



Fraser Health: Exploring a Model of Clinical Care Management Systems

November 2012

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This report is a publication of the Canadian Foundation for Healthcare Improvement or CFHI. CFHI is dedicated to accelerating healthcare improvement and transformation for Canadians and is funded through an agreement with the Government of Canada. The views expressed herein are those of the authors and do not necessarily represent the views of CFHI or the Government of Canada.

ISBN 978-1-927024-74-4

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KEY MESSAGES

- The Fraser Health Authority is exploring health system transformation to enhance the delivery of healthcare services in light of growing demands and limited resources. This report outlines one strategic approach that would contribute to such change.
- Expanding on current clinical improvement strategies, we propose a further, systematic development of “clinical care management (CCM) systems” incorporating physicians and other clinicians and resources to provide high-value care for defined patient groups. Current BC initiatives for clinical care management focus on guideline implementation and more consistent use of evidence based practices for specific patient safety and quality concerns. Population focused CCM systems would extend current population based initiatives, incorporating clinical microsystem design, knowledge management and organizational learning, physician engagement and leadership, and be more broadly focused on designing effective care across the continuum.
- Creating more effective CCM systems requires explicit efforts to organize clinical work in interdisciplinary teams with clearly defined aims, defined work processes and information flows, and well-organized patterns of work and learning that produce high-value care. These teams would require strong internal leadership as well as support from broader system resources to develop the necessary measurement, improvement and work design capabilities.
- High-performing CCM systems would rely on the ability to implement high-performing CCM systems relies on a supportive organizational and policy context that addresses the availability of an effective information technology platform, well-aligned incentives, leadership capacity across the system, and resources and investments for capacity development.
- Because of their focus on clinical care, CCM systems provide an effective approach for engaging physicians and others professionals in initiatives for organizational and health systems improvement.
- Given the growing importance and nature of chronic disease and the needs of complex “high-use” patients, the development of CCM systems must go beyond acute care settings and be deployed in primary care and community settings.
- To develop high-performing CCM systems within regional authorities, a step-by-step approach is recommended. This approach focuses initially on identifying sites with the greatest potential to fully deploy CCM systems and where they would have significant impact on cost, quality and health improvement. To test the feasibility and value of extended CCM systems for the Fraser Health Authority, we propose the following steps:
 1. Identify the population focus and core system elements for CCM system improvement.
 2. Create a clinical care management guidance council to identify improvement objectives, to provide advice and knowledge management support, and to involve key clinical leaders.
 3. Examine current outcomes and patterns of care for selected populations in one or more districts, benchmarked against other districts, regional authorities and relevant comparisons.
 4. Identify effective care processes and high-value improvements for selected populations.
 5. Test and implement changes in care processes in selected care settings to support better clinical outcomes and improved patient experiences at the same or reduced costs.
 6. Design and deploy a deliberate strategy for physician engagement and leadership.
 7. Implement senior leadership oversight for the clinical care management system pilot.

EXECUTIVE SUMMARY

Growing pressures to improve outcomes and the patient experience while limiting increases in costs have created considerable challenges for the healthcare delivery systems in Canada and elsewhere. Transformation of the system needs to focus on the core activity of healthcare organizations, clinical care. Healthcare organizations should be organized around care delivery processes and the needs of the patient; however, this is often not the case.

In this paper, we develop a model of “clinical care management systems” as part of a broader effort undertaken by the Fraser Health Authority (FHA) in British Columbia to inform the Fraser Health Transformation project. British Columbia has already initiated a process of clinical care management that focuses on the implementation of guidelines and patient safety interventions for sepsis, hand hygiene, venous thromboembolism (VTE) and other concerns. The next generation of clinical care management (CCM) systems must adopt a broader focus on the needs of specific populations developing care strategies that incorporate effective, integrated, evidence-informed care for patients across the continuum. Effective clinical care management systems would incorporate physicians and other clinicians and resources in purposefully designed clinical systems that provide high-value care for a defined population. By “high-value care,” we mean high-quality effective care, improved patient experiences, with decreases or limited increases in costs. British Columbia already has several examples of population focused care management networks, including the BC Cancer Agency, the BC Transplant Society and the Surgical Quality Action Network. Next generation CCM systems would create greater value in healthcare through the development of more effective processes of care and teamwork in caring for specific health populations and conditions. These clinical microsystems can be linked across the continuum of care to include a full range of medical expertise, technical skills and specialized facilities needed to treat patients with a series of related conditions. Some examples of such systems or units include the Spine Center at Dartmouth-Hitchcock Medical Center (Lebanon, New Hampshire), the organization of congestive heart failure care at Sentara Health (Norfolk, Virginia) and pediatric care at Cincinnati Children’s Hospital Medical Center (Ohio). In some cases these CCM systems are separate units or institutes, in others they are cross-continuum teams; in all cases the key changes are in work processes, not in structures.

We conceive of successful CCM systems as resulting from five interacting strategies or organizational capabilities. First, CCM systems build on clinical microsystem design that enables the development of an interdependent team and improvement skills. Secondly, CCM systems require the explicit creation of a system design and population focus that identifies current and projected needs for health and healthcare and informs efforts to address these needs. Third, system leadership, execution and deployment are necessary to deploy the system strategy, linking strategy to local improvement and communicating front-line issues and results. Fourth, CCM systems require the development of a clinical knowledge management strategy that integrates knowledge of effective practice with information on local populations and local care delivery experiences to create effective CCM systems. Finally, organizations require an explicit physician engagement and leadership strategy designed to overcome the typical bifurcation of knowledge, power and accountability between practising physicians and administrative leadership. These five elements act in synergy to create high-performing CCM systems, and organizations need to develop all of these elements to optimize performance.

CCM systems do not develop in a vacuum. High-value care requires improvement across systems to address the needs of chronic care patients and others receiving care from multiple providers and transitioning across organizations. Adopting a population health approach requires sensitivity to the needs of specific subgroups and to “high-need/high-use” individuals. Development of CCM systems should go beyond acute care settings. CCM systems in primary care settings are crucial to creating high-value care for patients with complex chronic disease. Regardless of the strategy used for system improvement, creating a leadership, execution and deployment strategy is a fundamental building block for large-scale improvement. To support improvement efforts, CCM systems also rely on the systematic organization of clinical knowledge and its use in improving care. In addition, a key element of CCM systems’ performance is the mobilization of a broad group of physicians in improvement initiatives.

Overall, we assume that establishing effective CCM systems would contribute to improving clinical care, focusing care resources on population needs and renewing the commitment of staff to the healthcare systems in the FHA region. To move forward with the development of effective CCM systems, we suggest that the FHA take the following steps:

Step 1: Identify the population focus and core system elements for CCM system improvement. Using data on population health status, healthcare costs and current service utilization statistics, along with an assessment of current leadership capabilities, FHA leaders need to select one or two populations and associated clinical microsystems that could serve as a test bed for CCM systems.

Step 2: Create a clinical care management guidance council. The CCM guidance council would have responsibility for setting aims, reviewing data, creating plans for change, monitoring results and evaluating impact. It would report to regional leadership and be provided with the resources necessary to achieve its mission. A useful model for guidance councils is provided by the Intermountain Healthcare experience.

Step 3: Examine current outcomes and patterns of care for specific populations in one or more districts, benchmarked against other districts, regional authorities and relevant comparisons. These data would help to build the tension for change and point out areas where improvements were possible. Process data and reviews of service delivery strategies in the FHA region or other settings could offer some ideas for improvements in care.

Step 4: Identify effective care processes and high-value improvements for selected populations. Based on the analysis of process and outcome data and the current delivery model, the guidance council should select some potential target areas for care redesign – some portions of the patient journey that offer clear opportunities for improved care. As part of this step the guidance council should also select one or two “benchmark sites”: external organizations or systems that provide excellent care and whose care systems and approaches offer useful learning for the FHA.

Step 5: Test and implement changes in care processes in selected care settings to support better clinical outcomes and improved patient experiences at the same or reduced costs. Using the Model for Improvement and other quality improvement tools, the CCM guidance council should develop a portfolio of projects aligned with strategic goals and aimed at improving performance for specific groups of patients. In addition to improvements in care processes to improve access, care transitions and overall care delivery, the guidance council should consider the development or modification of the clinical reminders, criteria sets, admissions protocols, medication recommendations and other decision aids used to organize care and support clinical decision-making.

Step 6: Design and deploy a deliberate strategy for physician engagement and leadership. Success in the previous steps will require strong clinical leadership and engagement. The development of CCM systems within the FHA region and the expectation that physicians will organize some or most of their care based on this model may create opposition from some clinicians. This opposition can be minimized by involving local health champions and subject matter experts in the leadership of the guidance council, engaging a diverse range of clinicians in the development of care protocols and decision aids, and offering opportunities to develop improvement skills.

Step 7: Implement senior leadership oversight for the clinical care management system pilot. Regular review by FHA senior leadership and local clinical leadership will enable continuing feedback on the pilot, recognize the successes achieved and provide opportunities to identify and address any system barriers that emerge in this work.

Developing effective clinical management systems that redesign and improve care across the continuum is a logical extension of the current BC clinical care management strategy and builds on the examples and achievements of leading health care systems such as Intermountain Health Care and Kaiser Permanente, two highly regarded systems in the US.

INTRODUCTION

Growing pressures to improve healthcare outcomes and the patient experience while limiting increases in costs have created considerable challenges for the healthcare delivery systems in Canada and elsewhere. Despite the growing prevalence of chronic disease and the needs of the elderly, Canadian Medicare payments still fund only hospital and physician services with limited or no government support for other healthcare expenditures. Most provinces have developed regional structures to manage healthcare delivery, yet neither these provinces nor the ones with less developed regional management (Ontario and Alberta) have fully integrated care between community and hospitals. In addition, primary care in most provinces is separately funded and separately organized. Growing fiscal pressures will limit budget growth, but public demands for improvements in service are increasing, creating dilemmas for governments and healthcare managers alike. Other countries, including England and the United States, face similar issues. Efforts to improve healthcare outcomes and limit cost increases require a strategy that focuses on improving care delivery, engaging clinicians and using tools such as clinical information systems to inform decisions and help to organize care.

The core activity of healthcare organizations is clinical care, so logically healthcare organizations should be organized around care delivery processes and the needs of the patient. However, this is rarely the case. In many organizations “medicine is organized around what doctors do, not what patients want.”ⁱ This arrangement fosters inefficiency and frustration, but attempts to change traditional departmental structures or leadership roles are often interpreted as incursions on clinical autonomy and risk confrontation with physicians. Still, as Swenson and colleagues note, the value of healthcare is a product of its design, its execution and its cost. The design of care (how to reliably deliver appropriate care to patients) and decisions on execution (such as clinic staffing, patient booking and referral arrangements) are typically left to individual physicians or physician groups. Local decisions may help to customize patient care to the needs of some, but they can also undermine the potential for continual learning and improvement, and make it more difficult to reduce inefficiencies and improve the quality of care across the system.ⁱⁱ Efforts to improve local design and execution are inescapable elements of creating more effective care delivery systems. But what care designs and what strategies will serve the needs of Canadian healthcare organizations?

In this paper we develop a model of “clinical care management systems” that integrates the work of a number of key scholars and a wide range of research. This work was undertaken to inform the Fraser Health Authority (FHA) in British Columbia, Canada, and relevant stakeholders as part of Phase 1 of the Fraser Health Transformation project. British Columbia has already initiated a process of clinical care management that focuses on the implementation of guidelines and patient safety interventions for sepsis, hand hygiene, venous thromboembolism (VTE) and other concerns. Most of the current initiative focuses on specific medical and surgical practices, not the development and integration of care practices across providers and the care continuum. The next generation of clinical care management (CCM) systems must adopt a broader focus on the needs of specific populations, developing care strategies that incorporate effective, integrated, evidence-informed care for patients in hospitals and the community.

British Columbia already has several examples of population focused care management networks, including the BC Cancer Agency, the BC Transplant Society and the Surgical Quality Action Network. Building on these examples, next generation clinical care management (CCM) systems

would incorporate physicians and other clinicians and resources in purposefully designed systems that provide high-value care for a defined population. By “high-value care,” we mean high-quality, effective care, improved patient experiences, and decreases or limited increases in costs. We explore the evidence for each of the elements needed to create high-functioning CCM systems, provide some examples of these elements in other delivery systems, and discuss the issues surrounding their development and sustainability in the Canadian contexts.

Much of clinical care currently reflects historical habits rather than conscious design. Even (some would say “especially”) large academic hospitals often fail to organize physician practices, other clinical personnel and resource flows in a way that optimizes care delivery, integrates new technology and organizes patient flow to minimize waits and use staff time efficiently. Organizing care across settings is even more challenging. Chronic care management requires coordination between primary care and specialists, and support for patients in managing their care at home.ⁱⁱⁱ But chronic care is often poorly coordinated.^{vi} So what do care systems look like that pay attention to high-value care – ensuring good outcomes at the same or lower costs?

CCM systems include the clinicians, support staff, technology and information systems together with the care processes and policies that organize care for clinical teams and across organizations. These systems include multiple teams or clinics as well as the organizational resources used to support them in practice. Healthcare organizations have historically focused on recruiting and supporting individual clinicians and practices. And concern for clinical autonomy has limited attention to the characteristics and strategies of CCM systems. Even today, most healthcare organizations permit physicians to organize departments and services rather than designing practice to best meet the needs of the patients and populations served.

We conceive of successful CCM systems as resulting from five interacting strategies or organizational capabilities that create a platform for high-value healthcare. The five capabilities of CCM systems begin with clinical microsystem design that enables the development of an interdependent team and improvement skills. Second, CCM systems require the explicit creation of a system design and population focus that identifies current and projected needs for health and healthcare and informs efforts to address these needs. Third, system leadership, execution and deployment are necessary to deploy the system strategy, linking strategy to local improvement and communicating front-line issues and results. Fourth, CCM systems require the development of a clinical knowledge management strategy that integrates knowledge of effective practice with information on local populations and local care delivery experiences to create effective CCM systems. Finally, organizations require an explicit physician leadership and engagement strategy designed to overcome the typical bifurcation of knowledge, power and accountability between practising physicians and administrative leadership. In the sections that follow we will examine the evidence for each of these components and discuss the patterns and processes of organizations that excel in designing clinical management systems that deliver high-value care.

CLINICAL MICROSYSTEM DESIGN

Healthcare research has typically viewed individual practitioners, clinics or departments as the fundamental practice units, without fully specifying the characteristics of these individuals or groups that contribute to effective practice. Porter and Teisberg argue that greater value in healthcare derives from the development of integrated practice units (IPUs) that focus on caring for specific medical conditions and include a full range of medical expertise, technical skills and specialized facilities needed to treat patients with a series of related conditions over the continuum of care.^v Examples of IPUs would include the Spine Center at Dartmouth-Hitchcock Medical Center (Lebanon, New Hampshire), the organization of congestive heart failure care at Sentara Health (Norfolk, Virginia) and cancer care clinics at The University of Texas MD Anderson Cancer Center (Houston, Texas).

Some delivery systems move toward an IPU model through the development of institutes, clinics and centres focused on care for particular patient groups. Concentrating on IPUs permits providers to develop expertise and allows healthcare organizations to compete on results against other organizations. Porter and Teisberg conceive of IPUs, rather than specialties or departments, as the “fundamental organizational unit in healthcare delivery.”^{vi} (p. 168) In a more effective system, they envision each healthcare organization or system being composed of a strategically selected set of IPUs that provide value to patients and maximize the quality of care while minimizing costs. The pressures to maximize effectiveness of these units would be driven by market forces (an assumption that has greater relevance in the U.S. healthcare market than in Canada). IPUs would focus on improving results through the detailed measurement of outcomes, patient experiences and costs and then would use this information to inform improvements in care. Porter and Teisberg note that “information becomes the central management tool” for IPUs. In their view, this information is a key factor that would contribute to greater value in healthcare delivery when coupled with health systems technology, systematic knowledge development (focused on guidelines, outcomes and costs), and new approaches to pricing that enable joint responsibility and accountability for performance.

Porter and Teisberg’s argument confirms many of the elements in the work of Nelson, Batalden and colleagues, at Dartmouth Medical School, who have carried out a 15-year program of research and practice that examines how *clinical microsystems* can be improved, resulting in better outcomes for patients and better work environments for staff. Their premise is that effective care ultimately rests on the capabilities of teams to organize and deliver care to patients. Clinical microsystems include “patients, clinicians, processes, and recurring patterns – cultural patterns, information flow patterns and results patterns.” A clinical microsystem “is a small group of people who work together on a regular basis to provide care to discrete subpopulations of patients. It has clinical and business aims, linked processes and a shared information environment, and it produces performance outcomes.”^{vii}

The focus on clinical microsystems builds upon and augments the traditional quality improvement emphasis on measuring and improving processes of care. The idea of working with small groups of staff, patients and associated resources as a basic building block derived initially from the insights of James Brian Quinn, whose research on excellent service organizations pointed to the important role of a well-designed front-line interface with the client. Quinn discovered that leading companies designed and managed this interface to ensure optimal results.^{viii} He described the interface as “the smallest replicable unit” and argued that its effective design was critical to creating excellent service and results. Building more effective clinical microsystems and developing key characteristics of these systems that contribute to their success provides a strategy for improving care delivery at the front line.

Nelson and colleagues carried out a study of 20 “high-performing microsystems” in 2000 to 2002 to identify the principles, processes and methods that led to their success.^{ix} Based on an analysis of interviews, surveys and their review of a small sample of patient records, the research team identified nine characteristics shared across these microsystems that contributed to their outcomes. These characteristics included microsystem leadership, culture and organizational support, along with patient focus, staff focus and interdependence of the care team. The microsystems also had the benefit of information and information technology (IT) that supported their work, along with process improvement skills and concern with performance and review of data (see Figure 1). Using these factors, Nelson and colleagues developed the Microsystem Assessment Tool,^x which provides teams with a means to assess their current status on each of the critical factors and to judge their success in building knowledge, skills and behaviours in these areas.

Figure 1: Clinical microsystems’ nine success characteristics



Source: Nelson, Batalden, Huber, et al., 2002 (Reproduced, with permission)

Nelson, Batalden and colleagues have also linked the microsystem framework to issues such as “partnering with patients to improve and design care,” improving patient safety and reliability, and designing specific types of care, such as chronic illness care, by understanding key processes, collecting relevant measures of performance and engaging patients in self-management of their condition. For example, in a case study of the Dartmouth-Hitchcock Medical Center’s neonatal intensive care unit (NICU),^{xi} the Dartmouth group outlines the experience of the neonatal ICU clinicians “to improve outcomes for babies less than 1500 grams, to decrease the incidence of major morbidity and mortality and to do this at a lower cost.”

This initiative began with efforts to “create awareness of our clinical unit as an interdependent group of people with the capacity to make changes,” continued with the development of skills to identify and make changes to improve performance, and culminated with the capabilities to “juggle multiple improvements while taking excellent care of patients as we continue to develop an enhanced sense of ourselves as a system.” The clinical microsystem framework focused initially on optimizing quality improvement efforts, but it has transpired over 15 years to become a robust framework for restructuring team processes and addressing the core problems of organizing daily clinical care.

Reflecting on the role of clinical microsystems, Nelson and colleagues argue that microsystems are the key elements of great health systems. Improving health systems rests on the capabilities of the microsystems:

Increasing the capability of microsystems to do work, to perfect handoffs, to improve work, and to innovate is, we believe, the best strategy to achieve sustainable high performance organization wide.^{xiii (p. 371)}

The linkage between successful *clinical microsystems* and high-performing *healthcare systems* is addressed at several points in recent articles and books on microsystems. The Dartmouth authors note that microsystems are embedded in mesosystems and macrosystems that contain other clinical units and organizational components critical for their success.^{xiii, xiv, xv} Yet the authors acknowledge that understanding and improving clinical microsystems is not enough and that large-scale efforts to improve quality, safety and reliability must address broader system issues as well as microsystem concerns. They explicitly point toward the need for system leadership and a system-based approach for redesign as important components of system redesign.^{xvi}

The concept of clinical microsystems provides a powerful framework for engaging staff and building awareness of microsystem performance. Although there is a substantial and separate literature on “healthcare teams,” the idea of clinical microsystems extends the team construct to include patients, information and other resources necessary for effective care, and it links to clinical quality improvement skills and a multi-dimensional framework for performance measurement and improvement. The clinical microsystem framework also enables action on other important issues such as patient safety. Patient safety requires a focus on system design as a context for interpreting individual action. Thus, engaging microsystem members and collecting measures of patient safety events and near misses are critical components for improving patient safety. In some cases, however, improvements at a microsystem level could optimize individual units while sub-optimizing whole system performance. Thus clinical microsystem design needs to be consistent with larger system priorities and guided by system leadership as well as local clinical champions to ensure improved performance at an organizational or healthcare system level.

Efforts to develop CCM systems should focus on clinical microsystem design as a building block for developing more self-awareness of relationships, care processes and performance in well-defined clinical groups. However, attention must also be paid to system design, system leadership and information management. We consider these issues in turn, starting with system design and population focus.

SYSTEM DESIGN AND POPULATION FOCUS

Work on process improvement within organizations enables more effective care within single sites, but high-value care requires improvements across systems to address the needs of chronic care patients and others receiving care from multiple providers and transitioning across organizations. Efforts to improve systems of care require first a clear definition of the populations and their needs, identifying the clinical and social needs of populations within specified geographical boundaries and subgroups within those populations who have distinctive care needs now or in the future.^{xvii} Registries created from healthcare records and other information systems are critical tools that enable the identification of populations and the experience of the population and subgroups with care, their health status, the costs of their care and other important data. Using these data as a strategic tool to assess the current mix of services, their geographic locations, the integration of care across different providers and the anticipated healthcare needs provides an important strategic lens.

Among the most interesting recent efforts to create a system-wide effort to improve care for defined populations is the Triple Aim project of the Institute for Healthcare Improvement (IHI). The Triple Aim (improving the experiences of care, improving the health of the population and reducing per capita costs of care) links process improvement thinking to population health, providing leverage for system wide-improvement.^{xviii, xix}

Although easy to conceptualize, the Triple Aim goals are challenging to implement. Achieving these aims requires coordination between a range of players and a re-examination of who delivers what services and how. In developing the Triple Aim, the IHI identified the need for “integrators”: organizations that could link providers across a continuum of care to optimize service for a defined population. Integrator organizations rarely control the full range of services required; instead, they must coordinate and motivate a broad range of providers to collaborate and innovate new ways of delivering care. Successful Triple Aim communities and organizations have set broad system goals, engaged physicians and other providers, developed a culture of mutual accountability through transparent measurement, and reviewed and redesigned service delivery patterns to optimize healthcare to meet population needs. McCarthy and Klein describe the work of three U.S. sites that worked on Triple Aim goals. Among other participants in the IHI Triple Aim efforts were teams from England, Sweden and Canada.^{xx}

Adopting a population health approach also requires sensitivity to the needs of specific subgroups^{xxi} and to “high-need/high-use” individuals. Gawande^{xxii} and others have drawn attention to the disproportionate use of health services by a small percentage of the population and the need to provide enriched services, including a variety of supportive services not usually included as “healthcare” in order to reduce emergency department use and hospital admissions. Several pilot projects and service delivery organizations are investing in expanded primary care models to improve near- to immediate-term outcomes while limiting use of high-cost services.^{xxiii} These service delivery models provide a way to customize care packages to meet the needs of identified subpopulations.

LEADERSHIP, EXECUTION AND DEPLOYMENT

Creating system-level aims is a prerequisite for improving system-level outcomes. Yet organizations participating in the IHI's Triple Aim initiative and other system-level efforts quickly discover the challenge of translating goals into action. System leadership designed to improve patient experiences, enhance population health and reduce per capita costs must focus on all three goals, engaging individuals and families, identifying ways to improve and link primary care to other care providers, and managing resources effectively across the system.^{xxiv} This is no easy task.

Executing system goals requires a deliberate approach to link strategy to action. Numerous frameworks for this linkage have been developed, including ones from the NHS Institute for Innovation and Improvement and the IHI's guide, *Execution of Strategic Initiatives to Produce System-Level Results*.^{xxv} The IHI's guide identifies the need for organizations to possess three critical capacities: (1) the ability to deliver on system-level aims by coordinating a portfolio of projects and their associated resources, (2) local management and supervision of activities to support front-line improvement, and (3) continual development of a sufficient cadre of employees with the skills that enable them to produce results.

In many settings quality improvement activities have been predominantly stand-alone projects developed to address local needs, rather than efforts aligned with system priorities. The linkage of local improvement to system goals is more explicit in large-scale “lean” initiatives^{xxvi} that often incorporate leadership training and assign leadership responsibilities for monitoring rapid process improvement workshops and other activities. Regardless of whether the system improvement strategy is built on a “triple aim” framework, “lean healthcare” or other frameworks, creating a leadership, execution and deployment strategy is a fundamental building block for large-scale improvement.

Achieving and sustaining performance targets set for strategic goals requires coordinated and focused action across the system. The organization or system must identify a portfolio of projects that cumulatively provide the means to achieve the system-level aim. Such projects can be developed in either a “top-down” or “bottom-up” process through negotiation and discussion between levels of management. One method for a top-down approach is *hoshin* planning, where successive levels of management engage lower levels through discussion and negotiation (called “catchball”) to cascade goals, measures and projects through the organization.^{xxvii} Alternatively, some organizations use a more bottom-up approach, requesting nominations for projects in key goal areas (such as patient safety, patient experience or access) and then selecting and supporting those projects that meet specified criteria (such as innovativeness, likelihood of success and return on investment). In practice, most organizations balance senior leadership views on strategic priorities with local knowledge.

Successful systems provide resources and oversight on these projects to increase their impact and contribution to the system goal. Organizations that are successful in executing system-level aims develop a project review process that engages senior-level executives in regular and structured review of projects. These reviews communicate the importance of the projects to the project teams, identify actions necessary to keep the projects on track and decide whether the projects are sufficient to achieve the larger goals, need to be modified or, in some cases, need to be stopped. Bellin Health in Green Bay, Wisconsin, uses a 120-day cycle for its projects.^{xxviii (p. 18)} Senior managers review each project and make decisions on the portfolio of projects, assessing their successes and barriers, creating new projects and stopping those that appear unlikely to achieve their project goals. Senior leaders at Virginia Mason Medical Center in Seattle, Washington, review projects in weekly “stand-up rounds” where project leaders update their progress and identify issues and barriers for senior leaders.^{xxix} These strategies enable closer linkage between front-line projects and staff, and senior leaders and the broader organizational strategy.

KNOWLEDGE MANAGEMENT AND ORGANIZATIONAL LEARNING

The fourth critical strategy for CCM systems addresses the systematic organization of clinical knowledge and its use in improving care. The components of knowledge management and organizational learning include health-related IT tools and their linkage to guidance structures that assist in disseminating, updating and integrating clinical knowledge and practice across healthcare systems.

Knowledge management systems are composed of specialized, independent yet interconnected IT systems and associated resources. These systems work best when housed within a common integrated IT infrastructure, with administrative, financial and clinical applications.^{xxxii} Integrated knowledge management systems require a strong alignment between clinical and administrative processes across various care environments.^{xxxii, xxxiii, xxxiv, xxxv} They can include a broad range of technologies and systems for managing and sharing patient information, such as electronic medical records (EMRs), clinical physician order entry (CPOE) systems, clinical decision support (CDS) systems and clinical pathways.

These technologies can provide an effective way of implementing guidelines in practice^{xxxvi} while also providing capabilities for electronic documentation, order entry, results management and administrative tasks.^{xxxvii} EMRs and individual computerized documents for patient data have the potential of increasing communication and coordination between physicians by being transferrable, automated and standardized.^{xxxviii} CPOE systems are often paired with EMRs and automate medication ordering to ensure legible, complete orders.^{xxxix} CDS systems are often built into CPOE systems and are designed to improve clinical decision-making by matching patient characteristics with a knowledge base for patient-specific recommendations and providing alerts, reminders, advice, critiques and suggestions.^{xl} Compared with other approaches to improving care, CDS systems have been shown to be among the most effective and to have the longest lasting effect on physician behaviour.^{xli} Lastly, clinical pathways can be used to link evidence to practice through structured multidisciplinary care plans for specific clinical conditions.^{xlii}

Health IT and evidence-based recommendations

Health IT has been viewed as a method to overcome the challenges inherent in implementing evidence-based guidelines in practice.^{xliii} Traditional, passive dissemination strategies such as the distribution of printed educational materials have not been very successful at changing physician practice. Moreover, one reason for the limited effectiveness of guideline implementation strategies is that traditional guidelines are population-based and not always available at the point of care. CDS systems, however, allow for the provision of patient-specific recommendations at the location and time of decision-making, increasing the chance of impacting patient care.^{xliv, xlv, xlvi} For example, the Brigham and Women's Hospital (Boston, Massachusetts) uses integrated clinical information systems to offer clinically relevant information for providers to assist decisions on care.^{xlvii}

Health IT and workflow changes

One major barrier to knowledge management systems, including CDS systems, is their disruption of daily routines; changes in workflow can generate resistance from physicians and other staff. However, the role that broader knowledge management systems play in providing workflow support and facilitating communications can be very important to the provision of high-quality care.^{xlviii, xlix} Damberg and colleagues examined health IT projects and recommended that systems be customized to minimize the impact on workflow.^l

Implementing knowledge management systems also can be an opportunity to revisit processes and promote change in existing clinical processes.^{li} Prior to implementing any knowledge management systems, a workflow analysis should be conducted to determine the degree of change required in daily routines and workflows. For example, researchers found that workflow analysis was critical before developing a system for the Ohio State University Health System.^{lii} The development of comprehensive order sets was also a key to successful system implementation and improved clinical decision-making. Although workflow disruptions can lead to physician resistance, involving physicians in the system selection, customization and implementation can lead to personal agency, innovative exploration of the system and refinements in routines.^{liii} An internal examination of processes can also promote multidisciplinary care by demonstrating the interdependent and reciprocal nature of care tasks.^{liv} However, once a system is selected and customized, the efforts required by physicians to receive and act on recommendations should be minimized to avoid further resistance to its use.^{lv}

Effect of knowledge management systems on various outcomes

Studies examining the effect of healthcare IT and its various independent components have been conducted and synthesized extensively. Reviews have examined the effects of health IT and health information systems,^{lvi, lvii} EMR use,^{lviii} CDS systems and advice systems,^{lix, lx, lxi, lxii, lxiii} CPOE,^{lxiv} computerized reminders or feedback systems,^{lxv, lxvi} and clinical pathways.^{lxvii, lxviii}

Two systematic literature reviews examining the effect of health IT on quality of care found an improvement in physician compliance with evidence-based guidelines.^{lix, lxx} The 2006 review found that implementing a multifunctional system can also lead to enhanced monitoring and surveillance activities and decreased rates of inappropriate care. However, at least two retrospective, non-experimental studies reported that EMR use had little effect on quality in hospitals and ambulatory care settings, demonstrating that not all health IT projects are effective at improving quality of care.^{lxxi, lxxii}

Positive effects of healthcare IT systems on practitioner performance have been observed across four reviews, with one review finding small to modest effects on provider behaviour as a result of computer reminders.^{lxxiii} In the other three reviews more than half of the included trials were associated with significant improvements in clinical practice.^{lxxiv, lxxv, lxxvi} Healthcare IT systems were also found to substantially reduce medication error rates, increase desired prescribing behaviour and improve medication management, but no effect was reported in reducing adverse drug events.^{lxxvii, lxxviii, lxxix, lxxx} The effect of systems on patient outcomes, on the other hand, was not as clear. Jamal and colleagues observed that three of eight studies reviewed had a positive impact on patient outcomes, while five studies showed no change or adverse outcomes.^{lxxxi} Garg and colleagues noted the limited capacity of studies to detect clinically significant differences in patient outcomes.^{lxxxii} However, two reviews assessing the impact of clinical pathways showed a positive effect on length of stay and complications.^{lxxxiii, lxxxiv}

Lastly, there is some evidence that healthcare IT systems can have a positive impact on efficiency and costs. One review found that, within four benchmark institutions, health IT significantly improved efficiency.^{lxxxv} However, the generalizability of these findings to other healthcare settings is unclear. A review by Rotter and colleagues found a reduction in hospital resource use without a negative effect on patient outcomes,^{lxxxvi} and, similarly, a meta-analysis by Barbieri and colleagues noted a reduction in hospital costs with the implementation of clinical pathways.^{lxxxvii}

Factors associated with successful knowledge management systems implementation

Various studies have attempted to tease out what system features and organizational contexts are associated with successful implementation of healthcare IT and knowledge management systems, some of which are presented in this section. Firstly, healthcare IT systems implementation should be incorporated into the organization's strategy and change management approaches to reduce resistance among physicians and staff.^{lxxxviii, lxxxix, xc, xci} Secondly, several studies noted the importance of integrating IT with other systems in a healthcare organization to maximize the benefits for each system.^{xcii, xciii, xciv, xcvi} Thirdly, all successful IT implementations included significant engagement of health professionals and end-users throughout, from needs analysis to selection, customization and implementation of a system.^{xcvi, xcvi, xcvi, xcix, c, ci, cii} This involvement should be accompanied by strong leadership and commitment from top management^{ciiii, civ, cv, cvi, cvii, cviii} and the use of champions at the user level.^{cix, cx, cxi, cxii} Fourthly, customization and adaptation of existing systems paired with internal process review and redesign is also strongly correlated with success because it ensures that the system meets the needs of the users with minimal disruption.^{cxiii, cxiv, cxv, cxvi, cxvii, cxviii} Lastly, effective communication throughout the process^{cxix, cxx} and sufficient training of users^{cxxi, cxii, cxiii, cxiv, cxxv} contribute to successful implementation.

Gaps in the knowledge management systems literature

Studies on healthcare IT and associated knowledge management systems often report insufficient details of the system and its development and implementation, making it difficult to generalize results and learn from their experiences. Without sufficient details, it is impossible to determine which system features enhance system effects on provider and patient outcomes and which do not.^{cxxvi, cxxvii, cxxviii, cxxix} Also, Adler-Milstein and Bates have suggested a shift away from designing health IT around current workflow and practices and instead a greater focus on research examining the complementary changes that can take place in an organization when health IT is implemented to optimize benefits.^{cxxx} In addition, too few studies examine the effects of systems on patient health, focusing instead on physician process outcomes.^{cxvxi}

Successful implementation of knowledge management systems has occurred mostly in large academic medical centres in the United States, and it remains unclear whether these successes can be reproduced in other settings.^{cxvxi} Few studies have analyzed the cost of development and implementation, leaving it uncertain as to whether it is cost-effective to implement health IT in every setting.^{cxvxi} Many well-regarded systems are the product of local development, so there is also a strong need for research evaluating commercial systems and their benefits.^{cxvxi}

Despite these caveats, effective knowledge management within clinical settings is key to improving care and services. Healthcare IT plays an important role in collecting, disseminating and supporting the application of knowledge about patients, their care and associated costs. Still, most of the investment on healthcare IT has been focused on acute care or hospital settings. The development, adaptation and deployment of healthcare IT across health systems and primary care are important areas for future work.

PHYSICIAN ENGAGEMENT AND LEADERSHIP

CCM systems are local work systems populated by professionals who demonstrate a high level of autonomy. Although all health professionals contribute to the production of care and services, physicians are key players, and their engagement and leadership is crucial for health system performance. Yet this engagement presents unique challenges.^{cxxxv, cxxxvi} Physician engagement and leadership refers to the role of physicians in formal executive positions and the engagement of doctors in activities “within their normal working roles to maintaining and enhancing the performance of the organization which itself recognises this commitment in supporting and encouraging high quality care.”^{cxxxvii, p. 214} Little formal evidence exists about the impact of physician engagement and leadership on the quality of care and services and on overall organizational performance. However, many case studies of high-performing systems detail the critical role of physician engagement and leadership in transformative change and improvement.^{cxxxviii, cxxxix, cxl, cxli} Recent policy initiatives in various jurisdictions also stress the need for effective medical leadership and engagement.^{cxlii, cxliii, cxliv, cxlv, cxlvi, cxlvii}

Analyses of the relationship between the medical professions and governments in Canada have repeatedly underlined the difficulty of engaging physicians to lead system change and improvement initiatives. These problems stem from the legacy of physician autonomy built into Medicare and the long history of confrontational physician politics aimed at advancing physician interests.^{cxlviii} However, recent studies of primary care reform in Canada suggest that it is possible to develop strategies for physician engagement and leadership within the current Canadian political and institutional environment.^{cxlix} Efforts to stimulate physician engagement and leadership form an essential piece of CCM systems and, more broadly, health system improvement. The challenge is to move beyond focusing on individual professionalism for physicians to emphasizing broader professional socialization and participation that values the involvement of physicians in improvement initiatives and in organizational and system governance.

Two considerations have to be taken into account in designing strategies to engage physicians in health system improvement. First, although physicians practise increasingly in formal organizational contexts,^{cl, cli, clii, cliii} the accommodation between the medical profession and healthcare organizations has had limited impact on the participation of physicians in organization and health system goals. A second consideration, derived from the work on physician integration and physician alignment within U.S. healthcare organizations,^{cliv, clv, clvi, clvii} suggests that there is only weak evidence supporting the use of economic incentives to engage physicians with their organizations. These findings suggest the need for a diverse set of organizational strategies to support a better alignment between the medical professional, organizational and system goals that go beyond economic incentives. High-performing CCM systems thus face two challenges: converting the influence and expertise of autonomous physicians into assets for health system improvement and resisting the pressures to rely solely on economic incentives to generate commitment for improvement.

Two broad types of strategies can be used to promote physician engagement and leadership for improvement: those involving the design of formal executive or leadership positions for physicians and a variety of strategies to nurture physicians’ commitment to broader organizational and system goals.

Structural approaches to physician engagement and leadership

Broadly speaking, structural approaches to physician engagement and leadership involve the use of organizational design and economic incentives. We will focus here mostly on organizational design strategies. One example of a structural approach to physician leadership is the creation of joint management roles at the divisional level similar to the structure put in place at the Johns Hopkins Hospital in Baltimore, Maryland, in the 1970s. This approach has been considered or implemented by many healthcare organizations in Canada and elsewhere through the adoption of program management. Numerous papers have examined the creation of formal positions for physician executives for health system improvement.^{clvii, clix, clx, clxi, clxii, clxiii, clxiv, clxv, clxvi} These papers identify a broad variety of structural approaches to physician leadership, from the nomination of individual physicians in top executive positions like chief executive officer, to the involvement of physicians in co-management of clinical programs at the intermediary level of organizations, to the creation of quality officer positions and the integration of physicians into the organizations through various corporate and economic arrangements such as the ones at Kaiser Permanente in the United States. The reports suggest that structural arrangements are a key ingredient in stimulating physician engagement and leadership for improvement, and they underline the importance of adopting a more consistent, systemic and less ad hoc approach to physician engagement. A systemic approach relies on structural levers (such as formal positions and economic incentives) as well as a series of soft mechanisms (such as capacity development and process improvement).

Physicians in individual and collective roles

The literature on physician leadership focuses mostly on the motivations of individual physicians to engage in executive and leadership roles, on barriers to physician involvement in such roles, and on the challenges they face once entered into managerial positions. Several factors that promote physician engagement in formal leadership roles have been identified: a desire to impact population health, a search for new professional challenges, and a self-perception of competencies and the ability to succeed in managerial jobs.^{clxvii, clxviii, clxix, clxx, clxxi} Important cultural differences between the medical and managerial worlds have been identified by many authors.^{clxxii, clxxiii, clxxiv, clxxv, clxxvi, clxxvii, clxxiii, clxxix, clxxx, clxxxi, clxxxii} Cultural differences include disparities in decision priorities; while management focuses more on the allocation of resources and efficiency, clinicians focus more on patient care. Many physicians view their organization as highly bureaucratic and characterized by inertia, whereas their professional values emphasize rapid decision-making, innovation and less hierarchical relations.

Although cultural differences are important, some authors argue that the similarities of values among managers and physicians, like altruism and concern for patient well-being, may attenuate the impact of these differences.^{clxxxiii, clxxxiv, clxxxv} Recent empirical research on healthcare reform in Alberta concludes that collaborative strategies may overcome different views and commitments between physicians and system leadership.^{clxxxvi} Factors that promote the emergence of dual commitments among physicians include the absence of perceived conflicts between professional values and organizational objectives, a positive managerial experience by physicians regarding clarity of roles and responsibilities, and transparency in decision-making processes.^{clxxxvii, clxxxviii, clxxxix, cxc, cxci, cxcii} Chreim and colleagues^{cxci} and Goodrick and Reay^{cxci} have also emphasized the importance of broad policy influences like professional regulation in the emergence of new professional roles and identities. Recent research on medical managers in the United Kingdom highlights important health system conditions that attract physicians to managerial positions and the need to provide physician executives with sufficient professional recognition and career advancements.^{cxci}

This research on physicians in formal leadership positions indicates the importance of a facilitative organizational context to support physician involvement. But the research pays little or no attention to the role that these medical professionals can play in health system improvement beyond formal leadership positions. A key element of CCM systems' performance is the mobilization of a broader group of physicians in improvement initiatives.

The rationale for moving beyond a structural approach to physician engagement and leadership is found in the development of a more collective and distributive approach to leadership. Contemporary scholars see leadership more as a process and a set of practices performed by numerous individuals throughout organizations than the role of a single individual in a formal position of authority.^{cxcvi, cxcvii, cxcviii, cxci, cc, cci} The collective property of leadership refers to the sharing of leadership roles among a set of actors in a complementary manner. These groups of organizational leaders combine a diverse set of expertise, skills and sources of legitimacy to respond to system challenges.^{ccii} Distributed leadership denotes the degree to which such roles are spread across a system or an organization from the strategic to the operational levels.^{cciii} Because of the fundamental characteristics of healthcare organizations, leadership is widely distributed and is *de facto* not concentrated in the hands of a few administrative or physician leaders. The challenge is to develop and harness this leadership potential for organizational and system improvement.

A collective approach to leadership has two consequences for the design of strategies to stimulate physician engagement and leadership: (1) to achieve major and continuous improvement, healthcare organizations need to invest in leadership capacity development at the strategic and operational levels,^{cciv, ccv} and (2) efforts to create a coalition of physicians supporting improvement are key to achieving higher performance. The dynamics of physician engagement are analogous to a social movement (see recent work by Bate, Robert and Bevan^{ccvi}) in supporting change in health systems. The generation of a sufficient stock of clinical leaders involved in health system improvement and in the day-to-day functioning of CCM systems becomes a strategic priority for high-performing organizations. Creating a more collective and distributive form of leadership implies that physicians will participate in the design and improvement of their working and practice context.^{ccvii} While we focus here on physician engagement and leadership, a more collective view of leadership also implies the development of strong leadership roles and capacities among others professions and staff, creating effective microsystems with high degrees of interprofessional collaboration.

Strategies to develop and sustain physician engagement and leadership

A recent systematic review on the influence of context on the implementation of quality improvement in healthcare organizations identified factors at the macro, meso and micro levels that affect its development and success.^{ccviii} A broad set of contextual factors has been identified in most of the studies reviewed: leadership from top management, external competition that may stimulate attention to quality improvement, years involved in quality improvement, and experience with data infrastructure and the management of data. Factors that seem positively associated with quality improvement success but that are less frequently mentioned in studies are board leadership for quality, organizational structures that enable clinical integration across departments or units, a focus on customer satisfaction and physician involvement and leadership in quality improvement, microsystem motivation to change, resources, and quality improvement team leadership within these microsystems. Strategies to engage physicians and professionals will thus depend on a series of interdependent strategies that reflect a systemic approach to quality improvement.

A study of general practitioner involvement in quality improvement and effectiveness of care in the United Kingdom suggests that engagement of physicians has resulted from a combination of strategic health authority (that is, regional) support and local clinical leadership.^{ccix} Physicians' involvement in quality improvement locally is motivated by a series of factors like the desire to improve patient care, well-aligned financial incentives, the maintenance of professional autonomy, efforts and strategies to reach performance targets, the maintenance of professional pride, and peer pressures. Good teamwork is also a determinant of successful improvement initiatives. Overall, the authors conclude that the alignment of managerial vision with professional values and aspirations was essential for quality improvement success.

Research on adopting and implementing patient-centred care approaches and quality improvement also identifies strategies and facilitators to support physician engagement and, more broadly, the engagement of professionals in health system improvement. For example, studies by Audet and colleagues on the adoption of patient-centred care and quality improvement among a population of U.S. physicians suggest that a series of factors influence the propensity of physicians to engage in patient-centred care.^{ccx, ccxi} These factors relate to education and knowledge about patient-centred care, to the availability of technical support to manage data and use to improve care, and to financial incentives. Another promising strategy identified is to implement collaborative programs that support joint action by physicians and other professionals in practice settings to facilitate the adoption and implementation of patient-centred care. Providing tools is also critical to help physicians engage in patient-centred care. Large medical groups benefit from the resources invested in quality improvement that facilitates involvement by physicians. In addition, the development of capacities and provision of tools is essential to improve care and services, as is the role of management and organizational culture in supporting physician engagement in quality improvement. Similar results have been found in a survey of physicians in Australia regarding the implementation of evidence-based medicine and quality improvement.^{ccxii}

Overall, these studies suggest that the engagement of professionals, and more specifically, physicians, in quality improvement depends on a balance between the views of the professionals at point of care and the goals and strategies promoted by broader organizational leadership in terms of advice, knowledge development and tools.^{ccxiii, ccxiv} Strategies to foster the engagement of physicians in system improvement have to combine elements of standardization, collaborative learning, top management support, and local involvement and leadership – ideas also found in research by Chassin and Loeb on the application of high-reliability principles to healthcare organizations.^{ccxv} The researchers identify the limitations of strategies that target changes in an individual professional's behaviours for health system improvement; they see opportunities reliant on three interdependent factors to improve the delivery of care: leadership commitment, development of a safety culture, and (especially relevant in the context of this report) a culture of improvement and robust improvement process/tools. They clearly underline that the engagement of front-line clinicians depends on a variety of organizational or contextual factors that act in synergy. Leadership commitment includes embedding improvement goals within vision and mission statements, the setting of measurable goals, and the monitoring of goal achievement. Without such leadership, physicians and other professionals are not provided with credible and convincing rationales for organizational and system improvement goals. However, the commitment of top leadership may be insufficient if other elements of high-reliability organizations are not in place. The culture of improvement “involves three reinforcing imperatives: trust, report, and improve.”^{ccxvi (p. 564)} The importance of culture is also emphasized in work by Bate and colleagues on culturally sensitive restructuring emphasizing joint learning by groups through improvement

processes^{ccxvii} and in work by Adler and colleagues who stress the importance of community principles in structuring professional work.^{ccxviii} Culture is generated through concrete experience with colleagues and local microsystems where clinicians deliver care. These experiences reinforce or undermine the propensity of physicians to engage in quality improvement.

Overall, the commitment of physicians and other professionals is nurtured and reinforced by concrete experiences where vision, problem identification and operational decisions are well aligned and produce clear operational orientations and results. Physicians, and other professionals, need robust improvement processes/tools and appropriate knowledge to engage in health system improvement initiatives. High-performing CCM systems will have to rely on capacity development in improvement processes and on very concrete experiences of this improvement work by front-line workers. The importance of facilitative organizational and policy contexts to support the improvement of care and services in microsystems has been observed in the analysis of three transformative health systems that have the reputation of having achieved remarkable and consistent improvements through time.^{ccxix}

Most of the studies on engaging physicians in successful quality improvement have focused on acute care. Improving primary and community care will require more attention to collaboration among a diverse set of providers and organizations. This collaboration will require leadership capacities at network levels, shared goals, and a culture and infrastructure for improvement across organizations and providers.

CREATING CLINICAL CARE MANAGEMENT SYSTEMS: IMPLICATIONS FOR THE FRASER HEALTH AUTHORITY

In this report, we focused on the elements of effective clinical care management (CCM) systems and the ways in which they contribute to improving system performance. This discussion provides the basis for considering the path that the Fraser Health Authority (FHA) might follow to transform the way care is delivered in the region. Setting up effective CCM systems would contribute to improving clinical care, focusing care resources on population needs and renewing the commitment of staff to the healthcare systems.

The core ideas around CCM systems have strong resonance with the principles incorporated in socio-technical system theory.^{ccxx} In this theory, internal group dynamics (the relationships among different groups within and across organizations and between elements of a system) and the interface between technologies and human participants are critical influences on performance. Task groups (teams) focus on improving work processes within a system. Proponents of the socio-technical approach focus on identifying innovative and low-cost practices that would improve performance. They see these different interfaces as a source of added value for a system. They also insist on the importance of developing internal regulation of work systems rather than relying on external regulation (such as economic incentives or disincentives). Most importantly, the socio-technical approach suggests that the joint optimization of technical and human systems is a source of greater adaptation and performance than structural or economic strategies alone.

Our review of CCM systems clearly suggests that both elements of technologies (health IT) and social/human/cognitive capacities are critical for the formation of these systems. Our assumption is that the FHA could facilitate adaptation and improve performance by developing strategies and actions that jointly optimize the numerous clinical work systems within its health system. One key issue is how to convert this theoretical perspective into a more tangible strategy that is feasible and sustainable. A second issue is the transferability of CCM system and physician engagement strategies beyond acute care into more fluid contexts such as primary care services.

Sample proposal for the Fraser Health Authority

The following subsection offers an example of how the FHA might adapt the CCM system approach outlined in this paper in terms of the high-level strategies and resources needed. In this step-by-step scenario, the FHA would select and develop a couple of clinical microsystems and then scale up progressively to gain more traction on health system and population health improvement goals.

Step 1: Identify the population focus and core system elements for CCM system improvement.

Using data on population health status, healthcare costs and current service utilization statistics, along with an assessment of local clinical leadership capability, FHA leaders should select one or two clinical microsystems or programs that could serve as a test bed for CCM systems. The Microsystem Assessment Tool developed by Nelson and colleagues could provide a means to identify those microsystems that have well-developed leadership, team coordination and other factors that would enable them to accelerate their work with further investments. These initial selections would need to be reviewed in the light of leadership capabilities in these clinical areas and their strategic importance. The FHA leadership would also select the membership of the CCM guidance council (see Step 2).

For the purposes of this example, we assume that one of the test bed areas would be diabetes care in one or more geographic districts of the FHA region, in order to provide a more specific illustration.

Step 2: Create a clinical care management guidance council.

The CCM guidance council would have responsibility for setting aims, reviewing data, creating plans for change, monitoring results and evaluating impact. The guidance council would report to regional leadership and be provided with the resources necessary to achieve its mission.

A useful model for guidance councils is provided by the Intermountain Healthcare experience in Utah and southeastern Idaho. In that setting guidance councils are composed of clinical leaders with representation from administration and key support areas such as finance and information systems. The clinical leaders include relevant clinical experts and local clinical champions.^{ccxxi} At Intermountain Healthcare the clinical guidance councils create clinical process models that define “standard care” for patients with specific clinical needs. These models are founded on evidence-based reviews modified by local clinical experience and feedback.

In this adaptation for the FHA, the CCM guidance council might decide to focus on some selected components of a full care process module as a starting point (for example, patient self-management and/or communications and support for primary care providers from specialists). These starting points should be selected because they represent critical system issues with a potential for impact on outcomes and would be identified by the guidance council in Step 4. They should also include areas where improvements in clinical information technology are possible and feasible to support improved clinical decision-making.

Step 3: Examine current outcomes and patterns of care for the diabetic population in one or more districts, benchmarked against other districts, regional authorities and relevant comparisons.

These data would help to build the tension for change and point out areas where improvements were possible. The clinical microsystem approach uses the “patient value compass” to provide a balanced scorecard of results, including clinical outcomes, health status, patient satisfaction and patient care costs for a defined population of patients.^{ccxxii}

Process data and reviews of service delivery strategies in the FHA or other settings may offer some ideas about improvements in care. Key questions include these:

- Have we identified all the diabetes patients who need continued follow-up?
- Do we have good knowledge of the health needs of these patients?
- What additional knowledge do we need about the processes of care and outcomes?
- Are there important variations in how patients receive care in this district (that are unrelated to their medical and social needs)?
- To what extent are patients able to manage their diabetes? What additional supports might be helpful?
- How many patients are communicating regularly with clinicians in the system? What are the areas where needs are not well met?

Other questions on care outcomes and processes would be identified by the CCM guidance council and staff.

Step 4: Identify effective care processes and high-value improvements for selected populations.

Based on the analysis of process and outcome data and the current delivery model, the guidance council should select some potential target areas for care redesign – some portions of the patient journey that offer clear opportunities for improved care. As part of this step the guidance council should also select one or two “benchmark sites”: external organizations or systems that provide excellent diabetes care and whose care systems and approaches offer useful learning for the FHA. A benchmarking visit to one or two sites would be a very effective means of stimulating reflection on current care processes, identifying useful ideas for improving current services, and building relationships and support for change on the guidance council and among other clinical leadership.

As an option, or in addition, the guidance council should review current performance and consider possible initiatives on some critical system issues that are common problem areas. These include:

- ▶ Reviewing *transitions of care* between sites and levels of care and the fidelity of communication between providers at these different sites and the preparation of patients in self-care. Care transition models, including the Care Transitions Program developed by Eric Coleman,^{ccxxiii} offer strategies for improving transitions of care.
- ▶ Assessing current *access to care* in clinics and primary care offices and reviewing methods to redesign systems to improve access using tools such as “open access scheduling” and “advanced clinic access”^{ccxxiv}
- ▶ Reviewing the elements of the *Chronic Care Model* for preventive care and care management and reviewing the extent to which patients are supported in each of these elements^{ccxxv}

Step 5: Test and implement changes in current diabetes care to support better clinical outcomes and improved patient experiences at the same or reduced costs.

Using the Model for Improvement and other quality improvement tools, the CCM guidance council should develop a portfolio of projects aligned with strategic goals and aimed at improving performance for diabetes patients. These projects should include clear aims for improvement, an initial list of “change ideas” that are thought to improve current care and a plan for engaging local clinicians in the testing of these changes.^{ccxxvi}

In addition to improvements in care processes to improve access, care transitions and overall care delivery, the guidance council should consider the development or modification of the clinical reminders, criteria sets, admissions protocols, medication recommendations and other decision aids used to organize care and support clinical decision-making. These decision tools might be partly electronic and partly paper-based and would need to be developed by local clinical leaders who would interpret evidence-based reviews and guidelines, adapting them to local practice settings and populations.

The Intermountain Healthcare experience suggests that such guidance needs to be balanced between formal evidence and local knowledge gained in providing care. Complex patients and special circumstances require variation from specific protocols. In cases where variations are seen as desirable, clinicians at Intermountain Healthcare are asked to identify the reasons for variations, and these are viewed on a monthly basis to help revise and further specify care protocols and decision aids. At Intermountain Healthcare and in other systems, these protocols and decision aids are largely electronic, although most were developed originally in a paper format. No protocol is followed 100%; most have variance rates of 5% to 15%.^{ccxxvii}

Step 6: Design and deploy a deliberate strategy for physician engagement and leadership.

Success in the previous steps will require strong clinical leadership and engagement. The development of a Fraser Health model for diabetes management and the expectation that physicians will organize some or most of their care based on this model may create opposition from some clinicians. This opposition can be minimized if the following occurs:

- ▼ The leadership of the guidance council includes local clinical champions and subject matter experts.
- ▼ There is an ongoing attempt to include a diverse range of clinicians in the development of care protocols and decision aids, with financial support for those who forego practice earnings as a result of their involvement.
- ▼ The FHA creates and executes a leadership development strategy that offers physician leaders and other clinical microsystem leaders opportunities to develop knowledge and skills in microsystem design, clinical leadership and engagement, quality improvement methods and tools, and clinical knowledge management.
- ▼ There is a well-developed communications plan that identifies the aims, methods and results of this work, focusing on patient outcomes, the impact on clinical care processes, the satisfaction of clinicians in the changed care models and other relevant measures.
- ▼ One useful additional strategy may be to develop a series of rounds that focus on diabetes care with a mix of local clinicians and external experts.

Step 7: Implement senior leadership oversight for the clinical care management system pilot.

Regular review by FHA senior leadership and local clinical leadership will enable continuing feedback on the pilot, identify successes and provide opportunities to address barriers that emerge in this work. Clinical microsystems do not develop in a vacuum; they do not control all the resources and expertise needed to deliver the maximum value for patients and the maximum impact for the health of the population. System leadership needs to develop and execute a broader strategy that monitors and facilitates microsystem capability to improve care processes, build linkages among different microsystems and provide resources for population health improvement.

CONCLUSION

Clinical care management (CCM) systems are a new idea, but they build on important foundations. Clinical care is *the* core process of the healthcare system, and process improvement through quality improvement or lean healthcare methods is a critical strategy for developing more effective care. Developing effective clinical management systems that redesign and improve care across the continuum is a logical extension of the current BC clinical care management strategy and builds on the examples and achievements of leading health care systems such as Intermountain Health Care and Kaiser Permanente, two highly regarded systems in the US. Quality improvement in healthcare requires leadership, strategy, and the capability to monitor and shift directions. Knowledge of patients, their care experiences and outcomes, and associated costs need to be easily accessible to clinicians in microsystems and to managers and leaders across the system. Physician engagement and leadership provides the engine for the next generation CCM system. Such systems are impossible without trust and collaboration between physicians and other system leaders. Many healthcare systems have adopted one or a couple of these ideas, but creating effective CCM systems relies on integrating these component elements to transform the current fragmented patterns of care to an evidence-based and effective system that delivers value-based care.

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