Powell et al., 2017). Communicating and educating were two strategies that were consistently described by most study participants. Unfortunately, these strategies alone were not sufficient to ensure alignment of action among academics, regional managers and support staff, and clinicians, or to ensure successful implementation of the CPG.

Participants from each of the three groups demonstrated significant differences in perspective regarding the strategies that they deemed important to the CPG implementation process, as is evident in Table 8.1. Academics and regional managers and support staff described strategies and actions that were aimed at supporting and monitoring adherence to the CPG's expectations by clinicians. Regional managers and support staff worked to support the development of Decision Support Tools, including pre-printed orders, to support adherence by clinicians. Pharmacy support staff worked to inform the tools. Some support staff, including the laboratory, changed their own processes to ensure that that expectations of the CPG could be met. Academics, the BCPSQC Quality Leads, designed initiatives to

draw attention to the pre-printed order and to promote its use. These efforts to support adherence, however, were not aligned with clinicians' apparent intentions or capabilities. Strategies described by clinicians were not oriented toward adherence, but toward knowledge acquisition, teamwork, tacit action, and adaptation within the local context, with a focus of ensuring that the worst patient outcomes were avoided (nurses, for instance, spoke of the importance of teamwork to ensure that indicators of sepsis patient decline are not missed). Academics, regional managers and support staff, and clinicians made insufficient effort to align these approaches, and a discordant, ultimately unsuccessful, implementation resulted.

There was a compelling connection between the perspectives of academics, regional managers and support staff, and clinicians, and the strategies they chose – evident in the degree to which each described different strategies listed in Table 8.1. The principle that groups of people can hold differing perspectives, and that those perspectives can affect how they seek to enact change, has been established within the literature. Argyris and Schön (1974), for instance, described "theories of action" to explicate differences between the views and actions of academics and practitioners. Senge (1990) described "mental models" that all individuals hold based on their experiences, which drive action and lead to assumptions about the actions of others. Cammer et al. (2014) discuss the multiple underlying philosophies that can exist within an organization. The CPG implementation literature does not, however, discuss differences in the motivations, strategies, or actions toward CPG implementation of academics, managers and support staff, and clinicians specifically. The CLAHRC research speaks to the relational challenges involved in collaboration between academics and health service providers (Soper et al., 2015), but does not systematically consider their differences in perspective. The CLAHRC research does not address the differences that may exist between groups within the broader health organization or Regional

Health Authority, such as those between managers and support staff and clinicians. Proctor et al. (2013) provide recommendations for specifying and reporting implementation strategies. The domains identified by Proctor et al. (2013) – actor, action, target of the action, temporality, dose, implementation outcomes affected, and justification – offer some similar concepts as dimensions described in Table 8.1 (e.g., why implement? What outcomes are anticipated?), but the authors' purpose is very targeted to specifying implementation strategies as opposed to considering how perspectives might differ regarding CPG implementation overall.

The link between differences in academic, regional manager and support staff, and clinician perspectives as a mechanism promoting discordance in CPG implementation has not been discussed robustly in the CPG implementation literature. Kouzes and Mico (1979) theorized three very similar domains – Policy, Management, and Service – relevant to public service organizations. They further described discordance (interpersonal) as a potential result of differences among the domains in principles, success measures, structures, and work modes (Kouzes & Mico, 1979). Domain Theory, however, gained limited attention from researchers and does not appear to have been incorporated into the CPG implementation literature. These differences in perspective about CPG implementation, proved very important for Select Health's CPG implementation, and may be so for other organizations – particularly larger regionalized organizations where distance, history and multiple sites for care provision can promote divergence among the perspectives of academics, regional managers and support staff, and clinicians.

Perspectives and Practice Theory

Practice theory offers a theoretical foundation for understanding the discordance observed in the Select Health CPG implementation process, and its correspondence to the

different perspectives of academics, regional managers and support staff, and clinicians. To this point in the dissertation, I have described academics, regional managers and support staff, and clinicians as three "groups," established for the research based on organizational function. The perspectives, however, did not align solely to function, or any other single descriptor such as profession or location. There was little functional commonality between regional managers and support staff, yet their perspectives on CPG implementation were quite consistent. Many of the regional managers participating in the study were clinical professionals, yet their perspectives seemed different than those of the local Emergency Department clinicians. Few of the participants were located close to each other for any substantial amount of time. Instead of being driven by any single factor such as function, participants from each group appeared to have drawn upon a variety of influences (e.g., their values and experiences, training, professional affiliations, and organizational functions and roles) to negotiate ways of seeing and enacting CPG implementation.

The perspectives and actions of academics, regional managers and support staff, and clinicians, described and discussed in this study, were consistent with, and might be usefully understood, as reflecting three communities of practice as described by Wenger (1998). Each community of practice, facing different day-to-day realities, had come to see sepsis management and CPG implementation differently and acted accordingly. Communities of practice - loosely defined networks of people participating together in practice - continuously learn and negotiate meaning through degrees of mutual engagement, joint enterprise, and shared repertoire (Wenger, 1998, pp. 72-85). Different communities of practice can hold different perspectives, and these perspectives underlie the actions each might take (Wenger, 1998, pp. 103-121).

Similarly, Wenger notes that communities of practice can organize, in some way, into a broader aggregate he calls a constellation of practices. A constellation of practices shares a degree of continuity amongst its constituent practices, though they are "too far removed from the scope of engagement of participants, too broad, too diverse, and too diffuse to be usefully treated as single communities of practice" (Wenger, 1998, p. 126). Like communities of practice, the concept of a constellation of practices is helpful to understanding CPG implementation as it draws attention to the breadth and fluidity of social activity involved, whether the activity conforms rigidly to organizational boundaries or not. Certainly, together, regional managers and support staff, and clinicians, might be usefully considered as a constellation of practices, understood and sustained as an organization named Select Health, and comprising the inner setting of the Consolidated Framework for Implementation Research (Damschroder et al., 2009). But by "zooming out" (Nicolini, 2012), a broader constellation can be considered; a constellation which includes academic participants who were "outer" to Select Health, but who shared, at a particular place and time, a common interest in Sepsis Guideline Set implementation.

Wenger notes that continuities and differences across a constellation of practices are best understood by relationships amongst its constituent practices: how they interact at their boundaries (Wenger, 1998, pp. 128-129). People, structures, and processes can work across the (soft) boundaries of communities of practice, spanning boundaries, sometimes helping to align perspectives and activity (Wenger, 1998, pp. 103-121). Other practice theorists note, similarly, the critical importance of connections, or associations, among people in practice toward the integrity or change of any social construct including organizations (Latour, 2005; Nicolini, 2012). Wenger draws attention to the importance of engagement, imagination, and alignment of participants and their actions, in any efforts to promote successful learning and

change across a constellation of practices (Wenger, 1998, pp. 225-229). Study findings are consistent with Wenger's observation: limitations in engagement – especially of a wider range of clinicians - limited their ability to contribute (their ability to imagine solutions with other groups), and align with participants from the other groups, leading to discordance.

Interpreted as a constellation of practices, a focus on the connections (and disconnections) amongst individuals from the constituent communities of practice is instructive. The findings presented in chapters 5-7 demonstrate that the degree of collaborative activity of individuals from each of the communities of practice was, at most times, very limited. The most collaboration (as reflected by consistency in study participant accounts) was apparent during the implementation 2-3 week "go-live" period. While several individuals in key roles (BCPSQC Leads, Service Program/Service Network Leads, CNEs, Chiefs of Staff, ED Department Managers) worked across the boundaries of the academic, regional management and support, and clinical communities of practice, this activity proved insufficient to ensure the degree of alignment of people and action required to enable adherence. In the case of Select Health, the organization's leaders, ultimately the Executive Team, had either not established, or marshalled effectively, the system of people, structures, and processes to ensure the changes required for adherence; what Wenger calls affordances (Wenger, 1998, pp. 225-240). The result of insufficient engagement across communities of practice was a discordant and ultimately unsuccessful implementation process.

The next sections examine the Select Health CPG implementation process to understand the relational connections that were and were not successfully made, to support a better understanding of how discordance might have been avoided. This examination begins by summarizing some aspects of the implementation that participants noted to have been

weak or limited. These limitations may prove instructive in identifying opportunities for better connectivity among academics, regional managers and support staff, and clinicians.

Limitations of CPG Implementation Process

Participants identified several activities, detailed in Appendix F, as missing or only partially realized in the Select Health Sepsis Guideline Set implementation – limiting the implementation process and encumbering its success. These activities include:

- Review of research evidence and regional and local implications,
- Interprofessional forum to enable clinical participants to engage with the evidence and implementation process,
- Analysis and practical resolution of workflow issues related to Sepsis Guideline Set implementation,
- Automation of diagnostic or care tools, and
- Staffing adjustments to reflect changes in workload indicated by the guidelines.

Regional managers and support staff, and clinicians described missing or partially accomplished activities as barriers to CPG implementation success. Clinicians noted that they had little control or capacity to enact these activities; they required resources only available from regional managers and support staff including: financial resources to support clinicians to be paid for involvement, and non-financial supports including changes to their information systems. Nadalin Penno, et al. (2019) identify human resource and financial/non-financial resource limitations as common barriers to implementation sustainability.

Several of the activities (detailed further in Appendix E) are consistent with important implementation strategies identified in literature syntheses of strategies, including: interprofessional education/development (Spoon et al., 2020), automation (Armson et al.,

2018), culture change, and research evidence and assessment (Fischler et al., 2016; Jeffs et al., 2013). However, workload and workflow assessment are missing activities that are not well addressed in the ERIC compilation (Powell et al., 2015) or in research syntheses regarding CPG implementation strategies including Spoon et al. (2020), Ebben et al. (2018), Sarkies et al. (2017), or Sungkar et al. (2018). Based on the findings of this study, this appears to be an important omission given that workflow might be seen as the most direct way for RHA decision-makers to alter the resources and rules that affect practice (Wenger, 1998).

In addition to the five missing or partially accomplished activities (review of research evidence, interprofessional forum, workflow resolution, automation, and workload adjustments), the clinical managers had limited involvement in Guideline Set implementation. Clinical manager involvement was curtailed both by explicit delegation of leadership of the implementation to CNEs, and by the lack of time managers had available. Clinical managers proved necessary both locally within the clinical community of practice, and as conduits to/from regional management and support, and academic communities of practice for support in implementing the CPG. Regional managers and support staff consistently described the Program/Service Network structure as involving a flow of information, activity, and accountability by connecting, and integrating, regional managers and support staff and clinical managers, educators, and physician leaders. Yet, in practice, they did not discuss clinical managers substantially in their accounts of how the Sepsis Guideline Set implementation actually unfolded. Clinicians seldom referenced the clinical manager in their account of the implementation.

Connections and Disconnections Between and Within Communities of Practice

A discordant implementation process resulted at Select Health as engagement across the constellation of three communities of practice was insufficient to ensure alignment of action. To better understand how discordance might be avoided, this section examines areas of activity that were notably discussed by study participants; considering the degree to which they did, or did not, facilitate engagement among academics, regional managers and support staff, and clinicians.

Given the importance of interpersonal connections and relationships, it is not surprising that the areas of activity influencing engagement were not necessarily unique to the Sepsis Guideline Set implementation. Certainly, some improvement could have been made through better implementation process (e.g., a more robust Shared Work Team might have helped to engage more individuals across communities of practice). However, the areas of activity that proved more important appeared to have been contextual, day-to-day aspects of organizational activity, not specific to the Sepsis Guideline Set implementation, that did, or did not, promote sufficient engagement and alignment.

Following are six areas of activity that appeared to be important to the CPG implementation at Select Health. While each of the six made some positive contribution to engagement of participants across and within the three communities of practice, they each had deficiencies – disconnections – that were noted by study participants as limitations. Consideration of the strengths and weaknesses of each of these areas of activity is helpful to understanding how RHA decision-makers might seek to establish structures, processes, and people/roles – the affordances - to better support and enable CPG implementation in future.

1. Service-Oriented Improvement Structures, Processes, and People

Organization-wide service improvement conversations were important for facilitating connections within and among communities of practice at Select Health, though key opportunities for improvement were apparent. At Select Health such conversations were facilitated through the organization's service-oriented Emergency Medicine Program/Network structures, processes, and people. The service-oriented structure was organized to ensure engagement of decision-makers from across sites, roles, professions, and functions toward ongoing service quality improvement. The service-oriented structure helped to support communication and connections across the organization's regional management and support, and clinical communities of practice. Connections were facilitated by articulating committees (committees with overlapping membership) and meetings, and supporting processes, which brought together some individuals holding key positions from the two inner setting communities of practice: regional managers and support staff, and clinicians. Specifically, managers, physician leaders, educators, and some clinicians from across the organization were included in the committee activity, to an extent making the management and support, and clinical communities of practice less insular.

The strength of the service-oriented structure was not its top-down hierarchical nature, but its non-hierarchical horizontal, facilitative capacity. Greenhalgh (2004) identifies horizontal, engaging organization structure as important to effective spread of innovation. The Select Health Programs/Networks were established as a formal, service-oriented part of Select Health's organization structure. Specifically, managers, physician leaders, and educators had the ability to come together through the Program/Network to share information and to identify and pursue opportunities to improve. The service Program/Network alignment of regional managers and support staff and clinical stakeholders, *particularly* educators,

physician leaders, and to a lesser extent, clinical managers, contributed to the Sepsis Guideline Set implementation. These three roles appear to have been important as they facilitated boundary spanning (Wenger, 1998) connection and interaction among specific regional managers and support staff, and clinical leaders.

There were apparent shortcomings in the service improvement activities' effectiveness at facilitating connections given the limited degree to which clinical managers engaged in Sepsis Guideline Set implementation. Further, during the timeframe of the Sepsis Guideline Set implementation, the Executive Team had not designed supports to enable very rich engagement, through the Program/Service Networks, with academics or clinicians. Study participants reported only very sporadic interaction with BCPSQC leads and virtually no interaction with post-secondary educators. Similarly, the Select Health Executive Team might have done more to reinforce the collaborative, iterative local-regional nature of the Program/Network by supporting further involvement amongst clinicians. A clear connection between the service-oriented structures and processes, and the local clinical teams' efforts toward professional development could have enhanced engagement of clinicians, reducing the insular nature of each community of practice.

While structure is reflected in CFIR as a construct affecting CPG implementation, the framework construct offers little clarity regarding optimal organization structure beyond favouring smaller unit sizes and flat rather vertical hierarchies (Damschroder et al., 2009). In fact, the CFIR research team identify that "little is known about the interplay between formal structure, informal networks, and effective communication" (Consolidated Framework for Implementation Research, 2020). Further, literature is sparse regarding regional health organization service-oriented structure (e.g., Programs/Networks) and its relationship to CPG implementation (Humphries et al., 2014). This study suggests that a benefit of a horizontal,

service-oriented structure is its ability to draw together and engage a variety of participants from across the three important groups – offering the opportunity to align their perspectives and avoid insularity among communities of practice, and the resulting discordant action. To optimize this impact, it might have been helpful for Select Health decision-makers to have ensured a formal connection between the service-oriented structure and a formal, rigorous approach to professional and interprofessional development.

2. Professional Learning and Development

The Emergency Medicine Program/Network structure and processes provided a clear connection and schedule of meetings among some regional managers and support staff, clinical managers, nurse educators, and physician leads involved in the provision and improvement of Emergency Medicine services at Select Health. But beyond these few role-based relationships, connections between regional managers and support staff and clinicians were uneven and limited by profession. For nurses, a coherent connection between regional managers and support staff, and clinicians (nurses) was apparent for learning and professional development activities. The Sepsis Guideline Set was incorporated by regional managers and support staff, and nurses into recruitment, training, orientation, and ongoing professional development materials and activities. These materials and activities helped to orient nurses to the guidelines, and to reinforce skills important to identifying and meeting the needs of deteriorating septic patients. This activity is consistent with Fixsen et al. (2005), who highlight the importance of staff selection, training, coaching to successful implementation. Regional managers and support staff and Clinical Nurse Educators worked well together to align ongoing professional development across the Emergency Medicine Program/Network by establishing, and promoting use of, the education checklist to guide learning. Further, during day shifts, the Department benefitted from the development and

practice support activities of the Nurse Clinician. The Nurse Clinician worked with the CNEs over time to reinforce CPG knowledge, including that of the Sepsis Guideline Set, in the minds of nurses on the floor.

While professional development activities for nurses enhanced engagement and alignment for that profession, gaps existed for physicians. Efforts were made by the Department Chief to ensure that City Hospital Emergency Department physicians were oriented to the Department's CPGs, but physicians lacked the in-practice support available to the Department's nurses through the Clinical Nurse Educator and the Nurse Clinician. Physicians expressed that they felt engaged in, and supported by, the Department's team ethic, yet some conceded that few opportunities existed to benefit from professional development activities at Select Health.

Further, several physicians and nurses reflected that the team did not engage in many development activities together, interprofessionally. In a systematic review of CPG implementation strategies, Spoon et al. (2020) notes the importance of interprofessional education activities to implementation success. Interprofessional education/development activities might have helped further promote engagement and collaborative learning within and beyond the local clinical team, creating a context that was more conducive to successful CPG implementation. It might have been beneficial for Select Health decision-makers to have facilitated closer connections between clinical and regional managers as important participants in interprofessional development activities. As there were no such activities at Select Health, there was limited opportunity for alignment of perspectives among managers and clinicians, which, ultimately, led to weaknesses in the Sepsis Guideline Set implementation process and limited success. Robust, engaging interprofessional learning and development structures and processes might have provided a sensible space and way for

RHA participants to engage with academics – both researchers and educators – reducing the insularity of communities of practice, enabling cross-fertilization across the constellation of practices, and enhancing the "research culture" that some study participants believed to be missing at Select Health.

3. Quality Improvement Collaboratives and Networks

The Select Health Sepsis Guideline Set implementation case study findings offer an opportunity to examine the potential positive impact, within a RHA, of participating in networks and quality improvement collaboratives with other health organizations and with academic partners. The influence, within Select Health, of the E2E and BCPSQC network and quality improvement collaboratives was significant. The Evidence to Excellence and, subsequently, the BCPSQC Sepsis Network Leads established and promoted a compelling case for implementation of the CPG. The quality improvement collaboratives they organized were remarkably effective at building interest among participants in sepsis management, and in implementation of the Sepsis Guideline Set. Academics and participants from several RHAs shared information, strategies, and tools. The two Select Health CNEs involved with the collaboratives drew upon materials and activities provided during the collaboratives to help influence and support early CPG implementation activity at two Select Health sites. The activity even caught the attention of the Ministry of Health as they looked to mandate provincial health quality improvement activities through the Clinical Care Management initiative.

A variety of research studies, including systematic reviews, corroborate the importance of networks and quality collaboratives in CPG implementation, recognizing their capacity for bringing researchers and knowledge users together (Fitzgerald & Harvey, 2015;

Rycroft-Malone et al., 2016; Schouten et al., 2008). Yet, there is a limited understanding how they work to improve the success of CPG implementation (Consolidated Framework for Implementation Research, 2020). For the Select Health Sepsis Guideline Set implementation, inter-organizational collaboration and engagement with academics through ongoing relationship-building and through focused, credible quality collaboratives, worked to promote the spread of interest and understanding of the improvement opportunity across the organization. The collaboratives and networks proved engaging for regional managers and support staff, and clinicians. Collaboratives and networks enabled academics, regional managers and support staff, and clinicians to work together to merge credible evidence and analysis with practical knowledge from knowledge users.

While compelling and helpful for those who participated from Select Health, the E2E and BCPSQC networks and collaboratives were not effective in establishing sustained engagement among clinicians in CPG implementation activities. For the most part, involvement in the collaboratives, and direct interaction with BCPSQC Leads, was limited to the CNEs and Select Health Program/Network Leads. Given the limited capacity of the two BCPSQC Leads, engagement with the Select Health clinicians, or regional managers and support staff beyond the Program/Network leadership, was rare. Ongoing involvement of a broader range of clinicians and regional managers and support staff with BCPSQC and other academics might have helped establish greater engagement and alignment of perspectives across communities of practice comprising the RHA.

The Select Health Sepsis Guideline Set implementation experience highlights the risk of formalizing mandates for quality improvement activities, including engagement with quality improvement collaboratives, without aligning resources for implementation. The formal directive appears to have changed the nature of collaborative activities – moving the

focus from engaged clinical discourse, information sharing, and voluntary action, to include more structured activities related to provincial adherence measurement and performance reporting. The directives appear to have obliged the RHA decision-makers to take unilateral action without robust engagement of clinicians, assessment of implications, and/or resources with which regional managers and support staff might provide support.

4. Evidence Review and Impact Assessment

Organizational structures, processes, and people that are supportive of collaboration among academics, regional managers and support staff, and clinicians in reviewing CPG evidence and in assessing the CPG's potential impact appear to be critical for successful CPG implementation. When considering the discordant Sepsis Guideline Set implementation at Select Health, it appears that many of the challenges experienced, including the apparent tensions between regional managers and support staff, and clinicians, stemmed from the limited degree to which relevant CPG evidence was critically reviewed, and its implications assessed, both regionally and locally. Without a tangible opportunity to improve outcomes, clinicians saw the guidelines as an administrative, rather than clinical, imperative. Several researchers point to the importance of evidence assessment (Fischler et al., 2016; Jeffs et al., 2013), and of prioritizing by determining the relative advantage of implementing one CPG over another (Greenhalgh et al., 2004).

Drawing from the study findings, I offer three details about evidence and impact assessment that are often missed in the literature. First, evidence review and impact assessment is an ongoing, contextual process as much as it is specific to any particular CPG implementation process. Prioritization implies that the organization is continually assessing CPGs using some common set of criteria to inform leaders' prioritization and resource allocation decisions. Second, given the nature of the RHA as a single organization with

multiple sites, the study findings reflect that there are multiple points upon which decisions about priority might be made. Findings highlight the importance, particularly for clinicians, to see the connection between CPG adherence and the potential to improve clinical outcomes practically, at their own sites. Further, since the clinicians' perspective favours case review, the study findings indicate that motivation will be highest when statistical evidence corresponds to the clinicians' own experiences. Third, findings highlight the potential strength of the service network (e.g., Emergency Medicine Program/Service) structure as a medium for communicating about the evidence and its potential impact, and in bringing related case experiences to bear, toward alignment between regional managers and support staff, and clinicians. These three points, taken together, suggest that evidence review and impact assessment might best be an ongoing and collaborative process across the constellation of practices, and involving wide engagement from all three communities of practice.

5. ***Prioritization and Resourcing CPG Implementation***

This study highlights two simple but important findings with respect to CPG implementation at Select Health:

- That interest in CPG implementation at Select Health originated from early engagement of clinicians acting to improve care within their own contexts. These clinicians undertook much work and testing, and they naturally sought to engage regional support through the Emergency Medicine Program/Network leadership and the organization's Policy Office.
- That clinicians appeared to hold a critical assumption that formal, regional prioritization of the CPG for implementation meant that they would have been

> engaged to determine what resources were necessary, and that appropriate resources and supports would follow. Clinicians expected that prioritization - by the Executive Team - of Sepsis Guideline Set implementation would trigger investment and allocation of financial and non-financial resources to support changes that were outside of clinician control including management of workload, workflow, and further automation.

At Select Health the move from early interest and experimentation and investment and support following regional prioritization did not proceed as anticipated by clinicians. The Select Health Executive Team could have supported CPG implementation more robustly by establishing aspects of the organization's financial and other support planning and deployment cycles (human resources, information technology, change, analytics, business process analysis) to better align how the implementation evolved. First, resources and supports might have been made available to enable local engagement and experimentation with potential improvements. Such activity could have been designed to promote broader clinician engagement and could have provided critical information about the supports needed to implement the CPG and to inform future regional prioritization and resourcing decisions. Second, planning and resourcing processes could have been further organized to enable full support of changes required to implement the CPG once it was prioritized for wide-scale implementation in Select Health. Many researchers note the importance of prioritization, and leaders' decision-making with respect to the organization's resources, to the successful implementation of EBPs, including CPGs (Ellen et al., 2014; Fischer et al., 2016; Gifford et al., 2006; Moore et al., 2016; Nadalin Penno et al., 2019; Raveis et al., 2014). The lack of such resources has been seen as a common impediment to success (Cammer et al., 2014). This study suggests that resource investment might need to be organized in a way that is

transparent, reliable, supportive, and focused on early clinician participant learning and experimentation, and on supporting broader implementation activities if, and when, the implementation of the CPG becomes a regional priority. Like evidence review and impact assessment, prioritization and resourcing CPG implementation might benefit from ongoing, widespread engagement and participation of individuals from all three communities of practice. Such involvement could work to reduce insularity within communities of practice, and establish greater alignment across the constellation of practices.

6. Clinical Management

This study highlights the importance of the clinical manager in both leading aspects of CPG implementation process, and in establishing a clinical context that is conducive to CPG implementation success. At Select Health, a variety of challenges arose during the Sepsis Guideline Set implementation as a result of an organizational delegation of leadership of the implementation to the Clinical Nurse Educators. While the clinical managers were involved in the Service Program/Network structure and processes, the delegation appears to have limited the role clinical managers played within the clinical community of practice as the link, or mediator, between the clinicians and the region's decision-makers.

Middle managers and supervisors can facilitate or impede effective CPG implementation (Birken et al., 2018; Boutcher et al., 2022; Bunger et al., 2019; Votova et al., 2019). Boutcher et al. (2022) highlight the importance of the middle manager in convincing others of the benefits of CPG implementation and as strategic influencers. Birken et al, (2018), describe the importance of diffusing information, selling implementation, and synthesizing information, while noting that much remains to be understood about the role played by middle managers in CPG implementation. Had the organization's leaders not delegated CPG implementation leadership to CNEs, clinical managers (a particular type of

middle manager), could have better facilitated CPG implementation by undertaking essential activities including those of resource management - informing regional managers and support staff of implementation support needs; and drawing resources into the clinical department to support implementation.

Given the variety of perspectives involved, this pivotal role appears to require a relatively sophisticated approach to facilitating interpersonal relationships. Consistent with practice theory, McGivern et al. (2016, p. 37) note that organizations that promote an "open" stance - open to receiving and blending knowledge and perspectives from different communities of practice (for instance, management and clinical) - were the most successful in implementation efforts. CFIR describes a learning climate as one where leaders take this type of stance (Consolidated Framework for Implementation Research, 2020). Nembhard and Edmondson (2006) relate this approach to management as one that can lead to increased psychological safety of staff and physicians, and Currie et al. (2007) describe such positioning by managers as critical to address real or perceived power differentials within the organization. The Select Health Executive Team might have recognized and further supported clinical managers to foster interpersonal connections and collaboration amongst communities of practice (academics, regional managers and support staff, and clinicians), exercising, rather than delegating, this important aspect of their role.

Avoiding Discordance, the Need for a Process

The Sepsis Guideline Set implementation at Select Health suggests that, despite some collaborative and connecting activity, the implementation's success was challenged by an unhelpful insularity or compartmentalization where: researchers researched, regional managers and support staff made key decisions and managed, and clinicians learned and adjusted based on their local, day-to-day context. The insularity resulted from differences in

the perspectives about CPG implementation within the constellation of practices critical to implementation success. As predicted by practice theory (Wenger, 1998), without alignment of the different community of practice perspectives, the CPG implementation process was discordant and, ultimately, unsuccessful. Select Health might have benefitted from a process designed explicitly to offset community of practice insularity and the discordance it creates. Such a process would have supported the explicit recognition of differences in perspectives among academics, regional managers and support staff, and clinicians, yielding purposeful decisions and commitments about a particular undertaking such as a CPG implementation. This is not to say that it is necessary for all participants to be involved at all times. Academics, regional managers and support staff, and clinicians hold different roles and accountabilities. However, discussion, decisions, and commitments for action could have better aligned the perspectives and actions of the communities of practice, for each of the dimensions of perspectives. Drawing from Table 8.1, dimensions of perspectives appear to include:

1. The focus of, and rationale for implementation,
2. A vision of successful implementation,
3. The priority of a particular CPG implementation over potential uses of time and resources,
4. The amount and mechanisms of motivating power (e.g., expert influence, authority, and professionalism), and
5. The goals, strategies and actions required to implement the CPG successfully.

A process that enables discussion, decisions, and commitments for action across communities of practice aligned on each of these dimensions would need to involve trustful sharing and integration of perspectives about CPG implementation. Study findings presented

in Table 8.1 suggest that participants from all three communities of practice held a common overarching interest in improving safety and better outcomes for patients. This common interest could have been the foundation of a shared vision among the three communities of practice. Researchers point to the importance of shared vision (Kislov et al., 2018) and a strong patient focus (Nilsson et al., 2018). Given the limited degree to which most study participants spoke of the views and needs of patients, Select Health might have achieved a higher degree of alignment if they had spent more time focusing on this aspect of the CPG implementation.

A shared vision based on a common interest – better patient care – might have helped the three communities of practice to address and balance their respective power bases. Social power is the potential for a person or group to exert influence, leading to a change in the belief, attitude, or behaviour of someone who is the target of influence (Ravens, 1965). This study describes three sources of power motivating action, and the processes through which power was exerted by the different communities of practice toward CPG implementation:

- Academics influenced through expertise, mobilized through advocacy and networking,
- Managers influenced through authority, mobilized through organizational position and control of resources, and
- Clinicians influenced through professionalism, mobilized through learning and competence, or competent practice.

Unfortunately, due to the degree of insularity of the three communities of practice, their respective power bases were not aligned and struggles, expressed as conflict or ambivalence among individuals from different communities of practice, resulted. In an EBP

implementation research study, Currie (2014) observed similar tensions. To avoid discordance, a process is needed to support participants to explicitly recognize their different power bases, and to engage through power-balanced structures and processes (Fitzgerald & Harvey, 2015) toward to the productive, mutually beneficial, application of each.

To avoid discordance, it appears that the insularity of communities of practice needs to be reduced. Individuals from all communities of practice must be willing to share and resolve their differences in perspective. A systematic review conducted by Sarkies et al. (2017) highlights the importance of trust and relationship for CPG implementation. This research extends the concepts of trust and relationship by recognizing that trust and good relationships stem from collective discourse and activity and, for CPG implementation, must enable some specific decisions and commitments to be made. Avoiding discordance isn't simply about getting along, it enables participants to engage, imagine, and make aligned commitments to act, and to coordinate their actions (Wenger, 1998).

A process designed to avoid discordance would incorporate, but extend well beyond, the concept of coordination. Li et al. (2019) draw from systematic review findings to promote coordination among stakeholders as a mechanism to "magnify the facilitators and overcome the barriers." Coordination is only likely to be successful, however, if all participants agree on the actions to be coordinated, and the means of coordination. Agreement across communities of practice, then, is a precursor to successful coordination.

Building from an assumption that, without some intervention, differences in perspectives will prevail and discordance is the likely outcome of any modestly complex CPG implementation, harmonization is proposed in the next chapter as a necessary process underlying successful CPG implementation. Like its musical metaphor, harmonization appears to be about sharing and understanding of perspectives across a constellation of

practices - within and across communities of practice - so that, together, they can determine the best way to align their activities toward a shared goal. The six areas of activity influencing the CPG implementation at Select Health discussed in this chapter will inform the identification of key enablers – affordances (Wenger, 1998, p. 229) - for harmonization within Regional Health Authorities.

Chapter Summary

While most study participants had some reason to describe the Select Health Sepsis Guideline Set implementation as successful, the implementation process itself was discordant. Academics, regional managers and support staff, and clinicians had different perspectives about the implementation, and undertook actions that were not sufficiently aligned to ultimately ensure adherence to the CPG. The differences in perspectives among academics, regional managers and support staff, and clinicians were significant and appeared to have been deeply rooted in the functions, experiences, and day-to-day realities of each of these groups of participants. The discordance in the implementation appears to have been a result of inadequate engagement among participants across a constellation of practices; insufficient connections within and across communities of practice to support shared understanding and alignment of action.

A relational process might have facilitated explicit recognition of differences in perspectives across the constellation of practices most critical to CPG implementation success. Greater and ongoing collaborative engagement of academics, regional managers and support staff, and clinicians, is likely to have yielded more purposeful decisions and commitments about the sepsis CPG implementation. Discussion, decisions, and commitments for action among the three communities of practice could have better reflected alignment

across the five dimensions of perspectives: focus and rationale, vision, priority, power, and goals, strategies and actions.

The next chapter presents a proposal for harmonization as a process of alignment of perspectives within and among communities of practice, that can facilitate better CPG implementation.

Chapter Nine: Conclusion and Implications

This concluding chapter proposes the concept of harmonization as a process that is critical to successful CPG implementation in Regional Health Authorities. Harmonization is a process that RHA decision-makers need to support explicitly, to address the discordant actions that arise from differences in deeply rooted perspectives about CPG implementation among three communities of practice: academics, regional managers and support staff, and clinicians.

RHA decision-makers can enable harmonization by supporting the collaborative planning and action, across the constellation of practices relevant to the CPG implementation. Harmonization can be supported through ongoing collaborative activity, facilitated by structures, processes, and people, that engage individuals from the three communities of practice in meaningful discussion, decisions, and commitments for action. While RHA decision-makers are best positioned to promote and enable harmonization (Martin et al., 2013), academics, regional managers and support staff, and clinicians (communities of practice) will need to make significant changes to avoid insularity that can arise within their individual communities of practice and to engage fully in what must be an ongoing, collaborative process.

Harmonization advances practice theory by strengthening its prospective focus; helping decision-makers to use the theory to inform action. The study highlights that, while communities of practice facilitate learning, identity, and normalize day-to-day practice, they can also promote insularity, and differences in perspective that must be addressed if collective action across a constellation of practices is to be successful. The study also offers some implications for improving the Consolidated Framework for Implementation Research while demonstrating the utility, for implementation researchers, of complementing CFIR

with the more processual, relational view of practice theory. The study's findings offer considerable potential for application and future research. Harmonization and its enablement offers researchers and decision-makers a unique way to think of, approach, and improve CPG implementation, with the potential for better implementation processes and corresponding health outcomes.

Harmonization and Enabling, Harmonizing Activities

This research set out to understand how individuals and teams with various functions and decision-making purviews come together to implement prioritized clinical guidelines in a Regional Health Authority. The study findings bring a variety of insights in response to the research question. The findings explicate the groups of individuals involved, and the mechanisms through which they do, or do not, come together to bring about a successful CPG implementation in a Regional Health Authority.

Three broad groups of individuals are highly relevant to CPG implementation: academics, regional managers and support staff, and clinicians. These broad groups can only be loosely defined as they are not comprised based on singular attributes. This study used function as a starting point for establishing participant groupings. The initial functional categories proved helpful but insufficient for explaining study findings. Instead, the groups are better described as communities of practice: loose affiliations of participants in practice who share sufficient mutual engagement, joint enterprise, and shared repertoire as to be distinct from one-another (Wenger, 1998). For CPG implementation, this distinction manifests as three very unique perspectives about the objectives of CPG implementation and the things that are important to ensure successful implementation. The differences in perspective among academics, regional managers and support staff, and clinicians are significant and deeply rooted in the beliefs, functions, experiences, and day-to-day realities of

each of these groups of participants. Individuals within each group hold different perspectives about CPG implementation along at least five dimensions: focus and rationale, vision, priority, power, and goals, strategies and actions required. Without explicit action to reconcile the perspectives within the constellation of practices essential to CPG implementation, individuals from each group act based on their own interpretations and definitions of success, and a discordant, and likely unsuccessful, CPG implementation results.

This dissertation presents a proposal for harmonization as a process comprised of many harmonizing activities that support engagement, relationship-building and explicit reflection and reconciliation of key differences in perspective among three communities of practice: academics, regional managers, and clinicians. Harmonization requires iterative cycles of discussing, deciding, committing, and acting, with explicit focus on the dimensions upon which perspectives can differ. Harmonization enables a higher degree of shared, negotiated meaning – a characteristic of a community of practice – to a wide network, a constellation of practices (Wenger, 1998). Harmonization is not about winning individuals over to one of the perspectives. It is about working together in an ongoing and meaningful way such that new norms, new practices, can be established across an important constellation of practices. Harmonization is not just about "getting along." Harmonization is targeted to specific types of decisions and actions that support the adoption of evidence, such as a CPG, into practice.

The Processes Underlying Harmonization

Harmonization is based on an assumption that the three communities of practice can become insular and establish differences in perspectives that are sufficiently entrenched that, without intentional intervention to better support engagement and alignment among the

communities of practice, discordance is likely in all but the simplest of implementations, and the goals of the implementation are unlikely to be achieved. Discordance (noun) was seen during the CPG implementation at Select Health. Harmony (noun) would have been the result if perspectives and actions had been sufficiently aligned. Harmonization (noun) is characterized as a process but is comprised of many, largely contextual (to a particular implementation), activities that act, over time, to promote harmony through interpersonal and inter-community-of-practice connection amongst academics, regional managers and support staff, and clinicians. Activities that engage and align perspectives and actions of individuals within and among communities of practice are harmonizing (verb).

Harmonization is underpinned by ongoing connection and interaction of many individuals from all three communities of practice – academics, regional managers and support staff, and clinicians. Discussing, deciding, committing, and acting appear to be foundational to the iterative, interactive cycle of harmonization. The dimensions of perspectives bring a focus for this cycle. Each dimension can be investigated using the questions posed for each in Table 9.1. Further, each dimension relates to a set of processes[3] that, when performed collaboratively, can facilitate harmonization across the constellation of practices essential for success. Together academics, regional managers and support staff, clinicians appear to need to work together, regularly, on the five sets of processes presented in Table 9.1.

[3] The term process set is used here to reflect the layered nature of process as described by Business Process Management Jeston, J., & Nelis, J. (2014). *Business process management: Practical guidelines to successful implementations* (3 ed.). Routledge. The process of harmonization is comprised of sets of processes or sub-processes reflected in subsequent process layer.

Table 9.1

Dimensions of Perspectives and Proposed Harmonizing Process Sets

Dimension of Perspectives ***Together,*** *communities of practice (academics, managers and support staff, and clinicians) need to harmonize their perspectives about:*	**Processes/Process Sets Supporting Harmonization** ***Together****, communities of practice (academics, regional managers and support staff, and clinicians) might learn to:*
1. Focus and Rationale: Why might the CPG be implemented? How compelling are the benefits based on assessment of the merits of the evidence? What are the clear implications for improved outcomes for specific local and regional patient populations?	1. Review and assess evidence about improvement interventions including CPGs, considering the current performance and the potential for the intervention to improve patient outcomes (or some other explicit and shared objective) for the RHA overall but also for specific sites.
2. Vision: How will successful implementation be described and assessed? What are the practical workflows, actions, and behaviours required?	2. Envision and specify the operational requirements prescribed by the evidence and agreed among participants. Experiment with implementation to learn and inform subsequent work, determining the changes in process, structure, and people, including workload and workflow, required to implement the intervention.
3. Priority: What is the relationship of the implementation to other priorities? Are there potential synergies or conflicts with other priorities? What is the relative advantage of each?	3. Assess benefits and costs, prioritize, and communicate priorities and rationale.
4. Power: What amount and mechanisms of motivating power (e.g., expert influence, authority, and professionalism) correspond to the implementation strategies selected? How will they be collectively managed to motivate and ensure aligned accountability, while not perpetuating differences?	4. Reflect explicitly on different perspectives including their underlying forms and perceptions of power. Negotiate approaches to mitigate negative impacts and the enhance motivating aspects of power and power differentials.
5. Goals, Strategies and Actions: What activities are required of all participants to implement the CPG successfully? Who must do what, by when? What supporting implementation strategies and resources are required to promote and coordinate these activities?	5. Set goals, plan, resource, establish accountabilities, coordinate, act, and evaluate.

Enabling Harmonization

Regional Health Authority decision-makers are responsible and accountable for establishing the affordances that can enable harmonization over time. The six areas of activity discussed in the previous chapter, with effort to address their potential for intra- and

inter-community of practice connections, incorporate structure, process, and roles to establish an enabling context for harmonization within Regional Health Authorities. With the objective of harmonization, RHA decision-makers need to facilitate co-development across the communities of practice (with academics, regional managers and support staff, and clinicians) of mechanisms for service improvement including consideration of CPGs:

1. Horizontal service-oriented improvement conversations and activities,
2. Interprofessional learning and development,
3. Quality improvement collaboratives and networks,
4. Evidence review and impact assessment,
5. Prioritization and resource decisions, and
6. Relationship management.

The six enablers of harmonization promote interdependent action toward harmonization. Strong, widely engaging service-oriented improvement structures, processes, and people, articulated with inclusive local interprofessional learning and development activities for a strong, reliable foundation for harmonization. Integrated with this foundation, robust engagement with academics and regional managers and support staff, and clinicians from other health organizations through quality improvement collaboratives, has the potential to stimulate interest and information sharing among all participants, potentially prompting early CPG assessment and implementation activity amongst local clinical teams. Together these structures, processes, and people can establish an enabling context within which a broad range of participants across the three groups can be engage in reviewing evidence and assessing impact, prioritizing and resourcing CPG implementation. RHA managers, particularly clinical managers can support harmonization by encouraging open sharing of perspectives and managing in a way that is responsive to the realistic ebbs and flows of a

dynamic, non-linear implementation process. Coordination and accountability management can be enacted by management, but as a support to agreed activity rather than direction in advance of necessary shared engagement, imagination, and alignment (Wenger, 1998, pp. 174-181).

Study Implications by Community of Practice

In this research, three communities of practice proved important to CPG implementation: academics, regional managers and support staff, and clinicians. The next sections present the implications of harmonization for individuals within each of the three communities of practice.

Implications for Academics

By focusing on harmonization through increased and ongoing engagement with regional managers and support staff, and clinicians, academics, including researchers and educators, have an opportunity to support better patient outcomes while creating relationships that can support: improved uptake of research, more practically relevant research questions and research, and closer alignment of education and practice opportunities within the Regional Health Authority. All of these benefits are consistent with a more practical, aligned relationship between academia and industry that some researchers argue will be essential to the survival of the academic institution in the future (Brown & Duguid, 2000, p. 222) and others argue to be essential to improved research use by health providers (Bowen et al., 2019).

Academic engagement with Regional Health Authorities to the degree required to support harmonization will require academic policy and decision-makers to promote significant change within the academic environment. Teaching, research, and administrative schedules may need to be altered to ensure that academics have time available to engage in

collaborative activities. Incentives and advancement structures (e.g., promotion/tenure) must be broadened to better recognize applied research, collaboration, and practical impact. With these changes, academics will require more support to ensure clear, relevant communication and, potentially, mediating roles that can strengthen connections across the boundaries between academia and health management and clinical care (Kislov et al., 2018).

Academics will also need to learn to recognize, discuss, apply, and adapt the use of their power of influence. This study demonstrates the discordance that can result when academic, advocacy, and policy influence exerts such pressure on Regional Health Authority decision-makers that normal learning, prioritizing, resourcing, and implementation activities are usurped. Academics should consider quality improvement collaboratives as a sensible, productive activity through which they could productively organize, focus and exert their influence.

It is not clear from this study whether mandating CPG implementation by government was an effective strategy. It appears reasonable to argue that if policy-makers wish to mandate implementation of a CPG, they should be careful not to circumvent wide engagement and rigorous organizational assessment and prioritization processes. Policy-makers might also consider alignment of resources in support of identified improvement priorities, to be allocated by regional managers and support staff in alignment with a collaboratively designed CPG implementation process. As with regional managers and support staff, policy-makers would need to consider and assess the evidence of potential widespread improvement of outcomes prior to mandating implementation of a CPG.

Implications for Regional Managers and Support Staff

By focusing on harmonization through increased and ongoing engagement with academics and clinicians, regional managers and support staff have an opportunity to support

better patient outcomes while realizing more successful CPG implementation, better culture and relationships within the organization, and less wasted resources and effort.

Given the authority and accountability inherent in their control of resources, Regional Health Authority decision-makers must be particularly cognizant of the different perspectives held by different communities of practice. Regional Health Authority decision-makers must establish the structures, roles, and processes – the affordances – that allow participants from across the constellation of practices to work to harmonize their perspectives. Specifically, Regional Health Authority decision-makers must invest in, and support the ongoing development of harmonizing structures, processes, and people. Further, attention must be given to how each of the process sets that support harmonization can be designed and supported to facilitate collective discussion, decision, commitment, and action on each of the dimensions of perspectives as presented in Table 9.1 (e.g., supports for evidence review, data analysis, workload and workflow assessment, prioritization, coordination, etc.).

This study has described the foundational, harmonizing nature of horizontal service-oriented improvement structures, processes, and people, articulated with local interprofessional learning and development activities; an important iterative and horizontal regional/local dynamic. Given the importance of this foundation, Regional Health Authority decision-makers might place early focus, with academics and clinicians, on its collaborative design and development. Care must be taken to ensure that key boundary roles (e.g., managers, clinical leads, educators and others who work across communities of practice) and activities are woven into the service-oriented structures and processes, and that robust engagement of clinicians is supported.

There are many obstacles to robust engagement in regular interprofessional learning and development activity among all participants, but particularly, clinicians. With 24/7 shifts,

inconsistent staffing over time, unsupportive physician remuneration schemes, high service demand, and ongoing cost pressures and workforce limitations, establishing consistent mechanisms for improvement activity amongst clinicians is difficult. But the findings from this case study indicate that robust engagement among communities of practice is essential to establishing the harmonization required for successful CPG implementation and, so, must be a focus for Regional Health Authority decision-makers.

Regional managers and support staff will also need to learn to recognize, discuss, apply, and adapt the use of their power of authority. Within the ebbs and flows of a complex CPG implementation, hierarchical authority and performance management will be essential at times. At other times, however, regional, and particularly clinical, managers will need to learn to take a more open and flexible stance to ensure that all participants are free to express their perspectives and negotiate their interpretations and actions related to CPG implementation. Regional Health Authority decision-makers need to support managers to learn and practice these harmonizing skills.

Implications for Clinicians

By focusing on harmonization through increased and ongoing engagement with academics and regional managers and support staff, clinicians have an opportunity to support better patient outcomes while realizing more successful CPG implementation, better culture and relationships within the organization, less wasted resources and effort, and greater input and influence of the focus of academics (educators and researchers), and the priorities and resources allocations of regional managers and support staff.

This study highlights that clinicians should engage and advocate for time to work and develop in an interprofessional manner. Clinicians must have the time and inclination to engage in challenging conversations about perspectives, and to overcome professional or

hierarchical assumptions that get in the way of productive relationships. Evidence presented in this dissertation is supportive of establishment of a research culture which would be enhanced by considerable interaction between academics and clinicians. To achieve this, clinicians must be willing to take the time to engage in relationship-building activities and quality collaboratives. Clinicians must also be willing to engage in, and with, research and training, to test, redesign, and re-test clinical approaches. In recognition that barriers do exist within and among professions for such time commitment and activity, clinicians might advocate within their own professional and representational bodies for policies and resources that can advance fuller interprofessional interaction related to development, rather than those that can perpetuate professional divides.

Clinicians will also need to learn to recognize, discuss, apply, and adapt their use of professional power. Interprofessional activity requires that all participants recognize and respect the value brought by other professions and participants. While professionalism has many positive and motivating qualities, it must not be applied in a way that devalues other professions whether they be oriented toward clinical care, academia, or regional management and support.

Harmonization and Practice Theory

The perspectives presented in this case study provide a striking example of how three communities of practice established, over time, unique and rather different views of what it means, and what it takes, to implement a Clinical Practice Guideline. Consistent with practice theory, the perspectives held by participants within each community of practice influenced the actions of those participants, and unresolved differences within and across the constellation of practices led to critical limitations in the implementation process.

Besides offering a strong practical example of the applicability of practice theory, this study offers several new considerations for practice theory-building. While some theorists refer to perspectives within communities of practice, they do so in a relatively informal way, often interchanged with other concepts such as beliefs and perceptions. Perspectives held across communities of practice affect action of participants and can create barriers across boundaries. While communities of practice facilitate learning, identity, and normalize day-to-day practice, they can also promote insularity, and differences in perspective that must be addressed if collective action across a constellation of practices is to be successful. This study offers five dimensions in which perspectives can be analyzed (focus and rationale; vision; priority; power; and goals, strategies, and actions). These dimensions of perspectives can help bring greater explanatory and practical power to practice theory. Care must be taken, however, to keep discussion of community of practice perspectives within the fluid and negotiated theoretical foundation of practice theory, lest they become reifications, or stereotypes. Similarly, this study demonstrates the utility of Wenger's concept of constellations of practices (Wenger, 1998, pp. 126-133) as a fresh way of examining and, perhaps, promoting networks of activity – connections - that do not necessarily conform rigidly to organizational confines. The constellation of practices concept invites participants from all communities of practice to look outside of their own organizational confines to determine who really needs to be engaged and in alignment with some type of activity (e.g., the implementation of a CPG) and to ensure that ways of engaging meaningfully and over time are established. By promoting outward reflection and engagement, harmonization facilitates broader negotiation of meaning – extending the characteristics of a community of practice to a broader constellation of practices.

Along with the concept and dimensions of perspectives, harmonization is a novel, practical addition to practice theory, adding a needed degree of instrumentality (practical applicability) to the theory. Harmonization recognizes the unique perspectives held within communities of practice and offers a framework – the dimensions of perspectives and related process sets - with which decision-makers can work forward toward better alignment and, ultimately, more successful CPG implementation. Harmonization may prove helpful beyond CPG implementation in Regional Health Authorities; to be used to conceptualize and enact change within larger organizations in general.

This study adds value to Wenger's communities of practice theory by demonstrating the primary importance of engagement. Wenger identifies engagement, imagination, and alignment as critical activities toward learning or change (Wenger, 1998). This study indicates that without engagement, no imagination or alignment can occur and the likely outcome to change initiatives will be discordance, severely limiting the potential for success.

This study affirms the importance of boundary spanning activity as established by practice theorists. The findings are also suggestive of the breadth and depth of collaborative boundary activity required for successful change within larger, geographically distributed organizations. While discrete role-based boundary spanners are likely essential (e.g., educators, middle managers) these very thin "threads" of connectivity may prove insufficient to avoid the discordance that arises from differences in perspective within and among communities of practice. As Giddens notes with the concept of structuration, if not addressed, differences in perspective among communities of practice can be reified - made real - through the actions of participants, establishing structures that can then perpetuate the differences in future (Giddens, 1984). A key objective of those roles spanning communities of practice should be the promotion of widespread, inter-community of practice engagement

in the processes described in Table 9.1. Through this engagement, the participants themselves can imagine solutions and facilitate alignment amongst themselves (Wenger, 1998).

Harmonization and the Consolidated Framework for Implementation Research

Having now conducted the study and discussed key findings and interpretations, including the novel concept of harmonization, it is important to reflect on CFIR and its application in advancing knowledge about CPG implementation. There is little in this study of CPG implementation that did not align in some way with some construct within CFIR. There are, however, some areas where opportunities might exist to adjust or build upon the CFIR framework.

CFIR's domain Characteristics of Individuals could better recognize that individuals act within socially situated practices, or communities of practice. The practices of academics, regional managers and support staff, and clinicians are social activities involving their negotiated meaning; their perspectives about CPG implementation, their assumptions, and resulting actions. Without reflecting this practice-oriented view on how individuals think and act in communities of practice, CFIR's inner setting appears too homogeneous, interaction between inner and outer settings too bipartite, and efforts to apply the framework's various constructs can be seen as overly functional and mechanistic. While the CFIR inner setting construct Networks and Communication offer some discussion of the complexity of social relations among individuals and groups, the power of communities of practice not only to facilitate learning and alignment of day-to-day activity, but also to promote unhelpful insularity, is lost.

In addition to the above consideration, harmonization is offered, not as an adjustment to the CFIR framework itself, but as a potential complement. Harmonization provides a unique line of sight to CPG implementation and to CFIR. While the CFIR

framework offers domains and constructs that categorize implementation enablers, harmonization provides a process for mobilizing those enablers through practical structures, processes and people. CFIR might be seen as describing the "what" of CPG implementation, while harmonization brings new insights to the "how."

Harmonization and Implementation Strategies

The Expert Recommendations for Implementing Change (ERIC) project (Powell et al., 2015) offers an extensive list of strategies that can be employed toward more effective CPG implementation. Harmonization and its enablers, being processes targeted toward enhancing CPG implementation success, can be considered to be implementation strategies. Harmonization warrants consideration as a novel implementation strategy as it does not appear to be captured, either by name or concept, within the current ERIC listing. The concept of facilitation, listed in ERIC (Powell et al., 2015) and detailed by Harvey and Kitson (2015) incorporates activities related to relationship and trust-building, but is not specifically aimed at addressing differences in perspectives across a constellation of practices involving academics, managers and support staff, and clinicians. The enablers of harmonization – also reasonably considered implementation strategies – include three activities, interprofessional learning and development, evidence review and impact assessment, and quality improvement collaboratives and networks, that are clearly reflected in ERIC. The remaining three, horizontal service-oriented improvement conversations and activities, prioritization and resource decisions, and relationship management, are not directly addressed in ERIC, though some overlaps may exist.

Harmonization and its six enablers warrant consideration as implementation strategies and, together, they complement the ERIC (or any other) taxonomy by presenting a layered, interdependent relationship amongst a set of strategies, tied to an objective. The

objective of harmonization is to promote engagement across communities of practice to address differences in perspectives that can cause discordance. The strategies are layered and interrelated – harmonization is a higher-order process, comprised of at least the six enabling strategies. Harmonization, with its linked objective, can bring further practical value to the ERIC listing as other documented strategies can be assessed for their potential, or tailored to be, harmonizing.

Future Research Opportunities

Many opportunities for further research can be identified based on the findings and conclusions of this Sepsis Guideline Set implementation research case study. Prospective case study and quasi-experimental research would be helpful to further examine and build upon the concepts of harmonization, testing and evaluating new approaches to engagement across communities of practice and the five dimensions of perspectives. Prospective case study or action research could be conducted to examine approaches to facilitating and documenting agreements relative to each of the five dimensions of perspectives identified in this study. Survey tools could be developed, tested, and used to identify and measure differences in perspective along the five identified dimensions. Such tools could help to identify the loose boundaries of communities of practice, and/or to assess the degree of similarity or difference in perspective among them. Comparative case study research can examine the impact of different approaches to supporting each of the six enablers of harmonization, beginning with the foundation of strong, widely engaging service-oriented improvement structures, processes, and people, inclusive local interprofessional learning and development activities, and improvement collaboratives. The effect of cross-cutting improvement collaboratives on community of practice perspectives could be assessed. Comparative case study could also be conducted to examine whether similar or different

perspectives arise in different jurisdictions (e.g., other provinces, other countries) or contexts (e.g., rural versus urban).

This dissertation presents the importance of engaging through service-oriented structures, processes, and people/roles toward harmonization and, ultimately, success of CPG implementation. Despite their apparent importance, very little is known about service networks, service management, or program management generally, or in healthcare specifically. Standard definitions for these structures do not exist (Humphries et al., 2014). Beyond what is described in this dissertation and Greenhalgh's emphasis on the importance of their horizontal nature (Greenhalgh et al., 2004), the definitions, attributes, and indicators of success of program/service management/networking largely remain to be explored.

Some researchers have highlighted the importance of middle management in successful implementation (Boutcher et al., 2022), however much remains to be explored to develop a full understanding of how front line and middle managers, including clinical managers, can develop and work with organizational structures and processes to most successfully affect CPG implementation. This study highlights the importance for managers of open and changing stances. Further, research should focus on how successful managers think about, and carry out, these stance changes, and how they constructively work through challenges that arise from differences in perspective. Participants from across the three communities of practice could come together to collaboratively create, implement, evaluate, and research training programs aimed at enhancing managers' competencies in managing relationships, multiple perspectives, and necessary changes in stance.

This study identified the importance of harmonization of perspectives among many participants in CPG implementation. Likely because of the retrospective and processual nature of this study, few participants spoke of the role of patients and their families or

informal caregivers in the implementation. Research should be conducted to better understand the potential and experienced role of patients in quality improvement collaboratives, and in service-oriented and interprofessional improvement structures and processes.

This study describes a central, enduring and supportive role for a regional office that guides and supports CPG implementation. Such an office has an important but challenging role in establishing regional standards toward evidence-based practice, while also promoting local professional interest and engagement. As such this central office could be the focus for a breadth of research activity designed to understand how that engaging and balancing role, across the three communities of practice, can best be structured and supported. Specific research into how a regional health organization's Executive Team might best organize and assign resources in support of both local learning and experimentation, and of regional priorities, would be valuable for organizational decision-makers.

This research suggests that a stronger relationship between academia and the regional health organization would be highly beneficial (Bowen et al., 2019; Bowen & Graham, 2013). Further research is needed to understand the best ways this collaboration can be promoted and supported through quality collaboratives, and how collaboration can inform and affect the commitments of harmonization. Case study and quasi-experimental research could examine approaches to better meet the needs of the academic through closer relationships with decision-makers and clinicians, and vice-versa.

Finally, further theoretical work and empirical testing should be undertaken to incorporate the concepts of harmonization into practice theory. This dissertation describes a meaningful relationship between community of practice perspectives and the actions their respective participants most likely take toward CPG implementation. Communities of

practice facilitate learning and alignment of activity into practice, but insularity within individual communities of practice can be detrimental to the achievement of an organizational goal that requires collaboration among them. Theoretical work could be conducted to assess this study's five dimensions of perspectives toward further alignment with concepts of psychology explicating individual behaviours. The relationship between individual and community of practice perspectives and underlying concepts including beliefs, values, and stances could prove instructive. Theorists are just beginning to explore the relationship of adoptable stances to effectiveness of EBP adoption (McGivern et al., 2016). Further exploration of these inter-related concepts of perspective, stance, and action would be highly instructive to both theory and practice.

Reflections on Positionality

In Chapter 3, I provided a positionality statement describing my background and likely influences and biases entering into this research study. At the time I initiated this research, practice theory offered an intriguing way to approach the organizational, relational focus to CPG implementation that was not well established in the CPG implementation literature. As the study progressed, practice theory not only proved helpful in ensuring that I remained open to what study participants were telling me, but, with Wenger's communities of practice, it offered me a way of making sense of what I was hearing.

While making sense intellectually, I admit to experiencing internal conflict as my hard-earned perspectives as a senior manager were challenged. This is not to say those perspectives are (were?) wrong – they are as correct as any other. Where I struggled was in abandoning the belief that managers could unilaterally conceive and enact a correct implementation solution. I came to realize through this study that managers need to let go of assumptions that people across the organization see an implementation problem, let alone a

potential implementation solution, in the same way we do. Alignment across communities of practice isn't inherent. Alignment comes from tackling the problem together. To the extent that managers continue to hold some legitimate role as stewards of the organization's resources, I am convinced that more of our focus must be placed on supporting rather than directing – supporting engagement and working toward alignment of perspectives and actions across communities of practice. The notion that managers can "drive out" (a term I hear all too often in my RHA executive role) our decisions now seems incredibly naïve to me. Further, I have come to believe that practice theory, with its focus on situated learning, negotiated meaning, and affordances, can philosophically underpin a new way of understanding and managing health organizations.

Study Limitations

This dissertation is written in compliance with published standards for reporting qualitative research (O'Brien et al., 2014). This Sepsis Guideline Set implementation case study offers much toward an understanding of guideline implementation in regional health organizations, though some limitations must be recognized. First, the study faces the limitations that are inherent in all retrospective case study research. Retrospective study is reliant on the clarity and accuracy of memories of its participants and availability of relevant documents and documentation. Retrospective study must assume that interview participants are able to provide a reasonable account of practice – the actions that actually took place. Direct observation is a useful source of research data that is not available in retrospective study. To address this limitation, the study involved triangulation of concepts among multiple participants and documents.

The transferability of the findings to other settings or situations is a decision to be made by the reader within her/his own context (Merriam, 2009). Other jurisdictions, for

instance, may not have the same structures or attributes (e.g., modest automation, publicly funded RHA with physicians operating as private businesses) that affect CPG implementation behaviours of different communities of practice. This dissertation provides rich description of the case study findings and explication of conclusions in an effort to assist readers in determining the degree to which it may be useful or meaningful to them.

For this study, a single student researcher undertook all data collection and analysis. While concerns about inter-researcher consistency do not apply, a single researcher can introduce bias that additional researchers might have identified and addressed. To reduce the potential for consistency issues, my supervisor conducted a review of my interview technique and coding at an early stage of analysis. Further, the dissertation contains rich description including extensive use of participant quotes so the reader is able to make their own judgement as to the consistency of study findings with the empirical data.

Finally, while interview participation enabled good coverage of the organization and the communities of practice referenced throughout, the study was not designed to enable definitive differentiation of viewpoints among professions. The study certainly identifies issues that appeared to be related to profession, particularly the unique perspective of physicians. While suggestive, further research would need to be focused more specifically on those matters.

Conclusion

This dissertation presents the results of a case study of a CPG implementation within a Regional Health Authority – the Sepsis Guideline Set at Select Health. The CPG implementation process was highly dynamic and non-linear, involving different activities and intensities of involvement of individuals from three communities of practice: academics, management and support staff, and clinicians. Individuals from each of the three groups had

different perspectives about the implementation along five dimensions (focus and rationale, vision, priority, appropriate balance and application of power, and goals, strategies and actions to be taken). As a result, the different communities of practice undertook actions that were not sufficiently aligned to ensure adherence to the CPG. The result was a discordant, and unsuccessful implementation. CPG adherence was not achieved. The differences in perspectives among academics, regional managers and support staff, and clinicians were substantial and appeared to have been deeply rooted in the beliefs, functions, experiences, and day-to-day realities of each of these groups of participants. The discordance in the implementation resulted from an insularity of each community of practice from the others, brought about by inadequate engagement among participants; insufficient connections across communities of practice to support shared understanding and alignment of action.

Without some intervention, differences in perspectives will prevail and discordance is the likely outcome of any complex CPG implementation. This dissertation proposes the novel concept of harmonization as a means of achieving more successful CPG implementation; a process intended to reduce insularity of individual communities of practice within and beyond a Regional Health Authority. Harmonization is conceptualized as a process comprised of many harmonizing activities that support engagement, relationship-building and explicit reflection and reconciliation of key differences in perspective among academics, regional managers, and clinicians. Perspectives can differ along at least five dimensions and, therefore, five harmonizing sets of processes can be collaboratively (amongst the three communities of practice) planned and implemented to support harmonization.

Collaboration through a well-designed CPG implementation process can certainly improve harmonization and can help to mitigate discordance. However, as a relationship-based phenomenon, harmonization is rooted in context; aspects of day-to-day activity that

extend well beyond the particular CPG implementation. Harmonization must be supported as part of the Regional Health Authority's ongoing operations.

This study identifies six inter-related enablers of harmonization. The six enablers can be supported by the organization's decision-makers and managers, to facilitate better harmonization of perspectives and actions within and between communities of practice. Strong, widely engaging service-oriented improvement structures, processes, and people, articulated with inclusive local interprofessional learning and development activities and quality improvement collaboratives, provide a strong foundation for engagement, alignment, and CPG implementation activity. Together these structures, processes, and people can establish an enabling context within which a broad range of participants across the three groups can engage in reviewing evidence and assessing impact, and in prioritizing and resourcing CPG implementation. RHA managers, particularly clinical managers can support harmonization by encouraging open sharing of perspectives and managing in a way that is responsive to the realistic ebbs and flows of a dynamic, non-linear implementation process.

The findings of this study advance knowledge about Clinical Practice Guideline (CPG) implementation in several ways. Harmonization of perspectives of participants within and across academic, regional management and support staff, and clinician communities of practice is a unique contribution to CPG implementation knowledge, merging organizational context and focused CPG implementation process, as a necessary process to enable CPG implementation success. By proposing harmonization as alignment across dimensions of perspectives and offering related process sets and enablers, this dissertation offers regional decision-makers a unique and promising way to practically support CPG implementation, and opens promising new opportunities for research.

The study also brings added empirical evidence to inform the growing body of practice theory, adding harmonization as a unique contribution to theory and offering an intriguing relationship between community of practice perspectives and harmonization and CPG implementation for future theoretical focus and empirical testing.

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Appendices

Appendix A: Effective Practice and Organization of Care Strategies

The Effective Practice and Organization of Care (EPOC) taxonomy (Cochrane Effective Practice and Organization of Care, 2015) provides a catalogue of evidence-based implementation strategies organized into three categories and 22 subcategories/strategies. The categories are summarized in the table below and can be accessed using the following link https://epoc.cochrane.org/epoc-taxonomy.

Category: Interventions targeted at healthcare organizations:

- Organizational culture

Category: Interventions targeted at healthcare workers:

- Audit and feedback
- Clinical incident reporting
- Monitoring the performance of the delivery of healthcare
- Communities of practice
- Continuous quality improvement
- Educational games
- Educational materials
- Educational meetings
- Educational outreach visits, or academic detailing
- Clinical practice guidelines
- Inter-professional education
- Local consensus processes
- Local opinion leaders
- Managerial supervision
- Patient-mediated interventions
- Public release of performance data
- Reminders
- Routine patient-reported outcome measures
- Tailored interventions

Interventions targeted at specific types of practice, conditions, or settings

- Health conditions
- Practice and setting

Appendix B: BC Sepsis Guidelines

The British Columbia Clinical Care Management (CCM) guideline set for sepsis is copied below from the British Columbia Patient Safety and Quality Council (BCPSQC) website at: https://bcpsqc.ca/clinical-improvement/sepsis/guidelines (British Columbia Patient Safety and Quality Council, 2011).

All patients with 2/4 SIRS (HR>90, RR>20, temperature ≥38 º C or <36º C, altered LOC) and suspected infection and one of the following will be triaged as a CTAS =2

- Looks unwell
- Age > 65
- Recent surgery
  Immunocompromised (AIDS, Chemotherapy, neutropenia, asplenia, transplant, chronic steroids)
- Chronic illness (diabetes, renal failure, hepatic failure, cancer, alcoholism, IV drug use)

All patients with 2/4 SIRS and suspected infection (with above risk factor)

- ABG venous lactate measurement within 30 minutes of presentation to triage should be taken with initial blood draw and this will require access to a ABG machine with rapid turnaround time (approximately 30 minutes)
- If initial lactate is elevated have a repeat venous lactate measurement drawn in next 2-4 hrs

If systolic blood pressure is < 90 mmHg at presentation CTAS =1

- Antibiotics within 1 hr
- Culture before antibiotics
- Second liter of crystalloid started with 1 hr

If initial lactate result is ≥4 mmol/L

- Antibiotics within 1 hr of measurement of elevated lactate
- Culture before antibiotics
- Second liter of crystalloid started with 1 hr of measurement of elevated lactate

If systolic blood pressure > 90 at presentation and initial lactate is < 4 mmol/L but patient is admitted to the hospital and received IV antibiotics

- Antibiotics within 3 hrs
- Culture before antibiotics

Note: During the study recent (2016) changes to international sepsis guidelines were recognized. Given the retrospective nature of the study the 2011 guidelines were used.

Appendix C: Participant Data Collection Tool and Interview Guide

Participant Personal and Professional Data Collection Tool

Participant name: _____

Title: _____ Years in current role: _____

Professional designation(s):_____ Since: _____ (year)

_____ Since: _____ (year)

_____ Since: _____ (year)

Current role description:

Roles since 2011:

_____

_____

_____

Years with organization: _____

Thank you. I would like to move on now to speak with you about your experience with implementing the Sepsis Guidelines.

Interview Guide

Pre-Interview Reflection: The following interview guide provides a frame for discussion during individual interviews. Questions are organized to reflect key components of investigation. Questions phrasing, order and priority may be changed by the researcher to reflect the participant and situation. Given the study's focus on implementation inquiry is to take a largely processual posture drawing out what happened, how it happened, when it happened and who was involved. Issues identified as attributes or characteristics may be probed to better understand how these characteristics/attributes arose or became relevant through the implementation process.

Introduction

- Describe the purpose of the study with the participant
- Review principles of confidentiality and confirm consent; signing of consent forms
- Discuss and seek permission to audio record interview
- Pause for opportunity for participant to ask questions about process or principles of participation

Discussion

1. When did the Sepsis Guidelines come to your attention? When would you say implementation started?
2. Tell me what you thought of the guideline in the first place? What concerns did you have about them? Did you feel they were shared by others? How were your concerns resolved?
3. Can you tell me what helped move the implementation forward? What got in the way? How were challenges addressed?
4. Can you describe how the process of implementation was managed? (Important people? Important meetings or structures (e.g., committees, team structures, departments)? Important documents? Other important things?)
5. Can you describe how your team worked to bring about the change? How did people know their roles in the implementation? Can you describe any challenges that arose? How were they resolved?

6. What other teams did you or others interact with during the implementation process? Can you tell me when and describe that interaction? (Board? Executive? Support Teams? Management? BCPSQC or Ministry?)
7. What was it about the involvement with these other teams that you found helpful (and/or not)?
8. Are there other things you can add regarding the Sepsis Guideline Set implementation process that would help me better understand what enables or impedes success?
9. How successful has the implementation been? Review process performance and outcome measures with the participant (RHA and/or site as applicable) and seek interpretation/comment.

Thank you for participating in the study!

- Review next steps including:
    - Study process steps
    - Process re: protection, transcription, retention and destruction of interview recording
- Reinforce willingness to hear and respond if any other input into the study or concerns about what was discussed today
- Turn off tape recording
- Thank participant.

Appendix D: Interview Consent Form

Interview consent form attached. Select Health pseudonym and obscuring of personal contact details has been incorporated.

INTERVIEW CONSENT FORM

Understanding Knowledge Translation Processes in a Regional Health Organization

Principal Investigator: Martha MacLeod, Professor, School of Health Sciences, University of Northern British Columbia
3333 University Way, Prince George, B.C., V2N 4Z9
Contact: Martha.Macleod@unbc.ca and/or (XXX) XXX-XXXX

Co-Investigator: Fraser Bell, PhD Candidate, School of Health Sciences University of Northern British Columbia 3333 University Way, Prince George, B.C., V2N 4Z9
Contact: bellf@unbc.ca and/or (XXX) XXX-XXXX

This study is being conducted toward fulfilment of Fraser Bell's PhD requirements.

INTRODUCTION

You are being invited to participate in an interview regarding your experience with Sepsis Guideline implementation at Select Health. You are being invited to take part in this research study based on your role and/or your experience with the implementation of the Sepsis Guidelines from 2011 to 2017.

YOUR PARTICIPATION IS VOLUNTARY

Your participation is entirely voluntary, so it is up to you to decide whether or not to take part in the study. Before you decide it is important for you to understand what the research involves. This consent form will tell you about the study, why the research is being done, what will happen if you participate and possible benefits and risks.

If you wish to participate, you will be asked to sign this form. If you do decide to take part in the study, you are still free to withdraw at any time and without giving any reasons for your decision. Also, if you do agree to participate you are free not to answer any questions with which you do not feel comfortable.

If you do not wish to participate, you do not have to provide any reason for your decision. Your decision will have no negative consequences.

Please take time to read the following information before you decide.

STUDY BACKGROUND

In spite of much effort, the health industry continues to face challenges in moving new clinical knowledge into practice at a substantial scale and pace. All but the simplest of guidelines require action from many people working in various departments and teams, and at many levels throughout the organization. Yet there is very limited knowledge about guideline implementation that recognizes this multi-team, multi-level reality.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this research is to gain a better understanding of how regional health authorities successfully implement clinical guidelines using Sepsis Guidelines as a case study. The focus of the study is on how various individuals and teams across the organization work together to bring about a successful implementation. If a better understanding of these interactive processes can be gained, health organizations may be able to develop better, more practical implementation supports. The question guiding the research is:

How do individuals and teams with various functions and decision-making levels come together to implement prioritized clinical guidelines in a Regional Health Organization?

WHO CAN PARTICIPATE IN THE STUDY?

Participants will include individuals who may offer a perspective on the implementation of the Sepsis Guidelines within Select Health between 2011-2017. Individuals have been invited to participate based on involvement and/or current or past roles. Participants also include individuals involved with implementation of the Sepsis Guidelines through the British Columbia Patient Safety and Quality Council (BCPSQC).

WHO SHOULD NOT PARTICIPATE IN THE STUDY?

As this study looks at implementation of the Sepsis Guidelines between 2011-2017, individuals who are very new to Select Health would not have the needed historical perspective.

WHAT DOES THE STUDY INVOLVE?

You are being invited to participate in a research interview based on your role and/or your experience with the implementation of the Sepsis Guidelines at Select Health. It will take up to 60 minutes. The interview will be scheduled at a time and location (Select Health office or meeting room) that is convenient for you. If applicable, arrangements will be made through Select Health Administration and your manager to obtain permission to participate during work hours. Select Health has agreed to this as part of the organization's support of this research study.

If you agree to participate, the Co-Investigator (Fraser Bell) will engage you in conversation to understand your perspective about how the Sepsis Guidelines were implemented between 2011 and 2017. He will seek to understand the process as you have seen it from the time the guidelines were published by the British Columbia Patient Safety & Quality Council (BCPSQC) to today. Because of the study's focus on team interaction, he will look for your view on the individuals and teams involved; the roles they played and how and when they played them. He will also seek to understand how any structures (e.g., committees, tools, systems, etc.) might have played a role in the implementation from your perspective.

WHAT ARE THE POSSIBLE RISKS OF PARTICIPATING?

Risk of participating is negligible. Social risk such as potential strained relationships or loss of reputation is unlikely but could arise for participants when addressing aspects of Sepsis Guideline implementation that were unsuccessful (e.g., failed processes, poor relationships). This risk will be mitigated by ensuring confidentiality, anonymity and documentation security. Additionally, the Co-Investigator will discuss with the participant any information provided that may involve risk. Discussion may involve:

- further probing to understand system aspects of the identified issue (moving away from personal attributions and/or blame-laying), and/or
- subsequent member-checking to confirm observations, interpretations and to ensure phrasing mitigates risk.

WHAT ARE THE BENEFITS OF PARTICIPATING IN THIS STUDY?

Participants may not benefit from being in the study, however, many of the participants involved will have a personal and professional interest in change management and will find the research discussion useful to their own understanding. Near the end of the study all participants will receive a summary of key findings. The summary may prove useful in future implementation efforts.

WHAT HAPPENS IF I DECIDE TO WITHDRAW CONSENT TO PARTICIPATE?

Your participation in this research is entirely voluntary. You may withdraw from the study at any time. If you decide to enter the study and to withdraw at any time in the future, there will be no penalty or negative consequences for you personally or professionally.

If you choose to enter the study and then decide to withdraw, all data collected during your participation will be destroyed.

WHAT WILL THE STUDY COST ME?

No costs should be incurred by you through participation in this study. You will not be paid for participating though where appropriate arrangements will be made with your manager to obtain permission to participate during work hours.

WILL MY TAKING PART IN THIS STUDY BE KEPT CONFIDENTIAL?

Your confidentiality will be respected. However, research records identifying you may be inspected in the presence of the Principal Investigator or her designate by representatives of the Select Health Research Ethics Board for the purpose of monitoring the research. No information or records that disclose your identity will be published without your consent, nor will any information or records that disclose your identity be removed or released without your consent unless required by law.

You will be assigned a unique study number as a participant in this study. Only this number will be used on any research-related information collected about you during the study, so that your identity (i.e., your name or any other information that could identify you) as a participant in this study will be kept confidential. Information that contains your identity will remain only with the Principal Investigator and/or the Co-Investigator (Fraser Bell). The list that matches your name to the unique study number that is used on your research-related information will not be removed or released without your consent unless required by law.

If you consent, the Co-Investigator (Fraser Bell) will audio-record the interview. The resulting digital file will be uploaded onto a secure server at the University of Northern British Columbia and accessed through a secure password protected laptop using secure VMware. The recording will be transferred securely using data encryption for transcription. The transcription service provider used for this study will be required to sign an agreement of confidentiality and non-disclosure which includes arrangements for the destruction of study information once services have been rendered. The recording will be accessible only to Martha MacLeod, Principal Investigator and Co-Investigator, Fraser Bell. The recording will be stored as described for a period of 5 years after which time the recording will be destroyed.

WHO CAN I CONTACT WITH ANY QUESTIONS OR CONCERNS?

If you have any questions or desire further information about this part of the study before or during participation, you can contact Martha MacLeod, Principal Investigator or Fraser Bell, Co-Investigator using the contact information provided on the first page of this form.

WHO DO I CONTACT IF I HAVE ANY QUESTIONS OR CONCERNS ABOUT MY RIGHTS AS A PARTICIPANT DURING THIS STUDY?

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Select Health Research Ethics Board (REB) Co-Chairs by calling XXX-XXX-XXXX. You may discuss these rights with one of the Co-Chairs of the Select Health REB.

CONSENT TO PARTICIPATE

Your signature below indicates that you have received a copy of this consent form for your own records. Your signature indicates that you consent to participate in this study.

I have read and understood the participant information and consent form and I am freely consenting to participate in the study *Understanding Knowledge Translation Processes in a Regional Health Organization.*

YES NO

I have had sufficient time to consider the information provided and to ask for advice if necessary.

YES NO

I have had the opportunity to ask questions and have had satisfactory responses to my questions.

YES NO

I understand that all the information collected will be kept confidential and that the result will only be used for scientific objectives.

YES NO

I understand that my participation in this study is voluntary and that I am completely free to refuse to participate or to withdraw from this study at any time without negative consequences.

YES NO

I understand that I am not waiving any of my legal rights by signing this consent form.

YES NO

I have been told that I will receive a dated and signed copy of this form.

YES NO

I agree to be recorded.

YES NO

The study summary or follow-up information (e.g. transcription) can be sent to me at the following e-mail or mailing address:

YES NO

Address: _____

Printed name of Participant: _____

Signature of Participant: _____

Printed name of Principal Investigator/Co-Investigator: _____

Signature of Principal Investigator/Co-Investigator: _____

Date: _____

Appendix E: Examples of Coding Method and Flow

This appendix provides examples of the study coding method and flow stemming from raw data extracted from interview transcripts and documents. All categories attached to codes in this example relate, with other codes and categories, to a theme Building Competence within the overarching theme: Learning, Becoming Competent conveying the Sepsis Clinical Practice Guideline from the perspective of the Academic, Advocacy and Policy group/community of practice (excerpt from Chapter 7).

Raw Data (with code section highlighted)	**Code (quotes drawn from raw transcribed interview data – lightly edited for reporting)**	**Category**	**Category**	**Theme**
R: Okay, as far as kind of ongoing, we've talked about the in-service so you now understand how to do it, are there other prompts or other refreshers or things? I: Um, for a lot of us, who are like Emerg trained, I almost feel like it's almost automatic. Like you've got your patient, you've got their history and everything like that and you kind of look at it and it's just kind of there. I don't know how else to say it, like oh, they look septic, or oh I think they might be septic, we should start a protocol and there's a lot of nurses that'll be like oh hey that guy he doesn't look very well, what are his vital signs? Oh, they're this, oh he looks septic, maybe we should start the protocol, you know what I mean? There's just, it's very, and if we sometimes as nurses miss it, the doctors will catch it. Like it's a big thing. Like that, asthma, DKA, massive transfusion, there's protocols that are very much like right there. You just do, for lack of a better word.	"For a lot of us who are Emerg-trained, I feel like it's almost automatic. Like, you've got your patient, you've got their history and everything like that. You look at it and it's just, kind-of, there. I don't know how else to say it. 'They look septic, I think they might be septic, we should start a protocol." (ED Nurse)	It's just what we do	Now it's just what we do	Building competence
R: Does the form get put on the chart? I: The form might not necessarily get put on the chart at triage, and we don't necessarily always print the paperwork out anymore because we all kind of, like the majority of us and especially the docs know, like it's just, cause it's an old guideline, you know you get a lot of the experienced docs, a lot of the experienced nurses and it's just, ya, this guy sounds septic, I've started the two litre bolus on him, you know, like we've started it without printing off the paperwork because we just know, it's just engrained. R: It's just the way it happens? I: I don't know how to explain it, it's just there.	"The form might not necessarily get put on the chart at triage, and we don't necessarily always print the paperwork out anymore because we all kind-of, like the majority of us and especially the docs know, like it's just, 'cause it's an old guideline, you know you get a lot of the experienced docs, a lot of the experienced nurses and it's just "this guy sounds septic, I've started the two-litre bolus on him." We've started it without printing off the paperwork because we just know, it's just ingrained. I don't know how to explain it, it's just there." (ED Nurse)	Becoming ingrained		

I: It depends where you are. And if I'm at triage, then they'll get a CTAS 2, they need to be seen quite quickly. You communicate to the next staff to implement fluids, early antibiotics, those are probably the two mainstays. And then if I'm in an acute bed and I receive a patient that meets that criteria then implementing the same thing, communication with a doctor quite quickly. I'd say here we treat it very urgently which is what we should be doing. Sepsis kills. R: So how do you know that? You know that all because of one 15 minute, I'm trying to understand how does this? I: So not, I wouldn't say the in-services, I mean I guess it's just nursing theory as well. I'm sure that we learned this in the emergency course as well. Maybe that's something I should've mentioned before, it's a big focus when we do our Emergency training. So maybe that was one of the differences too when I'm thinking back. When I mentioned that my first year and a half, two years were, it seems foggy and then I remembered sort of an increase in my knowledge around Sepsis so it was probably my Emergency training. And then when I did the ICU training, once again it was constantly revisited quite a bit.	"I wouldn't say the in-services. I guess it's just nursing theory as well. I'm sure that we learned this in the emergency course as well. Maybe that's something I should have mentioned before. It's a big focus when we do in our emergency training." (ED Nurse)	Part of emergency training	From when I was a student	Building competence
R: Can you describe the Surviving Sepsis campaign, what are you referring to then and what timeframe was that and what were you seeing then? I: So you know, it's hard to, I don't know when it originally started. It came to my attention probably like 2009, 2010 during my residency. The Surviving Sepsis campaign I think it's an American campaign, uh, so I believe it's part of Society of Critical Care Medicine and they came out with things like Sepsis bundles with the idea that Sepsis care is something that could be improved upon.	"It came to my attention probably, like, 2009, 2010, during my residency." (ED Physician)	Coming to my attention		

Appendix F: Missing Guideline Set Implementation Process Activities

Missing Activity	Case Study Examples
Review of research evidence and regional and local implications	Regional management and support, and clinical participants largely relied on the leads of the E2E network for their assessment of the rigour and clinical implications of the research evidence. Participants noted that prioritization of the Sepsis Guideline Set for regional implementation was not based on an assessment of the RHA or any site's potential for significant improvement in outcome. This process is named "evidence to outcome assessment in this dissertation."
"Research culture" at Select Health	Clinical participants noted that the Emergency Department team seldom engaged in research. Participants believed that engagement with research predisposes clinicians to experiment with changes in practice to see if outcomes can be improved. Lack of such involvement was believed to have led to a low tolerance for change – including the use of new tools such as pre-printed orders.
Interprofessional forums to enable academic, regional management and support, and clinical participants to engage with the evidence and implementation process	Clinical participants recognized that their learning and professional development activities during the Sepsis Guideline Set implementation were divided along professional (nurse, physician) lines that seldom intersected. Participants noted that this led to a lack of knowledge of each others' thoughts or concerns about the guidelines or how to implement them. Similarly, regional management and support participants tended to engage with clinical participants along professional lines and only sporadically. Academic participants engaged primarily with designated Select Health leads.
Analysis and practical resolution of workflow issues related to Sepsis Guideline Set implementation	Clinical participants noted that limited patient time with the triage nurse, and inability to attend to all potentially septic patients in the most appropriate Emergency Department space due to Department congestion challenged stringent adherence to the guidelines. Most strikingly, a workflow was not established within the Department to ensure that the pre-printed order sheet was placed prominently in the chart of all suspected septic patients. Some participants also noted challenges and a lack of clarity regarding expectations and process for handing over potential sepsis patients between clinicians at when work shifts changed.
Bundling of guidelines or parts of guidelines by regional management and support or clinical participants to improve use or effectiveness of implementation	Some clinical participants argued that three conditions – stroke, STEMI (heart attack) and sepsis might have been considered for implementation together, as conditions most requiring rapid response in the Emergency Department. Bundling of these conditions for implementation might have led to greater efficiency, and awareness of each, and reduced the impression amongst clinical participants that the three were in competition for implementation resources. Public awareness was high for stroke and heart attack, leaving clinical participants to feel that sepsis was of lower priority than these two conditions.
Automation of diagnostic or care tools	Streamlining and support of workflow can be accomplished through the use of digital and other technologies. In this case, while some early experimental automation enabled Sepsis case identification, further maturation of automation did not follow this early work-around effort.
Staffing adjustments to reflect changes in workload indicated by the guidelines	The Sepsis Guideline Set specified intensive clinical monitoring for patients suspected to have sepsis. Many study participants noted that the pre-Sepsis-3 definitions led to high volumes of suspected cases, with many false positives. Review and change of Emergency Departments resourcing was not conducted by management to ensure adequate staff/physician time to effectively achieve the aggregate work of the department, taking into consideration the requirements of practice expectations set out in standards and guidelines. Without this review and change, clinical participants deemed the practice expectations to be impractical.