

TRANSFORMING CARE FOR CANADIANS WITH CHRONIC HEALTH CONDITIONS

Put People First, Expect the Best, Manage for Results



APPENDICES



Canadian Academy of Health Sciences
Académie canadienne des sciences de la santé

ISBN: 978-0-9811589-7-6

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Printed in Canada

Suggested citation: Nasmith L., Ballem P., Baxter R., Bergman H., Colin-Thomé D., Herbert C., Keating N., Lessard R., Lyons R., McMurchy D., Ratner P., Rosenbaum P., Tamblyn R., Wagner E., & Zimmerman B. (2010). *Transforming care for Canadians with chronic health conditions: Put people first, expect the best, manage for results - Appendices*. Ottawa, ON, Canada: Canadian Academy of Health Sciences.

Published 2010 by the Canadian Academy of Health Sciences
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APPENDIX A

CHRONIC ILLNESS AND PRIMARY CARE

(Paper commissioned by the Canadian Academy of Health Sciences in 2009 written by Barbara Starfield, MD, MPH. The views expressed herein are those of the author and do not necessarily represent the views of the Canadian Academy of Health Sciences.)

The increased burden of chronic illnesses on the functioning of health systems is well recognized.¹ Although most of the increase in demand on the health system is a result of earlier detection of disease, lowered thresholds for making diagnoses, and, especially, increased intensity of treatment, some conditions may be increasing in frequency. Notable among these conditions are obesity and hyperlipidemia, which have moved from being considered risk factors to diagnosed chronic conditions. The increase is much greater in the US than in comparable European countries;² the proportion resulting from true increases in incidence and prevalence is unknown.

Data from the early 2000s in the United States indicate that about 40% of all visits to physicians were for chronic illnesses; about 80% of these were for routine follow-up. For primary care physicians alone, 46% of visits by previously known patients were for chronic illness, and 91% of these were for routine follow-up. Although there has been a slight increase in the percentage of visits for follow-up of chronic illness, it appears that there has not been a substantial change in the percentage of visits that are for chronic illness over the past 25 years, indicating that the increase in costs is likely to be due to changes in medical practice interventions rather than to a relative increase in visits for chronic illnesses. It is also likely that the increased diagnosis of chronic illness is not a result of an increased number of people with chronic illness but, rather, an increase in multiple diseases in people with one or more already existing chronic illness. For example, the overall number of people who had one or more chronic illnesses (based on survey data) was 133 million, projected to increase to 157 million in 2020 – an 18% increase. Yet the projected increase in frequency of the seven most common chronic illnesses alone is projected to increase 42%, clearly signaling a great increase in the co-occurrence of just the most common chronic illnesses.¹ A Canadian sample of adult patients coming for appointments to family practitioners in Quebec found that over 90% had more than one chronic condition, rising from 69% in 16-44-year-old women to 95 and 99% of women of ages 45-64 and 65 and over, respectively. In men, the comparable percentages were 72%, 89% and 97%.³ That is, the challenge for planning and budgeting for health services is multimorbidity, not specific chronic diseases.

In the past ten years, recognition of the importance of care over time for the management of chronic illness has become widespread and, with it, the increasing importance of primary care. Heightened recognition of the high frequency of co-morbidity in people with any given chronic illness has contributed to the recognized importance of primary care, as it is that branch of medical care that deals with people's problem *en toto* ("multimorbidity") rather than the "silos" of disease and organ system oriented care provided by a multiplicity of specialists.

This paper deals with the suitability of primary care, both in concept and in practice, in dealing with the challenge of management of chronic illness, and the challenges facing it as it undertakes to deal with the increasing burden on health systems of people with multiple chronic illnesses.

The Nature of Chronic Conditions

Except for Mendelian dominant genetic conditions, which are rare in the population, diseases are professionally constructed entities. They can be and are artificially created to suit special interests. They do not exist in isolation from each other and are, therefore, not an independent representation of illness. Moreover, they are but one manifestation of ill health, among others including (but not limited to) discomfort, disability, and limitation of normal activity.⁴⁻¹¹ A ranking of the frequency of health conditions based on lost productivity differs from a ranking based on medical costs.¹² For example, the top five high impact diagnoses based on productivity loss are fatigue, depression, and back or neck pain, sleeping problems, and other chronic pain whereas the top high impact conditions based on health care costs are relatively infrequent cancers, back or neck pain, coronary heart disease, other chronic pain, and high cholesterol.

The system of classifying diagnoses was originally based on coroners' reports in the early and mid 1800s and is therefore based on anatomical organ-systems. Health services system organization reflects these phenotypic classifications in its divisions of practitioners into specialty groups, which are largely based on organ systems. The increasing inadequacy of such a classification comes from a vast amount of evidence of greater variability *within* disease categories than across them. For example, "heart disease" encompasses 13 different rubrics in the International Classification of Diseases; to say that heart disease is the leading cause of disease provides no information about the nature of the disease, let alone the etiology or management of the disease in people and populations. Even "coronary artery disease" has diverse origins and manifestations. Chronic obstructive pulmonary disease (COPD), another leading cause of death in the world, is a syndrome with diverse systemic manifestations, not a "pulmonary" disease – although it is classified as such.¹³⁻¹⁵ Neither breast cancer, prostate cancer, nor diabetes is a single disease. The same is the case for many other "diseases" that are considered to be distinct entities with standard modes of diagnosis and intervention. Thus, lists of "priority conditions" (as in IOM, *Crossing the Quality Chasm*¹⁶) represent the particular points of view and orientation of disease advocacy groups and disease experts, particularly specialists in those diseases. Notable "chronic conditions", such as osteoporosis, occupational disorders and most childhood illnesses are almost never included in lists of priority diseases – a situation that under-represents the health-related needs of particular population subgroups and thus contributes to the perpetration of inequities in health in populations.

People with a diagnosis of a disease generally considered chronic (because it persists over time regardless of treatment) are, indeed, empirically found to have that diagnosis in subsequent years, thus confirming that they are "chronic". But people with a diagnosis of an acute or acute likely to recur condition are also more likely (than people in the general population) to have the same diagnosis in a subsequent year. In analyses of clinical data, even people with conditions such as upper respiratory disease, non-bacterial pneumonia, otitis media, urinary tract infection, and headache are more likely to be diagnosed with the same condition in a subsequent year than are diagnosed in the population as a whole (Starfield, unpublished data). That is, there is no clear distinction, either on the basis of etiology or persistence, between chronic illnesses and illnesses not considered chronic.

There is a large literature indicating that experiences over the life course determine the state of health at any period during that life course.¹⁷⁻¹⁹ This is the case regardless of what manifestation of health (e.g., acute illnesses, chronic illnesses, disabilities) is considered. Evidence is clear that there are early antecedents of various types of illnesses as well as later influences. For example, early influences on growth and development are associated with increased rates of growth retardation, short stature, neonatal mortality, and coronary artery disease; early infections predispose to chronic respiratory conditions, rheumatic heart

disease, gastric cancer, hemorrhagic stroke, and hypertension. Later socioeconomic disadvantage predisposes to almost all conditions.¹⁸⁻²⁰ In view of the evidence that the occurrence and progression of most diseases (with the exception of Mendelian dominant genetic conditions) are influenced by a myriad of interacting environmental and social conditions,²¹ regardless of the chronicity of their disorders, it does not make sense to concentrate attention of health services on chronic illnesses of ageing. Doing so undervalues health problems that set the stage for chronic illnesses later in life, particularly in socially disadvantaged populations. It also creates greater inequity in health between children and adults because the chronic illnesses in childhood are not the “priority conditions” targeted for health system attention. In fact, it is children who suffer disproportionately from multimorbidity. The coexistence of different illnesses is even greater in childhood than in adults although the overall prevalence of most specific illnesses is lower.²² In childhood, the coexistence of different illnesses (multimorbidity) is much greater than can be accounted for by chance distributions of illness.²³

The importance of a risk factor in a population depends on its relative risk and, more important, its frequency in the population. A relative risk of 1.5-2 with a prevalence of 90% gives the same population risk as a relative risk of 7-8 with a prevalence of 10% or a relative risk of 15 with a prevalence of 5%.²⁴ Most well-accepted risk factors have relative risks in the low range, indicating that they require a high prevalence to be salient as a population risk factor. That is why it is the combination of risk factors within individuals and vulnerable population groups that accounts for higher subsequent illness rates. That is, as with disease rates, it is the constellation of interacting risks factors that accounts for subsequent ill health, both chronic and acute. For example, prior infection (mostly sub-clinical) with cytomegalic virus raises the risk of subsequent cardiovascular disease (CVD) less than conventional risk factors, but it is so common in the population that it is associated with about 40% of the risk of cardiovascular disease in the population (as compared with a 15-40% for conventional cardiovascular disease risks) and for an even greater proportion of the excess cardiovascular disease in people of low SES.²⁵

The attribution of deaths to a single cause in tabulations of cause of death masks the importance of multidisease causation (pleiotropism).²⁶ The sum of deaths in the world attributable to individual diseases exceeds the actual number of deaths⁷ and, as was noted above, the increase in the frequency of diagnosed chronic illness is much greater than the increase in the percentage of people with chronic illness.

A particular feature of all illnesses is that they increase vulnerability to other (and unrelated) illnesses. That is, existing disease is one of the myriad of interacting influences on the occurrence and progression of ill health. The extent to which this increased vulnerability is a result of underlying common pathophysiology or a direct effect of the illness on decreasing general resilience to illness, has not been quantified.²⁷

Despite their greater needs, people with multimorbidity are less likely to get timely treatment for particular chronic conditions. In a US study, people with uncontrolled hypertension were found to be less likely to get adequate treatment for their hypertension the more co-morbid conditions they had. The conditions with the most negative effect on odds of hypertension treatment were cancer, chronic rhinitis or sinusitis, depression or anxiety, diarrhea or constipation, emphysema or asthma, gastroesophageal reflux or gastritis, headache, nonrheumatic arthritis, and thyroiditis – thus showing how important are acute as well as chronic conditions in ongoing care.²⁸

Most health systems are unprepared for the onslaught of multimorbidity. The management of the large percentage of people, especially the elderly with high morbidity burdens, should be in primary care, where care is person-focused, not disease-focused. Guidelines for the management of patients with multimorbidity are needed, in order to improve effectiveness of care, to increase equity by addressing the greater health needs of socially compromised populations, and to reduce adverse events deriving from polypharmacy and

other disease-specific interventions. Table 1 provides the extent and magnitude of multimorbidity in people with particular diseases, some common and some acute. Particularly high burdens of morbidity are found in people with congestive heart failure; people with diabetes mellitus and hypertension also are very likely to have unrelated, coexisting conditions. (Johns Hopkins University, ACG Manual, unpublished; available at www.acg.jhsph.edu). There are no published guidelines for dealing with conditions in the presence of a variety of other conditions. That is, the guidelines that dominate the evaluation of quality of care are not designed to deal with quality of care delivered to most people in primary care settings. Disease-oriented guidelines face a wide variety of problems concerning their validity, applicability, and conceptual logic. They cannot guarantee a higher likelihood of either good outcomes or avoidance of harm because the evidence from which they are derived is not generalizable to the populations to which they are applied. Moreover, they are implemented on the basis of evidence of reductions in relative risk in individuals and cannot be extrapolated to reductions in attributable risk in populations. They also are likely to lead to greater inequity in health across population subgroups, as there are differences in effectiveness and safety of interventions in different population subgroups, and there is a much greater likelihood of multimorbidity in socially deprived population subgroups (thus making disease-oriented guidelines even more inappropriate).²⁹⁻³⁰ Applicability of disease-oriented guidelines is also a concern; they assume no variability in disease manifestations, assuming that all people with a given disease are similar in responsiveness to standard interventions and are based on imperfect knowledge of the natural history of disease in individuals, subpopulations, and populations.³¹ Conceptual concerns involve their limitation to medically defined priorities for interventions. They do not address critical aspects of patient care, responsiveness to patients' needs, or the range of services available to meet patient needs and priorities for care. Moreover, they are based on evidence that is often rife with conflicts of interest and, thus, has a high likelihood of being unethical as well as ineffective and inefficient. Importantly, they are not prioritized according to the degree to which they are likely to improve health.^{29,32-33}

Primary Care and Its Importance in Ongoing Care Over Time

Primary care is that branch of medical care that provides first-line care (by virtue of its accessibility), person (not disease) focused care over time (not just in visits), is comprehensive in that it meets all health-related needs (referring only those too uncommon to maintain competence), and coordinates care when it has to be provided elsewhere. These features make it uniquely suited to dealing with both predispositions to and manifested chronic illness.³⁴

Access to first contact care provides the basis for dealing with the approximately 10% of visits made by people with acute exacerbations of their chronic illnesses (NAMCS analyses, Starfield November 2009).

Person-focused care over time makes it possible to identify, early in life, those conditions that are likely to influence subsequent ill health and, therefore, to attempt to reduce their impact. It also provides the continuity of attention that is important in reducing the impact of chronic illnesses and reducing the likelihood of the progression to more serious illness and to more multimorbidity. In addition to its impact on increasing effectiveness of care, it is also equity producing because more socially vulnerable populations have higher multimorbidity of multiple and interacting types and thus are more able to benefit from person-focused rather than specific disease focused care.³⁵

Table 1: Percent Distribution by Degree of Co-morbidity for Selected Disease Groups, Nonelderly Population

Disease Group	CO-MORBIDITY LEVEL (RUBs)		
	Low	Mid	High
Total population	69.0*	27.5	4.0
Asthma	24.0	63.8	12.2
Hypertension	20.7	65.4	13.9
Ischemic heart disease	3.9	49.0	47.1
Congestive heart failure	2.6	35.1	62.3
Disorders of lipid metabolism	17.6	69.9	12.5
Diabetes mellitus	13.9	63.2	22.9
Osteoporosis	11.1	50.0	38.9
Thrombophlebitis	12.2	53.8	33.9
Depression, anxiety, neuroses	8.1	66.3	25.6

*About 20% have no co-morbidity.

Source: ACG Manual (unpublished)

Comprehensiveness of care makes it possible to deal with chronic illnesses in the context of the common situation of multimorbidity, regardless of whether co-existing conditions are simply concurrent or a consequence of the particular chronic illness. In contrast to specialist care, which focuses on one type of illness (usually organized by organ system), primary care can deal with a multiplicity of types of conditions in the context of the individual. As a result, care is more appropriate, safer, and more efficient as management is unified and less likely to involve mutually conflicting strategies. As noted above, it is also associated with greater equity of care.

Coordination provides the mechanism for interpreting and reconciling the often conflicting recommendations and prescriptions imposed by a multiplicity of disease-oriented specialists.

As a result of these features combined, primary care is associated with greater effectiveness, greater efficiency (lower costs for better outcomes), and greater equity in care.³⁴ Many studies done across and within countries and using a variety of methods to characterize the strength of primary care services show that health systems and services oriented towards primary care have better health outcomes, including total mortality rates, heart disease mortality rates, infant mortality, lower low birth weight rates, and earlier detection of cancers. They also have better preventive care. (References are in Starfield et al,³⁴ pages 460-66.) The stronger a country's orientation towards primary care services, the lower the rates of all-cause mortality, all-cause premature mortality, and cause-specific premature mortality from asthma and bronchitis, emphysema and bronchitis, cardiovascular disease, and heart disease, even after controlling for a variety of other characteristics that influence health.³⁶ Canada, with a moderately strong primary care infrastructure, has better health levels and better equity in care than the United States (with its weak primary care infrastructure).³⁷

Costs are also lower in systems oriented towards primary care. (References are in Starfield et al,³⁴ page 473.) A recent study of the impact of better primary care in Canada found many millions of dollars of savings in the care of people with diabetes or heart failure.³⁸

Similarly, health systems more oriented towards primary care have greater equity in the distribution of health, as has been shown for infant mortality, all-cause mortality, heart disease mortality, and cancer mortality, low birth weight ratios, and self-reported health. (References are in Starfield et al,³⁴ pages 469-73.) Low socioeconomic status is strongly associated with age-adjusted survival from breast cancer in the US (with a poor primary care system) but not in Canada (with its better primary care infrastructure).³⁹ Survival rates from various cancers showed few if any differences in the survival of various income groups in Canada but substantial differences in the United States; the survival of poor people in Canada was much better than in the US.⁴⁰

The distinction between care that is disease-focused and that which is patient-focused is at the heart of rational organization of health systems. Although it is commonly believed that the increase in frequency of occurrence of chronic illnesses over the most two decades⁴¹ has led to a greatly increased need for and use of resources (with consequent increased costs), it is not the increase in chronic disease but, rather, the increase in multimorbidity that is the culprit. The importance of multimorbidity is highlighted by studies that show its association with increased hospitalizations for conditions that should be preventable with good primary care, adverse events rates, and, especially, costs of care. These increases are not linear; greater morbidity in terms of multiple diseases is associated with exponential rates of increase in all three, and especially in costs.⁴² Analysis conducted in British Columbia used the ACG-system of characterizing multimorbidity to stratify data from a year of claims forms into people with acute conditions only, people with only low impact chronic conditions, and people with “high impact” chronic conditions, and classified people in each of these strata into the degree of co-existing morbidity burden (according to the number of different TYPES of illnesses. Within each of the nine levels of morbidity burden, people in all three groupings of types of illnesses have the same resource use. In contrast, within each of the three types of morbidity strata, resource use increased progressively with increasing burden of co-morbidity. That is, it is the degree of co-morbidity (measured by the number of different types of conditions) that influences resource use, NOT the type of condition.⁴³

No innovation in the management of diseases will adequately and safely address the need to prevent and manage diseases unless extent and type of multimorbidity is central in the design of the innovative intervention. Patients’ health problems are neither synonymous with their diagnoses nor the sum of their individual diagnoses. Preventing and managing morbidity belongs in primary care because of its special features: first contact, person-focused care over time, comprehensiveness, and coordination. The benefits of primary care are greatest for young populations (which can benefit most from prevention of future illnesses) and for people with the highest morbidity burdens.⁴⁴⁻⁴⁵ This is at least part of the reason why disease management programs have not proven useful, and why the promise of the “chronic care model” will not be realized in its current form. Chronic diseases and acute diseases share common etiologies; repeated acute diseases predispose to chronic diseases over the life course. A major summary of the world focus on “chronic illness management” concluded that there is no evidence of benefit from a focus of health systems or health services on chronic diseases.⁴⁶ The well known but underappreciated secret of the value of primary care is its person and population, rather than disease, focus.

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APPENDIX B

LITERATURE REVIEW – AN OVERVIEW OF CHRONIC CARE MODELS

(Literature review commissioned by the Canadian Academy of Health Sciences to inform the work of the Expert Panel. The view expressed herein does not necessarily represent the views of the Canadian Academy of Health Sciences.)

Global Focus on Coordinated Action

Global actions on chronic disease, such as the Chronic Disease Action Group (Ebrahim, 2008) and the Grand Challenges Global Partnership (Daar et al., 2007), recognize chronic diseases as having multiple causes over time, requiring a horizontal, integrated approach with the patient, family, and community being active participants (Yach, Hawkes, Gould, & Hofman, 2004). Integrated chronic disease management focuses on moving beyond vertical interventions aimed at preventing and treating individual diseases to a health system perspective (Nolte & McKee, 2008). This includes tackling common chronic disease risk factors, such as obesity, tobacco use, sedentary lifestyles, and high blood pressure (Epping-Jordan, Galea, Tukuitonga, & Beaglehole, 2005; World Health Organization, 2005), and reconfiguring health systems along integrated care and prevention models (Bodenheimer, Wagner, & Grumbach, 2002; Nolte & McKee, 2008).

In contrast to disease management models, which focus on treatment and care of single diseases, integrated approaches emphasize commonalities across disease conditions and advocate system change across the continuum of healthcare (Nolte & McKee, 2008). DeBusk, West, Houston Miller, and Barr Taylor (1999) framed this shift toward integrated approaches as, “Treating the patient with disease(s) vs treating disease(s) in the patient” (p. 2739). Some of the key concepts in integrated approaches include a focus on the primary care setting, shifting attention from episodic care to proactive, recognition of the efficacy of multipronged approaches in ambulatory care improvement (Coleman, Austin, Brach, & Wagner, 2009), and focusing prevention efforts on risk factors linked to the most significant chronic diseases.

Integrated models acknowledge the likelihood for people with chronic conditions to have multiple conditions, along with the complexity of risk factors, increasingly complicated drug and other treatment regimens, a shift toward decreasing hospitalization in favour of community care for many conditions, the value of frequent monitoring for patients with chronic disease, and the value of patient and family knowledge and patient participation in decisions and self-care. Moreover, the models situate the person with chronic conditions in a social context, emphasizing the reciprocal role of community in prevention and care.

Comprehensive Chronic Care Models

The most widely adopted approach to improving care for chronic disease is the chronic care model (see Figure B1), introduced by Wagner, Austin, and Von Korff in 1996 (see also Bodenheimer et al., 2002; Wagner, 1998). The chronic care model was developed in response to studies that demonstrated that multicomponent practice changes in four categories led to the greatest improvement in health outcomes: increasing providers' expertise and skill, education and supporting patients, making care delivery more team-based and planned, and making better use of registry-based information systems (Coleman et al., 2009). The chronic care model assumes the primacy of primary care and is a guideline to ambulatory care improvement through patient-centred, evidence-based, interrelated system changes, including prevention, regular and coordinated treatment and follow up, and self-management for multiple conditions (Beaglehole et al., 2008; Wagner, 1998). Although the chronic care model is primarily a clinical model, it takes a cross-system and community-contexted view, and it has been used to guide national quality improvements as well as state based and regional efforts (Coleman et al., 2009).

The chronic care model asserts that to change outcomes requires "fundamental practice change" (Improving Chronic Illness Care, 2007, p. 8) with components in six areas: influencing physician behaviour, better use of all healthcare team members, enhancements to information systems, planned encounters, modern self-management support, and care management for high-risk patients (Improving Chronic Illness Care, 2007).

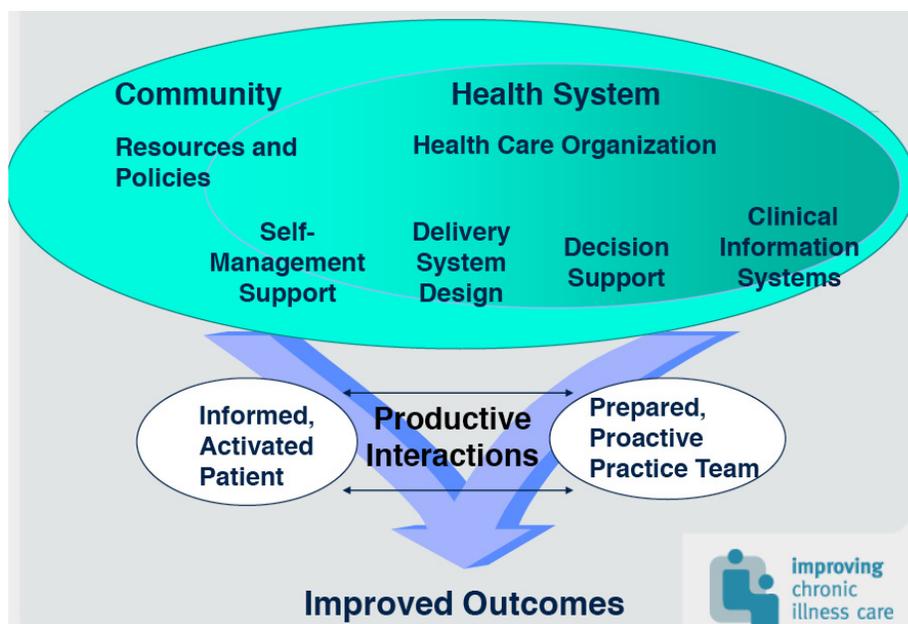


Figure B1: The Chronic Care Model¹

¹ From "Chronic Disease Management: What Will it Take to Improve Care for Chronic Illness?" by E. H. Wagner, 1998, *Effective Clinical Practice*, 1, p. 3. Copyright 1998 by E. H. Wagner. Reprinted with permission.

Wagner's (1998) chronic care model was expanded by Barr et al. (2003) to include a population and health promotion perspective, including recognition of the social determinants of health and the value of enhanced community participation (see Figure B2). In their expanded care model, Barr et al. recognized the extent to which health is significantly affected by policy decisions in nonhealthcare areas (including housing, transportation, and food distribution) and emphasized social change and community empowerment rather than individual responsibility. The aim of the expanded chronic care model is to reduce the burden of chronic disease through supporting people and communities to be healthy.

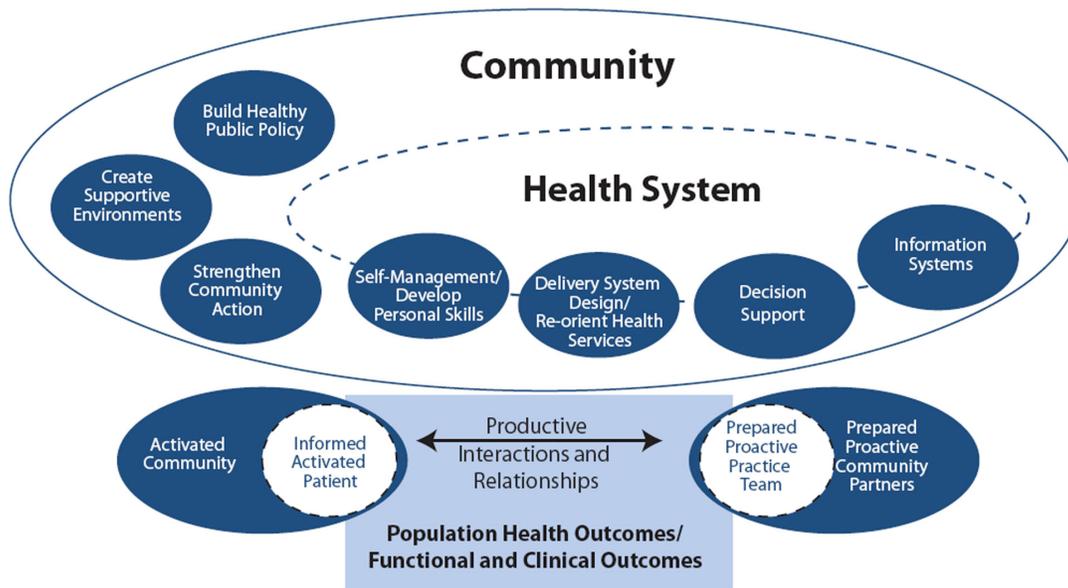


Figure B2: The Expanded Chronic Care Model²

Barr et al.'s (2003) expanded chronic care model deepened the community aspect of Wagner's (1998) model and added the components to build healthy public policy, create supportive environments, and strengthen community action to the health practice elements. In addition, this expanded model works toward activated community partners along with activated patients.

In the expanded chronic care model, Barr et al. (2003) also suggested that each component works at multiple points across the system. Self-management, for example, may relate to an individual's: capacity to cope with disease, ability to develop personal skills for health and wellness, and capacity to develop strategies for action in the community as well as in the health system.

Shortly after the expanded chronic care model was developed, the original chronic care model was enhanced to incorporate patient safety, cultural competency, care coordination, community policies, and case management. Community partners were added to the relationship between activated patients and prepared proactive practice teams. The healthcare organizational aspects were made more flexible to adapt to resource needs in different contexts, with an emphasis on continuity and coordination of services. Politics and financing became the system drivers.

² "The Expanded Chronic Care Model: An Integration of Concepts and Strategies from Population Health Promotion and the Chronic Care Model," by V. J. Barr, S. Robinson, B. Marin-Link, L. Underhill, A. Dotts, D. Ravensdale, and S. Salivaras, 2003, *Hospital Quarterly*, 7(1), p. 77. Copyright 2003 by Barr et al. Reprinted with permission.

Since then, several versions of an expanded chronic care model—both Barr et al.’s (2003) and Wagner’s (1998) models—have been adapted for use in several countries, including Australia, Denmark, Egypt, Germany, and England (Improving Chronic Illness Care, 2007; Nolte & McKee, 2008).

The United Kingdom uses an approach that incorporates Wagner’s (1998) chronic care model with a population needs-based model developed by Kaiser Permanente (as cited in Nolte & McKee, 2008), which emphasized that people with chronic conditions require a range of support that extends beyond the limits of the National Health Service (see Figure B3).

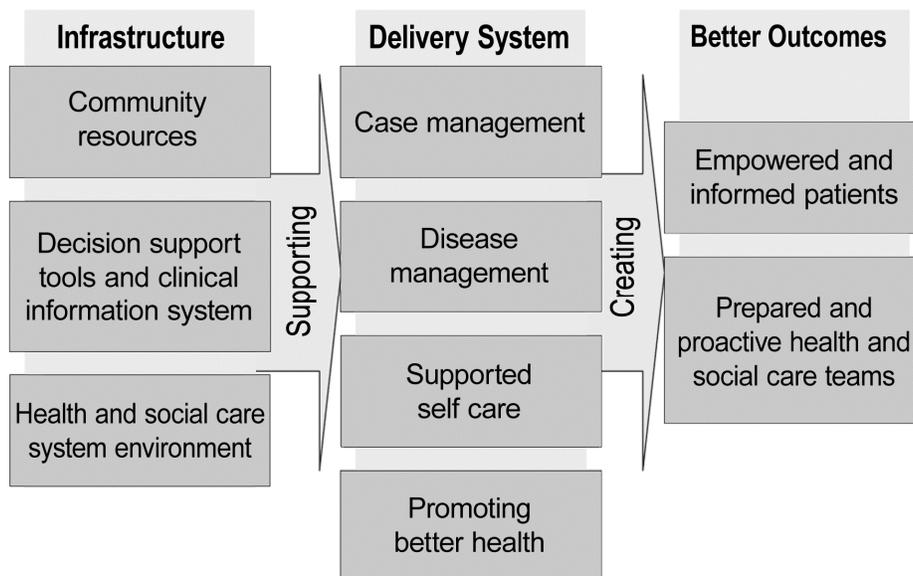


Figure B3: National Health Service Social Care and Chronic Disease Management Model³

³ From *An NHS and Social Care Model for Improving Care for People with Long Term Conditions* (The NHS and Social Care Long Term Conditions Model section, ¶ 1) by the Department of Health, 2010, retrieved from http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browsable/DH_4965951

Implementation of the Chronic Care Model

Wagner's (1998) chronic care model is widely regarded as a foundational and generative approach to chronic disease care, and there is a general understanding that effective responses to chronic disease must be systemic and multifaceted. At the same time, the realities of implementation have meant that it is rare for all six elements of the chronic care model to have been introduced as a unit.

Coleman et al. (2009) conducted a comprehensive review of chronic care model-based interventions to study the question of whether implementing this model improves the delivery of care and patient health outcomes. Published evidence suggested that practices redesigned in accordance with the model generally improve the quality of care and the outcomes for patients with various chronic illnesses (Coleman et al., 2009).

These improvements were not applicable across the board. Coleman et al.'s (2009) assessment found there was significant variation in the degree of health outcome improvement. Practices that had made changes across multiple elements of the chronic care model were higher performing than those that chose simpler interventions, underlining the significance of the multicomponency of the chronic care model. Additionally, most of the published evidence involved "highly motivated practices focusing on patients with a single chronic condition" (p. 6).

According to the Improving Chronic Illness Care (2007) program, successful implementation of the chronic care model requires shifting from reactive care to proactive, population-based care, leveraging community partnerships, supporting self-management at every encounter, delivering levels of care based on risk stratification, and using clinical practice guidelines. Tsai, Morton, Mangione, and Keeler (2005) conducted a meta-analysis of the chronic care model and determined that patient improvement occurs with the implementation of any of the elements and that no single element was essential. Coleman et al.'s (2009) review of chronic care model interventions was more specific about the critical success factors in effectively implementing an integrated approach to improving chronic illness care, particularly the need for interrelationships between the six elements: practices need to be able to identify key aspects of patient conditions (information systems), to engage in proactive care (delivery system redesign), and patients must be able to participate in decision-making and integrate changes into their daily lives (decision support).

Kreindler (2008) used the chronic care model as a framework for envisioning a comprehensive chronic disease strategy and proposed that it is neither necessary nor desirable to try to introduce the whole model at once. Kreindler suggested it is most effective to focus on one highly important change at a time and provided a matrix for decision-makers to set priorities by comparing the strength of the evidence for different approaches (see Figure B4). This matrix is based on an extensive review of the literature, including several meta-analyses and systematic reviews.

	MOST IMPACT	POTENTIAL IMPACT	LESS IMPACT
Chronic Disease Management	<p>Delivery System Redesign</p> <ul style="list-style-type: none"> Advanced access Multidisciplinary teams Non-physician practitioners Improving the scheduling and location of care <p>Self-Management Support</p> <ul style="list-style-type: none"> Integrated into primary care <p>Community Partnerships</p> <ul style="list-style-type: none"> Linkages between health and social services <p>Health System Leadership</p> <ul style="list-style-type: none"> Strategic priority-setting Staff engagement and input Evaluation and new initiatives 	<p>Delivery System Redesign</p> <ul style="list-style-type: none"> Case management <p>Self-Management Support</p> <ul style="list-style-type: none"> Lay-led programs <p>Community Partnerships</p> <ul style="list-style-type: none"> Linkages to specific programs (e.g., exercise) offered within the community 	<p>Decision Support</p> <p>Clinical Information Systems (in the absence of Delivery System Redesign)</p> <p><i>Interventions in these areas should not be introduced until there have been major changes in other ARES of the Chronic Care Model.</i></p>
Chronic Disease Prevention and Health Promotion	<p>Interventions Directed at Environments</p> <ul style="list-style-type: none"> Support policies that make healthy choices more convenient and affordable Support restrictions on unhealthy products <p>Interventions Directed at the Public</p> <ul style="list-style-type: none"> Community development initiatives emerging from residents' priorities <p>Addressing Broader Determinants</p> <ul style="list-style-type: none"> Advocate healthy economic, social, environmental policy 	<p>Interventions Directed at Environments</p> <ul style="list-style-type: none"> Promote healthy workplace and school environments through tangible changes <p>Interventions Directed at the Public</p> <ul style="list-style-type: none"> Well-researched, well-designed, social marketing <p>Interventions Directed at Individuals</p> <ul style="list-style-type: none"> Evidence-informed individual counselling and/or group programs 	<p>Interventions Directed at Environments</p> <ul style="list-style-type: none"> Workplace promotional campaigns, contests, etc. School-based interventions with minimal environmental component <p>Interventions Directed at the Public</p> <ul style="list-style-type: none"> Mass media appeals Community-based campaigns, initiated by health professionals, to encourage healthy lifestyles

Figure B4 : Chronic Disease: What's the Evidence?⁴

⁴ From *Lifting the Burden of Chronic Disease: What's Worked, What Hasn't, What's Next* (p.4), by S. Kreindler, 2008, Winnipeg, MB, Canada: Winnipeg Regional Health Authority. Copyright 2008 by Longwoods Publishing. Reprinted with permission.

Shift in Thinking About Care for People with Chronic Conditions

The emergence of integrated approaches to primary and secondary chronic disease prevention and management in the past decade has significantly challenged traditional single-disease initiatives in prevention and care. Zimmerman (2010) described the shift from the disease-specific perspective to an integrated, person-focused approach as a shift from a simple, predictable model to a more complex model (see Figure B5).

SINGLE MORBIDITY: Disease-Specific Focus	MULTI MORBIDITY: Person Focus
Often all causes can be identified and measured	Multivariate causes, changing over time
Diagnosis and prognosis are often accurate	Diagnoses are uncertain and prognoses obscure
Specific therapy or treatment is often available — disease management	Indecisive technologies and therapies with adversities — person's life course management
Technological intervention is usually effective: cure is likely with return to normal	No cure, pervasive uncertainty: coaching and self-care over time is needed to protect and improve health
Professional is knowledgeable while patient/family is inexperienced	Professional and patient/family must be reciprocally knowledgeable to prevent illness and improve health

Figure B5: Single Morbidity Versus Multimorbidity Focus

Starfield (2009) argued that the “rational organization of health systems” (p. 10) requires a distinction between “care that is disease-focused and that which is patient-focused” (p. 10). She noted that it is not the increase in occurrence of chronic illnesses over the past two decades that has led to the increase in need for resources, but the increase in multimorbidity (i.e., people living with complex conditions). Creating a more effective way to care for people with chronic conditions requires a holistic approach understanding the complexity of living with multiple chronic conditions. This integration constitutes a transformative approach to care.

The Medical Home

With evidence beginning to suggest that effective primary healthcare can lead to increased quality and safety of healthcare, it is important to acknowledge the emerging concept of the “medical home” (Berenson, Hammons, Gans, & Zuckerman, 2008, p. 1219). Used primarily in the United States, recently, the term medical home has been explored in Canada.

In the United States, a medical home includes an ongoing relationship with a personal physician who leads a practice team, whole person orientation, coordinated or integrated care, quality and safety, enhanced access to care, and payment that recognizes the added value provided to patients (American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians, & American Osteopathic Association, 2007).

A recent discussion paper from the College of Family Physicians of Canada (2009) introduced the concept of a patient-centred primary care medical home for every person in Canada. The College of Family Physicians of Canada is currently engaged in developing a Canadian-specific model and identifying where elements of this model already exist in Canada.

In this framework,

A medical home is a patient-centred medical care setting where: 1) patients have a personal family physician who provides and directs their medical care; 2) care is for the patient as a whole; 3) care is coordinated, continuous and comprehensive with patients having access to an inter-professional team; 4) there is enhanced access for appointments; 5) the practice includes well-supported information technology, including a health record; 6) remuneration supports the model of care; and 7) quality improvement and patient safety are key objectives. (College of Family Physicians of Canada [CFPC], 2009, p. 3)

This proposed Canadian model is physician-led, but is also centred in team-based care, including “inter-professional collaboration that includes the patient’s family physician and other health professionals, and intra-professional collaboration (i.e. between the patient’s personal family physician, other family physicians with special interests and skills, and other consulting specialists)” (CFPC, 2009, p. 4). The College of Family Physicians of Canada model also highlights “comprehensive, continuous care ‘from cradle to grave’ through appropriate linkages between primary care and other parts of the health system, and between the patient’s family physician and other healthcare providers” (p. 4).

Researchers have created a “composite medical home variable” (Scobie, MacKinnon, Higgins, Etchegary, & Church, 2009, p. 48) to examine the value of this form of comprehensive primary care. In Schoen et al.’s (2007) work, people were considered to have a medical home if they were adults with a primary care source who knows their medical history, is accessible, and helps coordinate care.

Kaiser Permanente’s Comprehensive Model

Kaiser Permanente’s model for care goes beyond the medical home to incorporate the consumer’s home (see Figure B6). Kaiser Permanente’s vision for the future of care includes the person’s home and other settings as a growing locale of choice for some care delivery, recognizing that “an individual’s care delivery support system has expanded to explicitly include other community and family resources” (Wiesenthal, 2010, p. 8).

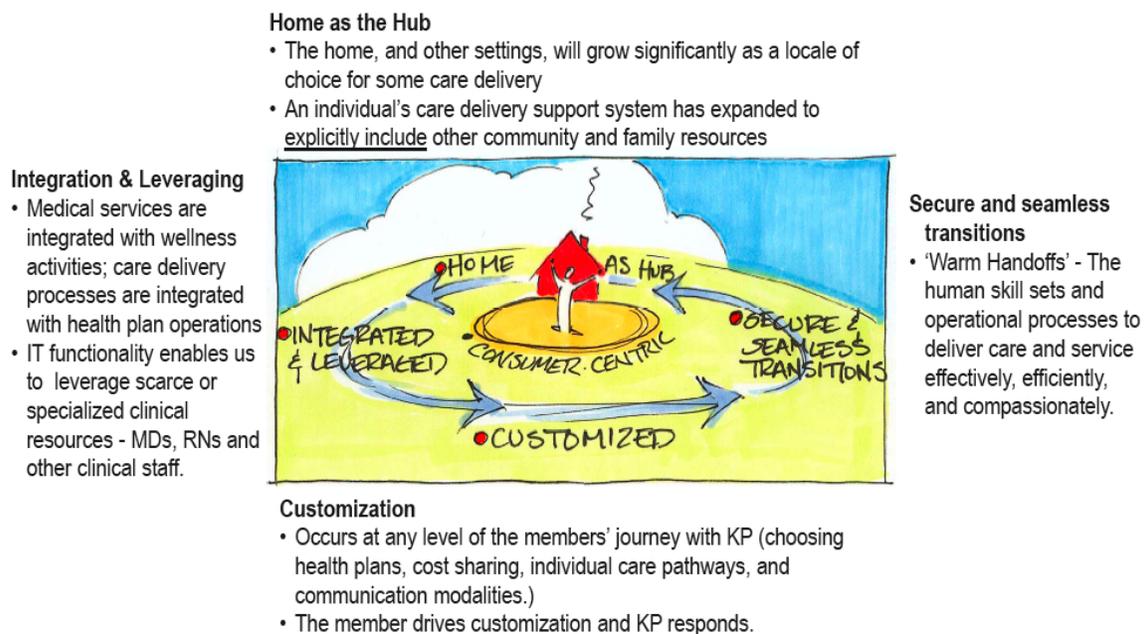


Figure B6: Kaiser Permanente’s Vision for the Future⁵

⁵ From *Lifting the Burden of Chronic Disease: What’s Worked, What Hasn’t, What’s Next* (p.4), by S. Kreindler, 2008, Winnipeg, MB, Canada: Winnipeg Regional Health Authority. Copyright 2008 by Longwoods Publishing. Reprinted with permission.

Health information systems are a critical part of the Kaiser model. The core technology, called “HealthConnect” (Kaiser Permanente Institute for Health Policy, 2008, p. 1) acts as much more than an electronic health record; HealthConnect provides a program-wide system to integrate clinical records with appointments, registration, and billing. HealthConnect creates an integrated hub that allows for the coordination of care between medical services, wellness activities, and community and home care. Longitudinal electronic health record and population support tools enable the expansion of preventive and proactive care to members with chronic conditions, who are estimated to account for 60% of healthcare costs (Zhou, Garrido, Chin, Wiesenthal, & Liang, 2007). HealthConnect is characterized by “warm handoffs” (Wiesenthal, 2010, p. 8)—delivering care and service effectively, efficiently, and compassionately—and smart technology that allows multiple providers to understand the population they are serving (Hyatt, Taylor, & Budge, 2004). The HealthConnect system has built in alerts that permit activities such as reminding clinicians to order specific diabetes tests and allows for any provider to note alerts such as the need for a mammogram.

The HealthConnect system also increases patient involvement, providing secure email messaging that allows members to communicate with their providers, view their own records, and manage their own care (Serrato, Retecki, & Schmidt, 2007). Kaiser Permanente has estimated that patients who use secure email are 7–10% less likely to schedule routine office visits and make approximately 14% fewer phone contacts (Serrato et al., 2007). The ability for clients to book their own appointments online also supports person-focused care because those who book appointments online are 50% more likely to keep them (Tong Nagy & Kanter, 2007). The Kaiser experience suggests that available information also enables caregivers to better support people with chronic conditions, enabling caregivers to coordinate and manage appointments (Zhou et al., 2007).

The HealthConnect system is also estimated to improve patient safety by reducing errors. One hospital using barcode scanning linked to HealthConnect, computer physician order entry, and electronic medication administration experienced a 57% reduction in the rate of medication errors (Simon et al., 2006). Results in another region showed that drug interaction alerts decreased hospital medication errors in elderly patients with high-risk medications from 32% in 2000 to 22% in 2006 (Smith et al., 2006).

Kaiser Permanente has estimated that since implementing HealthConnect it has achieved up to \$71.6 million annual savings in operating expenses, generated up to \$12.5 million additional annual revenue, and saved up to \$74.3 million capital cost avoidance (Wiesenthal, 2010). Kaiser Permanente also noted that patients “love it, have high expectations of it, and are not excessively worried about privacy” (Wiesenthal, 2010, p. 37) and underlined that the perfect system is not necessary, but rather, starting with an off-the-shelf package is the best way to begin achieving improved patient care and service and to start realizing savings.

Transforming How Quality is Assessed

As the implementation of comprehensive models increases, quality assessments need to be commensurately transformed. Starfield (2010) proposed that to shift to a model of patient-centred care, how care is guided, evaluated, and incented would need to shift. Starfield proposed “generic” approaches to quality of primary care functions that include comprehensiveness and first contact, coordination and longitudinality, and general indicators to technical quality and care (see Figure B7).

<p>Comprehensiveness and First Contact*</p>	<ul style="list-style-type: none"> • Rates of diagnoses of mental health problems (should be at least 10%) • Range of services available • Average number of different specialists seen in a year (preferably controlled for morbidity mix) • Percentage of patients referred in a year (preferably controlled for morbidity mix) • Number of problems accounting for 70% of visits • Hours of availability for patient face-to-face encounters • Hours of availability for phone contact
<p>Coordination and Longitudinality**</p>	<ul style="list-style-type: none"> • Documentation in medical records: history of allergies • Recognition of visits made elsewhere • Inclusion of information from referral visits in record • Percentage of patients with problem lists • Percentage of patients with medication list • Use of International Classification of Primary Care for coding patient problems • Unified records (primary care, specialist, hospitalization discharge record) • All diagnoses at each visit • Rates of return of patients from referral (within time interval) • Average number of different generalists seen in a year (within practice) • Average number of generalists seen in a year (out of practice)
<p>General Indicators of Technical Quality and Care</p>	<ul style="list-style-type: none"> • Percentage of new prescriptions promptly filled/not filled • Percentage of physicians who promptly review notes of consulting specialists • Documentation of reasons for disregarding clinical guidelines (“exception reporting”) • Rates of prescription of new drugs (should be low in primary care) • Prescription of drugs (Daily Drug Dose/1000 people) within range of community prevalence

Figure B7: Starfield’s (2010) Generic Approaches to Quality of Primary Care Functions

Note: * obtainable from medical records or claims forms; ** obtainable from medical records or claims/encounter forms or information from providers/facilities.

Starfield (2010) also proposed revised imperatives in quality assessment that include:

1. The importance of person-focused assessments rather than disease-focused assessments (e.g., many causes not single causes and comorbidity).
2. The increasing dangers of medical interventions (e.g., new technologies and medications).
3. The recognized effect of the mode of delivery of health services on health.
4. The explosion of interest in equity as an important outcome.
5. Knowledge generation for population-based evidence.

Improving patient focus in primary care would be enhanced by attention to:

- Use of a coding system . . . for patients' problems
- Clinical guidelines that include responsiveness to patients' problems
- Understanding the relationship between achievement of disease-oriented guidelines and improvement in patients' health, using generic measures
- Complement process-oriented clinical guidelines with degree of overall improvement in patients' symptoms
- Use of multi-morbidity measures in records and data systems. (Starfield, 2010, p. 15)

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APPENDIX C

INNOVATION HIGHLIGHTS IN CANADA

There are many health delivery innovations in Canada. There are also several highly promising nodes across Canada where innovative action at the micro and meso levels are already taking place; recommendations to make links and established shared learning between these initiatives support collaborative growth, increased knowledge, and spread through the system.

This is not a comprehensive inventory of health delivery innovations in Canada. Inclusion of an initiative in this appendix does not constitute endorsement by the Canadian Academy of Health Sciences and the omission of a health system delivery initiative does not infer that they are any less effective than those listed.

This appendix provides a sampling of some of the initiatives that could be linked together, drawn on, or learned from to create a more expanded approach to improving health outcome for people with chronic conditions.

Comprehensive Approaches to Chronic Disease Management

The most comprehensive approach to chronic disease care in Canada to date has been in Alberta, where a system-wide approach to chronic disease management was undertaken in 1998 when chronic disease was recognized as representing 75% of healthcare cost (Sargious, 2010). Capital Health in Edmonton first adopted an extended chronic care model to redesign services for patients with diabetes, then entered into an agreement with other regions to create primary care networks to improve access to and focus on care for patients with chronic disease (Every, 2007). Subsequently, the Calgary Health Region introduced the chronic care model within primary care and within community-based programs called “Living Well,” which focused on exercise, education, self-management, support from chronic disease nurses, and distributed information technology support (Sargious, 2010). Over a 12-month period, the comprehensive approach in Calgary significantly improved control of diabetes, emergency department admissions, and in-patient admissions. The reduction of 19,735 fewer bed days in the province represented \$16.9 million in hospital costs (Sargious, 2010).

The Alberta Health Services coordinated network has expanded to include 31 primary care networks and is integrated across diseases, including mental health and cancer. At Alberta Health Services, the current focus is on complex patients with multiple comorbidities, frequent admissions and emergency department presentations, and people with coexisting issues. The principles the Alberta network is using include:

- Patients with multiple problems need one ambulatory unit, not multiple specialty units
- Intensive ambulatory services for these individuals saves acute care resources
- “Generalist” thinking is the cornerstone to good chronic disease management. (Sargious, 2010, p. 36)

Among the most complex patients, Alberta Health Services has seen up to a 75% reduction in total admissions, including a 71% reduction in emergency department visits (Sargious, 2010).

The Alberta Health Services approach has included practice redesign, skills development for practitioners, community linkages, information system enhancement, and patient self-management programs. At Alberta Health Services, the current vision is to have every primary care physician in the province involved in changing physician practice, including: multidisciplinary team leadership, integrated care planning (including new fee codes), motivational interviewing, group visits, revisiting traditional referral patterns (central triage and phone consultations), and public health advocacy (Sargious, 2010).

The recently launched “C-CHANGE project”—the Canadian Cardiovascular Harmonization of National Guidelines Endeavour—is aiming at harmonizing clinical practice guidelines for cardiovascular care, with the aim of creating a guideline for each patient, not for each disease (M. Dawes, personal communication, June 8, 2010).

Mental Health Strategy for Canada

Following the Senate Standing Committee report on Mental Health, Mental Illness, and Addiction Services in Canada (Kirby & Keon, 2006) the Mental Health Commission of Canada was created in 2007 to develop a mental health strategy, conduct a 10-year antistigma campaign, and build a national knowledge exchange centre (Kirby, 2008).

The Commission created a framework for the mental health strategy in 2009 (Mental Health Commission of Canada, 2009), with seven goals:

1. People of all ages living with mental health problems and illnesses are actively engaged and supported in their journey of recovery and well-being.
2. Mental health is promoted, and mental health problems and illnesses are prevented wherever possible.
3. The mental health system responds to the diverse needs of all people living in Canada.
4. The role of families in promoting well-being and providing care is recognized, and their needs are supported.
5. People have equitable and timely access to appropriate and effective programs, treatments, services, and supports that are seamlessly integrated around their needs.
6. Actions are informed by the best evidence based on multiple sources of knowledge, outcomes are measured, and research is advanced.
7. People living with mental health problems and illnesses are fully included as valued members of society.

Models of Primary Care

In Ontario, the government has initiated a central transformation strategy of family health teams (commonly referred to as FHTs, pronounced “fits”). The explicit aim is to provide more Ontarians with access to primary healthcare; in the process, family health teams have created opportunities to develop innovative interprofessional care models as well as creating the infrastructure needed to enable population-health approaches to primary care through remunerating physicians based on rostered patients rather than per visit (Tepper, 2010).

Family health teams are the most comprehensive of Ontario’s blended and specialized models of primary care, which also include family health networks and organizations, community health centres, and rural physician group agreements. As of January 1, 2010, there were 7,547 family physicians in Ontario practicing through one of the primary healthcare models providing care to over 9.2 million enrolled patients (Tepper, 2010).

Aligned with the movement toward team-based care in other provinces, Québec has undertaken an assertive effort to set up *groupes de médecine de famille*. These family medicine groups will cover everyone within the province and will provide links to community health centres. Together, the *groupes de médecine de famille*, the *centres de santé et de service sociaux* (health and social service centres), and the local

networks constitute the structure required for case management of individual and collective health and social service needs. The *groupes de médecine de famille* ensure medical case management, while the *centres de santé et de service sociaux* and local networks take on clinical case management and guarantee the coordination and continuity of health services and social services. *Groupes de médecine de famille* have extended nursing services and on-call medical services 24 hours a day, 7 days a week for registered patients with diseases that put them at risk of decompensation, and they provide support in all services, from screening to systematic follow-up of vulnerable clientele. The goal is to improve access to physicians and to improve patient follow-up and service continuity to wellness, health promotion and care.

British Columbia's (BC) government has made "promoting integrated health teams and networks to provide a more integrated, patient-centred experience" (Government of British Columbia, Ministry of Health services, 2010, p. 9) a priority. Some of the elements behind this strategy have included primary care enhancements using an expanded chronic care model that is focused on integrating services to meet the needs of complex populations. Early findings suggest that quality of care and patient outcomes are improving (Tregillus, 2008).

The Sault Ste. Marie Group Health Association Clinic, a community-based primary care organization in Ontario, has more than 60 physicians and 300 other staff (Goel, 2010). Cooperatively run by a community board and the Algoma District Medical Group, the group provides primary healthcare to more than 80% of the municipality's residences and is structured on comprehensive population level coverage plan (Goel, 2010). The group has had a comprehensive medical record since 1997 with access to the Electronic Medical Record databases that allow triaging of high-risk patients (Goel, 2010). This clinic maximized scope of practice of their team members using medical directives and has been considered a national leader in healthcare innovation for decades.

The General Practice Services Committee was formed under the 2004 Agreement between BC's doctors and the provincial government (Government of British Columbia & British Columbia Medical Association [Government of BC & BCMA], 2009). The General Practice Services Committee is composed of eight representatives: four from the BC Medical Association and four from the BC Ministry of Health Services. The role of this committee was to develop and implement strategies that allow for optimum use of the cumulative total of \$382 million designated within the 2004–2005 agreement to support improvements in primary care (Government of BC & BCMA, 2009). The Committee subsequently evolved to tri-lateral representation with the Ministry of Health, the BC Medical Association, and the Health Authorities and the second agreement (2006-2012) provides for system redesign and renewal and identifies a framework for a new agreement structure, including increased input from the Health Authorities.

Interfaces Across the Continuum: Connecting Hospitals, Specialty, and Primary Care Practices

Stronger interfaces across the continuum of care are being created in Québec. In the Montréal Jewish General Hospital, for example, the emergency department has taken the approach that not every patient needs to be admitted. Relying on its own evidence-based protocols, the emergency department staff admit only those with the most serious illnesses that require more attention and the remainder are stabilized and discharged, but not before the hospital ensures that they will receive follow-up care in the community. The Jewish General's emergency department admits to other wards approximately one third of "stretcher" patients over the age of 75; the average for Québec hospitals is approximately 50% (H. Bergman, personal communication, September 10, 2009). Return rates and morbidity rates are examined monthly. The emergency room has a nurse who specializes in geriatrics who screens every elderly patient and checks the patient's list of medications.

The Colchester East Hants Health Authority in Truro, Nova Scotia used physician volunteers to support a chronic obstructive pulmonary disease education program. This facilitated the transition from a hospital-based model to a primary healthcare approach Health Council of Canada (2009b).

The Interprofessional Model of Practice for Aging and Complex Treatments at Sunnybrook Hospital in Toronto, Ontario is a primary care clinic for half a day weekly that bring together a pharmacist, social worker, nurse, occupational therapist, with residents and staff physicians to solve complex patient problems in a teaching environment (Upshur & Tracy, 2008). The program has been found to produce greater efficiency with real-time problem solving and avoidance of multiple referrals. The long appointments make it possible to address issues in depth and increase the comprehensiveness of care. The team approach used in this program allows for the harnessing of knowledge and skills and strives to create an enriched clinical learning environment for trainees and current practitioners.

Another novel model of integrated connections, the *Virtual Ward*, has recently been created in Toronto, Ontario. Modeled after a United Kingdom example, the Virtual Ward is a partnership between Women's College Hospital, the Community Care Access Centre, and the South East Toronto Family Health Team. The Virtual Ward addresses the short-term post-discharge needs of adults who are deemed to be at high risk of readmission as they transition from the acute care hospital setting to the community, with the goals of providing a more supportive patient transition. The Virtual Ward provides a limited period of high-level, interdisciplinary care and support for the patient, their families and caregivers, and their community-based care providers. Although patients being cared for in the Virtual Ward will reside at home, they will benefit from a hospital-like interdisciplinary team, a shared set of notes, a single point of contact, round-the-clock availability, improved coordination of specialist, primary and home-based community care, and medical home visits when needed (D. McMurchy, personal communication, March 25, 2010).

In BC, the Rapid Access to Cardiac Expertise (RACE) initiative was launched in 2009 as "a patient-centered, collaborative, shared-care model of service between primary care physicians and cardiology specialists for the investigation and management of patients with cardiovascular disease" (British Columbia Alliance on Telehealth Policy and Research, 2009, para. 2). The intention is to enable "real-time" (Background section, para. 1) communication between primary care physicians and a cardiologist for the purpose of expediting problem solving in ambulatory patient care of acute and chronic cardiovascular conditions. Providence Health Family Practice Physicians are now able to telephone a single number and receive a return call from an on-duty cardiologist within 2 hours. Queries regarding treatment, investigations, or referrals—urgent or elective—can be discussed to accelerate care plans and rapid cardiology follow-up when indicated. RACE is expected to reduce healthcare inefficiencies and result in improved patient and primary care provider satisfaction. The Ministry of Health Special Services Committee is helping to finance the specialists' time and administrative costs.

Community and Health Partnerships

Veterans Independence Program is a national home care program that helps clients remain healthy and independent in their own homes and communities by providing services such as housekeeping, grounds maintenance (i.e., snow removal), personal care, home adaptations, nutrition services, and transportation to social activities (Gerontological Advisory Council to Veterans Affairs Canada, 2006). This program takes into account the complex factors that affect well-being and make people vulnerable as they age, the type of services that can enhance independence, as well as the concept of linked lives (Gerontological Advisory Council to Veterans Affairs Canada, 2006).

The South East Toronto Family Health Team has formed a partnership with Toronto Parks, Recreation and Forestry in the Family Health Team's Healthy Weights Program. The Healthy Weights program was influenced by the Parents and Children Together Project based in Ottawa, Ontario. A Parks and Recreation therapist works one-on-one with patients to develop a tailored action plan for physical activity based on the patient's need and preferences in order to get overweight patients more active based on their interests. The recreation therapist works in collaboration with the Family Health Team dietitian and social worker. The social worker completes a series of cognitive behavioural therapy classes with patients enrolled in this program and monitors behaviour changes. At the end of each class, there is an element of 30–45 minutes of exercise incorporated. Given that Family Health Teams do not have the budget to include kinesiologists, physiotherapists, or recreation therapists on their teams, this partnership works effectively (D. McMurchy, personal communication, March 25, 2010).

Partnerships for Health (2009) is creating partnerships between primary care and community care partners. The South West Community Care Access Centre, Diabetes Education Centres, mental health, and community pharmacy join with primary care practices as interdisciplinary teams to support continuity of care, deliver evidence-based care, improve linkages to tertiary care, and support patient self-care. As a team, they map the process of diabetes care and identify inefficiencies, gaps, and opportunities for improvement. Partnerships for Health uses the knowledge to streamline care processes and clarify roles and responsibilities. Coaches support participants with team development, implementation of the chronic disease management and prevention framework and quality improvement methodologies (i.e., plan-do-study-act cycles). After 18 months, preliminary data suggest that Partnerships for Health has demonstrated: improved management of high blood pressure and compliance with diabetes care guidelines; reduced blood sugar tests and lipid levels; integration of the Community Care Access Centre Case Managers and Diabetes Education Centres with primary care teams; improved screening and early identification of clients, referral, care planning, care coordination, and patient satisfaction; improved provider satisfaction; reduced visits to the emergency and hospitalizations of Community Care Access Centre clients; improved communication and information sharing among partners; and use of patient self-management tools and techniques (D. McMurchy, personal communication, March 25, 2010).

Medical help lines are nonemergency health information lines available in almost all provinces and territories. Help lines are used for triage purposes, system navigation, and health education. Staffing varies—all help lines include registered nurses and some include access to pharmacists and dietitians. When compared to Group Health, an organization that offers full telehealth services, provincial and territorial programs do not yet fully leverage the help line as service delivery mechanism. There is the opportunity for telehealth services to become an integrated part of the system by providing selective and secure access to medical records and supports for the cultural shift within the health system to include the call centre as part of the on-site team.

Expanded Scope and Roles for Professionals

Several provinces are expanding traditional roles for health professionals through expanding scope of authority and practice. For example, in 2009, BC announced it was expanding the scope of practice of pharmacists, registered nurses, midwives and naturopathic physicians (Government of British Columbia, 2009). Among other new roles, this enables registered nurses to independently provide a broader range of health services, including dispensing and administering prescription medications in urgent situations.

The North End Community Health Centre, Halifax, Nova Scotia encourages staff development in specific areas of interest. All staff use harm reduction and social determinants of health framework in their work.

Patient-Oriented Research Taking a Multimorbidity Framework

One promising example of research that takes a multimorbidity framework is the recently launched Bridgepoint Collaboratory for Research and Innovation in Complex Chronic Disease. Based at Bridgepoint Health in Toronto, the program has the goal of creating leading edge research that advances understanding of and action on complex chronic disease prevention and care, through focusing on interprofessional teamwork and patient engagement in their healthcare (Lyons, 2010). The research program is integrated in the work of Bridgepoint community affiliated hospital and the Family Health Team partnership with the University of Toronto (Lyons, 2010).

The Canadian Strategy on Patient Oriented Research is a collaboration between the Canadian Institutes of Health Research and partners across the country to determine how to best support and invest in “patient-oriented research” (Canadian Institutes of Health Research, 2010, p. 1). The initiative is aimed at involving a broad group of stakeholders—the provinces, the private sector, health charities, universities and research institutes, scientists and, above all, healthcare professionals who deliver care—to better target and coordinate investments in research and to break down barriers to conducting and applying patient-oriented research (Canadian Institutes of Health Research, 2010). The goal is improve the health of Canadians by transferring research and scientific evidence into healthcare practice. The strategy has four components: improve the research environment and infrastructure; set up mechanisms to better train and mentor health professionals and nonclinicians; strengthen organizational, regulatory, and financial support for multisite studies; and support best practices in healthcare (Canadian Institutes of Health Research, 2010).

Quality Improvement and Learning Networks

Another quality improvement partnership, the Canadian Working Group for Primary Care Improvement, was initiated by the Canadian Health Services Research Foundation to advance national dialogue on the use of evidence to improve primary healthcare (Canadian Health Services Research Foundation, n.d.). The working group, established in April 2008, represents healthcare leaders from across Canada who are committed to collaborating in order to improve the processes and outcomes of primary healthcare (Canadian Health Services Research Foundation, n.d.).

Impact BC (2007) is a not-for-profit organization established to work across BC’s health system in support of system improvement and transformation. It is an alliance between BC’s Ministry of Health Services, the BC Medical Association and provincial health authorities. Impact BC works in collaboration to support health system quality improvement by building capacity for continuous learning and improvement that optimizes opportunities for sharing knowledge and experiences and for celebrating successes as they move forward through system transformation. A primary, but not exclusive, focus of Impact BC’s work is primary care and

chronic conditions. Impact BC uses the expanded chronic care model for improving primary healthcare as a cornerstone of its activities. Current initiatives include the BC Practice Support Program, Integrated Health Networks, Supporting Innovation and Improvement Action Services, and Patients as Partners.

The Saskatchewan Health Quality Council (n.d.a) is an independent agency that measures and reports on quality of care in Saskatchewan, promotes improvement, and engages its partners in building a better health system. Led by an appointed panel of provincial, national, and international health leaders, the Health Quality Council advises government, regional health authorities, and healthcare professionals on a wide range of issues related to health system quality and performance. The Health Quality Council was the first agency of its kind in Canada.

Currently, most provinces have health quality councils and, in addition, there is the Health Quality Council of Canada. The Health Quality Council of Alberta (2009) gathers and analyzes information and collaborates with Alberta Health Services, health professions, and the government to translate that knowledge into practical improvements to the quality and safety of the healthcare Albertans receive. The Ontario Health Quality Council has a mandate for monitoring and public reporting as well as to support continuous quality improvement (Ontario Health Quality Council & Ontario Joint Policy and Planning Committee, 2008). The New Brunswick Health Council (2010) promotes and improves health system performance through citizen engagement and measuring, monitoring and reporting on health system performance.

The Saskatchewan Chronic Disease Management Collaborative is a major quality improvement initiative to improve the care and health of people living with chronic diseases in Saskatchewan, and to improve access to physician practices. Since the Chronic Disease Management Collaborative started in Saskatchewan in 2005, 38% more diabetic patients are at optimal levels for blood sugar, cholesterol, and blood pressure. As of March 2008, almost one in five patients with diabetes had achieved this goal, up from one in eight in 2005 (Saskatchewan Health Quality Council, n.d.b). As well, since the start of the collaborative, 22% more individuals with coronary artery disease were prescribed cholesterol-lowering medication. In March 2008, almost three-quarters of those with coronary artery disease had been prescribed these drugs (Saskatchewan Health Quality Council, 2009).

In the Vancouver Island Health Authority collaborative, rates of appropriate testing among patients with diabetes have doubled and patients have fewer visits to the emergency department and hospital stays for diabetes-related conditions (Health Council of Canada (2009b). Moreover, the average cost for diabetes care in the province dropped from \$4,400 per patient in 2001–2002 to \$3,966 in 2004–2005 (Tregillus, 2008).

The Canadian Chronic Care Network (n.d.) is an informal group of researchers, leaders, and decision makers in chronic disease management and prevention. The network is striving to influence system change for effective and sustainable chronic disease policy and program development.

Similarly, bodies such as the Western Canadian Interprofessional Health Collaborative (2007) have been formed to advance research and practice across several provinces.

In Ontario, the Quality Improvement and Innovation Partnership (known as QIIP) provides a network between community health centres and the newly created family health teams, combining formal resources and opportunities for learning with other teams as well as to form relationships to connect with each other and exchange ideas and suggestions (Quality Improvement and Innovation Partnership, 2009). The first learning collaborative, which took place over a 15-month period, demonstrated incremental improvements and processes across three domains of focus: diabetes, colorectal cancer screening, and office practice redesign.

A recent Ontario White Paper (Ontario Health Quality Council & Ontario Joint Policy and Planning Committee [OHQC & OJPPC], 2008) analyzed the value of service accountability agreements and described the expectations of those who plan, manage, and deliver health services. Reviewing the accountability agreements in place since 2006, the committee concluded that current models are insufficient to support service quality, and suggested the implementation of an “indicator cascade” (OHQC & OJPPC, 2008, p. 15) to align accountability across different levels of the system (see Figure C1). Some other provinces have similar accountability mechanisms.

Electronic Health Information and e-Interactivity

The Champlain Local Health Integrated Network (LHIN) in Ottawa has initiated the BASE project to develop and implement the framework and infrastructure for an electronic consultation process between primary care providers and a range of specialists across the Champlain LHIN. The intention is to shorten the time frame between an initial referral to specialty care and the patient visit. The project leads note “the patient may wait months and overcome transportation challenges to see the specialist. The specialist may then determine that diagnostic testing is required before treatment, resulting in more delays for the patient” (Champlain Local Health Integration Network, 2009, para. 5). The project began a pilot in 2010, and aims to involve at least 20 primary care practices across two or more communities, while creating the framework for broader integration and spread. The initial group includes specialists in the areas of cardiology, dermatology, diabetes education, endocrinology, general surgery, nephrology, neurology and rheumatology.

OSCAR is an electronic health record made up of open source software that can be downloaded freely by anyone, which supports peer review and collaboration. As of May 2009, OSCAR has a user base of 700–800 clinicians across Alberta, BC, Ontario, Prince Edward Island, and Québec, with over a million patients on it across Canada (Oscar Canada, 2010). The OSCAR electronic health record includes a personal health record, as well as various different modules to help patients and providers manage specific aspects of their healthcare (e.g., MyDrugRep and MyBP), Chronic Disease Management Flow Sheets that can be customized for each person with chronic conditions, and other forms, reports, and audit tools that can be are customized for each patient (Oscar Canada, 2010). Many of the providers who use OSCAR are members of peer user groups that continually improve its function.

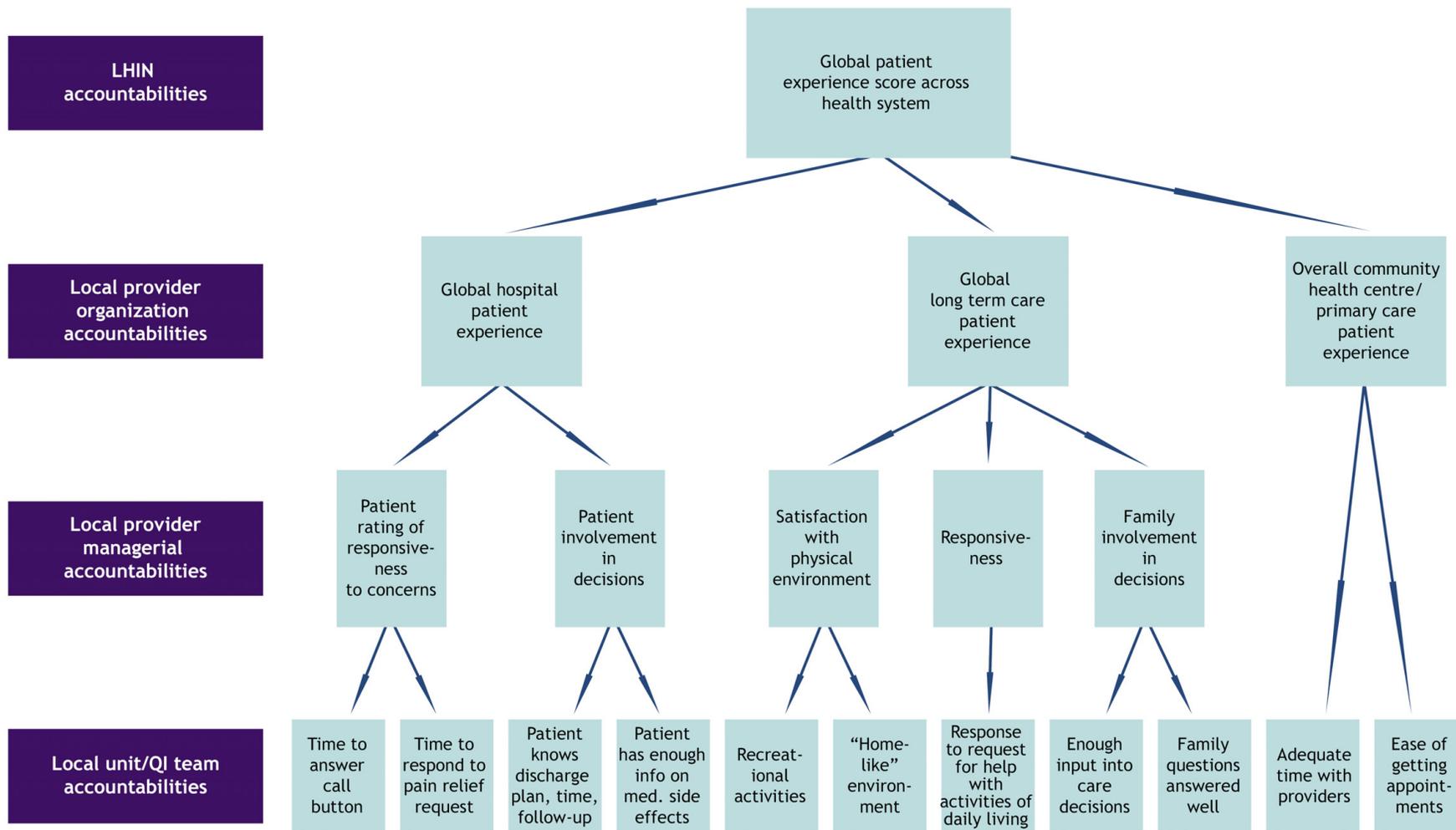


Figure C1: Indicator Cascades

Note: LHIN = Local Health Integration Networks, QI = Quality Improvement, med. = medical

Mydoctor.ca Health Portal is an online resource that allows people to communicate online with their health providers to better manage their own health (Canadian Medical Association, 2009). The Guelph Family Health Team is currently piloting the technology with 250 people with diabetes (D. McMurchy, personal communication, March 25, 2010). People share their diabetes-related information, such as blood sugar, exercise, and weight results, with their providers in a secure, online environment (Canadian Medical Association, 2009), the family health team registered nurses work with the people to improve blood sugar, exercise, and weight management. Providers are alerted when patients' health data are outside of a preset range and providers and patients can communicate online in order to collaborate in disease self-management. The portal also includes: tools to manage asthma, blood pressure, and weight; a personal health record; an interactive health library; and secure messaging between people and their providers (Canadian Medical Association, 2009).

The BlueSky Family Health Team in North Bay, Ontario, is innovating with a patient-held health record called MiHealth, which allows people to store securely encrypted personal health data that summarize their healthcare records and is endorsed and reviewed by both parties—the person and his or her provider (Lombardi, 2010). The goal is to create mobile personal health records. The system is an application that operates on a person's cell phone, which can securely store and display information anytime. MiHealth also allows people to easily access their information and to email or fax that information to the healthcare providers of their choice, providing information when it is needed (e.g., the emergency room). Secure text messaging is available for notifying patients that their Healthpass has new content, such as test results, follow-up appointments, and preventative reminders (D. McMurchy, personal communication, March 25, 2010). MiHealth's software runs on over 200 mobile devices, and patients can also store their healthcare data on a flash drive, and home computer (Lombardi, 2010). Initial results show great interest and enthusiasm among patients and providers.

The Western Health Information Collaborative was created by the Western Premiers and Deputy Ministers of Health to identify, plan, and coordinate collaborative opportunities for health information systems standards, architecture, and product development and implementation. This collaborative explored common opportunities that meet western provinces and territories health information needs and support the strategic directions and initiatives for health infrastructure at the national level. The Western Health Information Collaborative chronic disease management initiative (supported by the Primary Health Care Transition fund) arose from clinicians' need for better access to clinical information on chronic disease. The initiative identified, defined, and standardized core data sets and information interchange messages for three chronic diseases—diabetes, hypertension, and chronic kidney disease—and implemented the data standards and messages in the four partner jurisdictions (Sargious, 2007).

Western Electronic Health Record Regional Collaborative supports major health organizations in Calgary, Edmonton, Regina, Saskatoon, Vancouver, Victoria, and Winnipeg in working together on joint electronic health record initiatives (Government of British Columbia, 2003).

The Physician Information Technology Office (2009a) is an outcome of the 2006 Agreement between the BC government and the BC Medical Association where they agreed to work collaboratively to "co-ordinate, facilitate and support information technology planning and implementation for physicians . . . including the development and implementation in British Columbia of standardized systems of electronic medical records" (para. 1). This organization focuses on implementation of technology in physicians' offices. The BC Physician Information Technology Office (2009a) is preceded by the Alberta Physician Office System Project and OntarioMD. In BC, enrolment is ahead of schedule with approximately 2,000 physicians registered—almost half of the target for March 2012 of 4,000 to 4,200 (Physician Information Technology Office, 2009b).

Self-Management

The Chronic Disease Self-Management Program is a layperson-led patient education program, based on the Stanford model. First implemented as a pilot program in the Yukon in 1998 (McGowan, 2000), the Chronic Disease Self-Management Program became a territorial government-funded program, having demonstrated that participants had statistically significant improvements on 12 of 17 outcome measures (McGowan, 2000). This program was implemented in the Vancouver and Richmond Health Regions as a permanent program in 2000. In the spring of 2003, the BC Ministry of Health provided resources to the University of Victoria Centre on Aging to implement and evaluate the Chronic Disease Self-Management Program in each health region. During 2003–2006 the Chronic Disease Self-Management Program was implemented widely reaching over 4,300 British Columbians. Statistically significant changes were observed on 14 of the 16 outcome measures (McGowan, 2000).

Pharmacare Programs

The movement for a National Pharmaceuticals Strategy is outlined in Chapter 4. In tandem with the initiative to create a pan-Canadian coordinated approach to pharmacare, some of the individual provinces have introduced reforms.

In June 2006, the Ontario legislature passed Bill 102, the Transparent Drug System for Patients Act (2006). According to the Ontario Ministry of Health and Long-Term Care (2004), the government expects to save up to \$277 million per year as a result of the new legislation. The Act is focused on programs for cost saving, improve patient access to drugs, and shifting the role and scope of physicians and pharmacists. Specifically, cost changes include striking the best possible deals when purchasing medications for the government's Ontario Drug Benefit Program, which currently spends \$3.4 billion on medications each year and closing loopholes that lead to unacceptable price increases for drugs (Health Council of Canada, 2009a). In addition, the government will permit rapid funding decisions for breakthrough drugs for life-threatening diseases and transparency and citizen involvement about the process for drug listing (Health Council of Canada, 2009a).

The Transparent Drug System for Patients Act (2006) also enhances the role of pharmacists, including more direct patient care, such as counselling and other services, the creation of a new Pharmacy Council to advise the government, and lessening the requirements for physician paperwork for reimbursement on exceptional drugs.

Currently, provincial and territorial drug insurance plans vary considerably in eligibility criteria, including for catastrophic drug coverage (Bell, Griller, Lawson & Lovren, 2010). Everyone in Québec is covered at some level for drugs through a hybrid combination of private insurance plans at the workplace and a public program for everyone else. In Québec, 43% qualify for government reimbursement of drug costs, whereas Manitoba, for example, only 9% of the population qualifies (Canadian Centre for Policy Alternatives & Canadian Health Coalition, 2008).

Five provinces—Alberta, British Columbia, Manitoba, Nova Scotia, and Saskatchewan—have academic detailing programs (Health Council of Canada, 2007), which relate to getting the right information to prescribers (Health Council of Canada, 2009a). In this initiative, physicians and other prescribers are provided with the latest academic evidence on medications and recommended prescribing practices in order to promote optimal prescribing. These efforts are intended to counterbalance information from the representatives of pharmaceutical companies, a common way that physicians receive information about medications.

There is considerable evidence that academic detailing programs are effective at changing physicians' prescribing patterns (Health Council of Canada, 2009a). In 2008, only four provinces had these programs (British Columbia, Nova Scotia, Saskatchewan, and Manitoba). BC's academic detailing program was recently expanded from one academic detailer to 10 full-time pharmacists, aimed at supporting up to 2,000 physicians and other healthcare professionals in the province. Alberta's provincial-level program has been discontinued, but academic detailing initiatives in the province continue at the regional level.

An additional Canada-wide initiative is the National Prescription Drug Utilization Information System, which was established with the support of all ministers of health in 2001 as a collaborative effort between the Canadian Institute for Health Information and the Patented Medicine Prices Review Board. The database enables the tracking and analysis of prescription medications provided through publicly funded drug benefit plans in participating jurisdictions. The objective was to provide analysis of price, utilization, and cost trends so that Canada's health system has more comprehensive and accurate information on how prescription drugs are being used, as well as the sources of cost increases. Doctors and pharmacists also have better information from which to provide care to patients (Health Council of Canada, 2009a). As of November 2008, 11 jurisdictions (federal, provincial, and territorial) were participating in varying degrees. Six of these jurisdictions are providing claims data, 10 are providing drug plan coverage data, and all 11 jurisdictions are providing information on program policies. Data sharing agreements for claims data are under discussion in three jurisdictions.

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APPENDIX D

NOTES FROM CASE STUDY INQUIRY FOR EXPERT PANEL

Overview

To inform the recommendations of the Expert Panel, a case study inquiry was conducted in July and August 2009 to identify patterns and insights from a comparative variety of existing health system transformation initiatives. The overall purpose was to generate a meaningful analysis of the kinds of changes that make a significant difference to health outcomes for people living with chronic disease and how those changes can best be systemically achieved in the Canadian context. One of the motivators for this analysis was the recognition that there are many pockets of innovation on chronic conditions in Canada, and the question, “If we have brilliant and effective pockets of action on chronic disease, what is required in order to change the overall macro pattern?” Recognizing that no other country has “the perfect solution,” the inquiry focused on examples of significant health system change of all kinds.

Through this analysis of the *patterns of effective change*, the Expert Panel explored how to achieve a “tipping point” in Canada to make pockets of success much more generalized. The review spanned the micro (i.e., team), meso (i.e., program or policy), and macro (i.e., cross-system) levels. This framing allowed the panel to examine how interaction between levels occurs in order to make recommendations that could enable macro change within Canada.

The review considered where innovation originates, how “trophic cascades” occur, and how formal policy changes did and did not achieve desired results. The Expert Panel examined where successful projects did and did not “spread” to have any effect on the overall macro system; for example, what effect has the North Karelia success story had on overall policy and approach across Finland?

The method used was primarily document review, with selected telephone interviews with key observers. An iterative, narrative approach to this work was taken, each case review building on the one that came previously. Cases with at least some public healthcare aspect to their system were selected to allow for more direct comparisons with Canada. All case studies selected had:

- Changed their health system or approach, including primary care.
- Documented major elements in a way that illustrated how the change came about: how it was achieved, supported, not supported, and how it is continuing to emerge.
- The possibility to be examined at more than one level (i.e., macro, meso, and micro) so that it was feasible to explore why connections between sites and or levels had or had not happened.
- Been reviewed or received acknowledgement for their work through some form of external process.

Findings

In analyzing successful change in these case studies, the Expert Panel identified six simple patterns that support health system transformation:

1. All primary care and integrated chronic disease approaches are works in progress, and there are many sites that we can glean learning from. There is no “one right way” to do it—no magic bullets, no finish line.
2. The experiences of transformation and innovation in different countries and systems indicate several core patterns (i.e., ready made pathways for change):
 - Established pathways to change are natural grooves to follow for new ideas—don’t “fight the system” (*Netherlands, Finland, Sweden, Canada*)
 - Build on what already works, including incorporating core values (*Netherlands, United Kingdom, Finland, Sweden, Veterans’ Health Affairs*)
 - The core patterns fall on a continuum from reform and transformation (*United Kingdom, Veterans’ Health Affairs*) to gradual innovation (*Finland*) or both (*Netherlands, Sweden*).
3. Decentralization (regionalization) needs connectors for system-wide transformation to occur. System-wide transformation in decentralized systems can successfully emanate from the centre (*Veterans’ Health Affairs, United Kingdom*) or from local sources (*Finland, Sweden*), but it requires deliberate efforts to learn from and diffuse local innovations. Innovations can be intentional or accidental, and how they are diffused must take local or national culture into account (*Finland, Sweden*). There is a growing movement toward collaboration in many contexts, including cooperative efforts between public and private players (*Netherlands, Finland, Sweden, Veterans’ Health Affairs*)
4. Learning through comparison leads to quality improvements. Standardized performance measurements are prerequisites and incentives are enablers. It can be framed as competition (*Netherlands, United Kingdom, Veterans’ Health Affairs*), cooperation (*Sweden, Finland*), or as collaboratives and knowledge sharing (*Sweden, Veterans’ Health Affairs, Netherlands*).
5. There is an expectation of patient or consumer-centred systems. Consumer engagement leads to system change and supports self-management of chronic disease.

APPENDIX E

THE CANADIAN ACADEMY OF HEALTH SCIENCES' EXPERT PANEL

The Canadian Academy of Health Sciences greatly appreciates the significant contribution of the co-chairs and other expert panel members. Brief biographies follow:

Louise Nasmith (Co-Chair), University of British Columbia, Canada

Louise Nasmith assumed the role as Principal of the College of Health Disciplines in June 2007. She obtained a BA from the University of Toronto in 1974, her medical degree from McGill University in 1978, and a certification in Family Medicine in 1982.

Since 1985, Dr. Nasmith assumed a number of responsibilities in medical education that involved her in undergraduate, postgraduate, and faculty development portfolios. In 1995 she was named Chair of the Department of Family Medicine at McGill, a position that she held until 2002 when she moved to Toronto to take on the same role in the Department of Family and Community Medicine at the University of Toronto.

Her scholarship has centred on medical education resulting in her obtaining a MEd from McGill in 1994 and a series of publications and presentations in this area. Since 1989, she has been involved with the College of Family Physicians of Canada serving on a number of committees and was President of the College of Family Physicians of Canada from 2005–2006. In addition, Dr. Nasmith has been involved in a number of projects that focus on education and integration of care for chronic illness.

She was a member of the National Expert Committee on Interprofessional Education for Collaborative Patient-Centred Practice and now serves on the Health Education Task Force, both Health Canada initiatives. Her educational scholarship focuses on interprofessional education.

Penny Ballem (Co-Chair), City of Vancouver, Canada

Penny Ballem is currently the City Manager for Vancouver, British Columbia. She has made major contributions across a remarkable array of fronts including transfusion medicine, platelet immunology, complications of obstetrics, women's health research, and health policy.

Dr. Ballem founded the Platelet Immunology Laboratory at the Vancouver Canadian Red Cross headquarters and quickly went on to be recognized as a leading authority on the subject of thrombocytopenia in HIV infection during the first decade of the AIDS epidemic as well as immune thrombocytopenia in pregnancy.

After a successful career in blood research, Dr. Ballem turned to women's health by founding and successfully directing the BC Centre for Excellence in Women's Health and playing a pivotal role in the formation of the Canadian Institutes of Health Research Institute of Gender and Health

In 2001, she joined the Government of British Columbia as Deputy Minister of Health. As one of the longest serving and respected Deputy Ministers in Canada, Dr. Ballem oversaw major reforms of the healthcare system and pioneered a number of innovations that brought evidence-based policy making to health in British Columbia.

These included development of a fully regionalized healthcare system, institution of annual performance service agreements, adoption of a chronic disease management framework in primary care, and doubling of medical student and resident training in BC. At the table of Deputy Ministers, she played a central role in the development of the National Pharmaceutical Strategy and the Aboriginal Health Strategy.

Raymond J. Baxter, Kaiser Permanente, United States

Raymond J. Baxter, PhD, is Kaiser Permanente's senior vice president for Community Benefit, Research and Health Policy. As a member of Kaiser's National Leadership Team, Dr. Baxter leads the organization's activities to fulfill its social mission, including care and coverage for low-income people, community health initiatives, health equity, environmental stewardship and support for community-based organizations. He also leads Kaiser Permanente's work in research, health policy and diversity, and serves as President of KP International.

Dr. Baxter has more than 30 years of experience managing public health, hospital, long-term care, and mental health programs, including heading the San Francisco Department of Public Health and the New York City Health and Hospitals Corporation. Dr. Baxter also led The Lewin Group, a noted health policy firm. Dr. Baxter holds a doctorate from the Woodrow Wilson School of Public and International Affairs, Princeton University. He serves on the Board of Directors of Grantmakers in Health, the Advisory Board of the UC Berkeley School of Public Health, the Technical Board of the Milbank Memorial Fund, the National Public Health and Hospital Institute, and the Canadian Academy of Health Sciences Expert Panel on Chronic Disease. Dr. Baxter served on two Institute of Medicine Committees: the Committee on the Safety Net, which prepared the March 2000 report *America's Health Care Safety Net: Intact but Endangered* and the Committee on HIV Prevention, whose report *No Time to Lose* was released in September 2000.

In 2001 the University of California, Berkeley, School of Public Health honored him as a Public Health Hero for his service in the AIDS epidemic in San Francisco. In September 2006 he received the CDC Foundation Hero Award for addressing the health consequences of Hurricane Katrina by supporting public health teams in the Gulf Coast, and for his longstanding commitment to improving the health of communities.

Howard Bergman, Fonds de la recherche en santé du Québec, Canada

Howard Bergman is the Vice-President, Scientific Affairs of the Fonds de la recherche en santé. He is the first Dr. Joseph Kaufmann Professor of Geriatric Medicine and Professor of Medicine, Family Medicine and Oncology at McGill University. Up until his appointment to the FRSQ, he was Director of the division of Geriatric medicine at McGill as well as the Jewish General Hospital, Scientific Director of the Québec Network for Research in Aging and Chair of the Advisory Board of the Canadian Institutes of Health Research Institute of Aging. He is a past President of the Canadian Geriatrics Society.

Dr. Bergman is internationally recognized for his leadership on understanding the concept of frailty and for leadership in the organization of integrated health services for older people. The System of Integrated Services for the Frail Elderly is an innovative community-based program that delivers sustaining and highly specialized care to the most vulnerable people older people who have multiple chronic diseases with the objective of promoting their independence while optimizing the use of resources. His work in the area of primary care reform is very much centred on how we can improve primary medical and community care to frail elderly.

In 2000–2001, Dr. Bergman was a member of the "Clair Commission," an independent Commission set up by the Québec government to propose reforms to the healthcare system. Appointed by the Québec Minister of Health, Dr. Bergman in 2007–2009 chaired a task force that proposed the Québec Alzheimer Plan.

His initial preparation was in family medicine and he spent the first 15 years of his career as a family physician in a community clinic and several nursing homes. In 1987, Dr. Bergman extended his academic qualifications to include specialist certification in geriatric medicine.

David Colin-Thomé, Department of Health, United Kingdom

David Colin-Thomé is the National Director for Primary Care for the Department of Health in England. He has considerable experience in the public sector having spent 11 years as a councillor, was formerly National Clinical Director for Primary Care, a senior medical officer at the Scottish Office and Director of Primary care at North West and London Regional offices, and adviser to Central Manchester University Hospital.

From 1971, Dr. Colin-Thomé was a general practitioner at Castlefields Health Centre Runcorn, retiring in March 2007. His practice has been leading edge nationally, pioneering systematic management of long-term conditions and employing managed care techniques.

Dr. Colin-Thomé has also been on many overseas advisory visits specialising in primary care development and publishes regularly on primary care reform. He is the clinical lead for the Department of Health's Primary and Community Care Strategy, Long-Term Conditions (Chronic Disease), Urgent Care and 18-week (faster access) programs.

He was awarded the Order of the British Empire in 1997 and is an honorary visiting professor of the Manchester Centre for Healthcare Management at Manchester University and of the School of Health, University of Durham. He was educated at Hutton Grammar School in Preston and the University of Newcastle-upon-Tyne Medical School.

Carol Herbert, University of Western Ontario, Canada

Carol Herbert is the Dean of the Schulich School of Medicine and Dentistry at the University of Western Ontario. She was formerly Head of the University of British Columbia Department of Family Practice and was founding Head of the Division of Behavioural Medicine and a founder of the University of British Columbia Institute of Health Promotion Research.

She has conducted participatory action research with aboriginal communities, focused on diabetes and on environmental effects on human health. Other research interests include inter-professional education and patient and physician decision-making. She is a recognized leader in women's health and mentorship of academic women. Dr. Herbert was a pioneer in providing services for sexually abused children and was the founding Co-Director of the Sexual Assault Service for Vancouver.

She is a Fellow of the Canadian Academy of Health Sciences and Foreign Associate Member of the Institute of Medicine.

Norah Keating, University of Alberta, Canada

Norah Keating is one of Canada's preeminent social gerontologists. She is a Professor in the Department of Human Ecology and Co-director of Research on Aging, Policies, and Practice at the University of Alberta. She has an adjunct appointment in the Department of Family Medicine.

Dr. Keating's research focuses on family/friend caregiving, the costs of care to adults with chronic illnesses and disability, and seniors in rural areas. Her research has had a profound impact on the health of Canadian families and the elderly. Her research finding that 2.1 Canadians provided care to frail seniors with an estimated replacement value of \$5-6 billion dollars provided the impetus to a decade of development of health and social policy to support frail seniors and their caregivers. She consults with federal and provincial governments on issues of health and social policy to support older adults and their families.

Dr. Keating's research on aging in rural contexts has led to breakthroughs in our understanding of the diversity of rural communities in Canada in their ability to foster aging well. She has provided evidence that the ways in which rural seniors are embedded in supportive networks of family and friends and how challenges in rural service delivery more profoundly affect seniors who are economically and socially vulnerable than those who are frail.

Dr. Keating is a member of many international research teams. She is chair of the North American Region of the International Association of Gerontology and Geriatrics, and Past President of the Alberta Association of Gerontology and the Canadian Association on Gerontology.

Richard Lessard, Montréal Regional Health and Social Services Agency, Canada

Dr. Richard Lessard is a specialist in community medicine and has been Director of the Public Health Department at the Montréal Regional Health and Social Services Agency since 1992. He is a fellow of the Collège des médecins du Québec and of the Royal College of Physicians and Surgeons of Canada.

He is a Clinical Professor at Université de Montréal's Department of Social and Preventive Medicine and McGill University's Department of Epidemiology and Biostatistics.

He is a member of the Board of Directors of the Institut national de santé publique du Québec (INSPQ).

In September 2006, Dr. Lessard was seconded to the World Health Organization in Geneva to develop a World Health Organization Global Action Plan Against Cancer. In September 1998, he had also been seconded to the World Health Organization in Geneva to work on an intensified health development program for the 20 poorest and unhealthy countries of the world.

As director of the Public Health Department, he has published 7 annual reports on the health of the population. Dr. Lessard is known for his commitment to improving the health of his community and more specifically for his work on the social determinants of health and health inequities.

Renée Lyons, Bridgepoint Health and University of Toronto, Canada

Renée Lyons is the Bridgepoint Chair in Complex Chronic Disease and the TD Financial Scientific Director of the Collaboratory for Research and Innovation with an appointment in the Dalla Lana School of Public Health at the University of Toronto. She is also a full Professor and Tier One Canada Research Chair in Health Promotion, Dalhousie University, Halifax, Nova Scotia (on leave).

Over the past 10 years she has been the Director and the Senior Scientist at the Atlantic Health Promotion Research Centre (www.ahprc.dal.ca). She holds Dalhousie University appointments in the School of Health and Human Performance, Department of Psychology, School of Nursing, and the Graduate Faculty, UNB. Dr. Lyons is a member of Health Canada's Science Advisory Board. She is also a Fellow and member of the review panel on chronic disease of the Canadian Academy of Health Sciences.

Dale McMurchy, Dale McMurchy Consulting, Canada

Dale McMurchy is an independent healthcare consultant with experience in international, academic, and governmental organizations and expertise in health system and policy research, health financing and economics, policy, and planning with an emphasis on public health and primary healthcare.

Her recent experience includes: the evaluation of Ontario's Family Health Teams initiative, the evaluation of the Primary Care Reform pilots in Ontario, economic assessments of the Public Health Agency of Canada's programs targeted at-risk pregnant women and preschool children, and management of the *HealthInsider*, a semi-annual national consumer health survey of 2,500 Canadians. In 2002, Ms. McMurchy was seconded to the Commission of the *Future of Health Care in Canada* to synthesize the evidence on primary healthcare reform and health system accountability for the final report.

Ms. McMurchy currently acts as a senior consultant to the Scientific Director of Canadian Institutes of Health Research's Institute of Health Services and Policy Research. She was on the Board of the Canadian Health Economics Research Association, and then the Canadian Association for Health Services and Policy Research.

Pamela Ratner, University of British Columbia, Canada

Pamela Ratner is Professor of Nursing at the University of British Columbia and holds a Senior Scholar Award from the Michael Smith Foundation for Health Research. She has led research initiatives to inform practice and policy through analyses of the social contexts that create barriers to health, affect health seeking, and influence health system responses. In particular, she has examined how gender, diversity, and place influence health behaviour. Her particular research program has focused on cardiovascular risk reduction and the psychosocial determinants of health risk behaviour.

Dr. Ratner is a member of the Institute Advisory Board of the Canadian Institutes of Health Research, Institute of Circulatory and Respiratory Health, of the Research Advisory Council of the Michael Smith Foundation for Health Research, and of the Boards of the College of Registered Nurses of BC and the Canadian Nurses Association. She served on the Canadian Academy of Health Sciences Committee to Assess Interdisciplinary Research in Health Sciences in Canada and was elected a Fellow of the Academy in 2007.

Peter Rosenbaum, McMaster University, Canada

Peter Rosenbaum is currently the Canadian Institutes for Health Research Chair in Developmental Pediatrics at McMaster University. Prior to this appointment, he was Chief of Medical Staff at Bloorview MacMillan Children's Centre.

Dr. Rosenbaum's main area of research relates to the healthy and psychosocial well-being of children with disabilities and their families, the natural history of motor function in children with cerebral palsy, and related measurement and evaluative methods. He ensures that knowledge acquired through his research is communicated and moves into practice as quickly as possible. His work helps parents ensure that their children have access to new treatments or discoveries about the causes of childhood disabilities.

Dr. Rosenbaum's findings have been published in more than 85 peer-reviewed papers. He was awarded an honorary degree by Laval University in recognition of his contributions to the health of children with cerebral palsy.

Robyn Tamblyn, McGill University, Canada

Robyn Tamblyn has been an international leader in education. Following her PhD at McGill University, she continued her work at McGill on performance assessment but crucially began to analyze data about patient safety and public protection.

Over two decades, Dr. Tamblyn clarified the validity of medical licensing examinations, used health insurance data to clarify the reasons behind poor prescribing practices, and pioneered two integrated health data systems, IRIS-Québec and Medical Office of the 21st Century, to improve prescribing practices and the quality and safety of healthcare for Quebecers.

Ed Wagner, W.A. MacColl Institute for Healthcare Innovation, United States

Ed Wagner is a physician and epidemiologist; he is the director of The W.A. MacColl Institute for Healthcare Innovation, Group Health Cooperative in Seattle, Washington. Dr. Wagner's work includes studies of interventions to reduce disability in seniors and to enhance the care of persons with chronic illness.

Dr. Wagner has published extensively with research interests and experience including chronic illness management, collaborative approaches to transforming healthcare systems, cancer control and quality of life, and aging and geriatrics.

He has published articles in over 250 peer-reviewed journals, been a lead or contributing author of 20 books and technical reports, and has shared his findings and experience through hundreds of national and international presentations.

Dr. Wagner's significant contributions have been recognized through many special honours and appointments, including membership in the US Institute of Medicine and participation in the World Health Organization initiative for improving care for chronic conditions. He is a graduate of Princeton University, State University of New York at Buffalo and University of North Carolina.

Brenda Zimmerman, York University, Canada

Dr. Brenda Zimmerman is a professor of Strategic Management at the Schulich School of Business at York University in Toronto. She is the founder and Director of the Health Industry Management Program for MBA students. She is also an Associate Faculty Member for the Social Innovation Generation at the University of Waterloo.

During 2000–2003, she joined McGill's Faculty of Management as an Associate Professor and had a joint appointment with the Faculty of Medicine. Between 1998–2003, she was a professor in the McGill-McConnell Masters' Program for Voluntary Sector Leaders and the Masters in International Practicing Management Program

Her primary research applies complexity science to management and leadership issues in organizations, especially healthcare or not-for-profit organizations, experiencing high levels of uncertainty and turbulence. Since 1996, the bulk of her research and teaching has focused on healthcare. She is a member of a committee of the Royal College of Physicians and Surgeons, advises the Canadian Public Health Agency, and is the Vice-Chair of Patient Safety and Quality for the Mount Sinai Hospital Board

She has been an invited speaker at organizations and conferences in North America and Europe. She has written many articles, book chapters, and a co-authored book on the topic of complexity and management in healthcare, *Edgeware: Complexity resources for Healthcare Leaders*. Her latest co-authored book, *Getting to Maybe: How the World is Changed*, is a Canadian best seller published in 2006 and published in Japan in 2008 and Korea in 2009.

She is active in her community locally, nationally and internationally and in 2006 was awarded the Athena award in recognition of her community contributions and mentoring of women to reach their full potential. In 2009, she was awarded the Teacher Excellence Award for the Schulich School of Business.

Project Staff

Catherine Creede, Potential Group, Canada

Based in Toronto, Ontario and Vancouver, British Columbia, Catherine Creede is a scholar-practitioner in the world of system change and collaborative communications. A Partner in the Potential Group consulting firm, her current projects are mainly in healthcare, especially in the complex network of Toronto area teaching hospitals. Her focus is on creating more effective interprofessional collaboration and developing innovative and integrated care models.

Dr. Creede views her core role as creating meaningful conversations, creating new ways of talking about and framing a group's work that inspire the entire community. Other clients have ranged from global pharmaceutical companies to grassroots not-for-profits, especially agencies dealing with HIV/AIDS. In all contexts, she uses social construction and appreciative inquiry principles to support her clients in creating and enacting generative futures, creating more solid relationships along the way.

Dr. Creede's practice is integrated with her academic work. She completed her PhD in Human and Organizational Systems at Fielding Graduate University in 2008. In 2009–2010, she was an originator and Co-Director of an innovative learning program for health professionals becoming change leaders in the area of interprofessional care. She is working on several healthcare research projects, and is currently co-editing a book on advances in theory and practice of the coordinated management of meaning communication theory.

Dr. Creede's other passion is for her volunteer work with children in Africa. She is one of three co-leads responsible for all fundraising, strategic direction, and operational oversight of the Nikibasika Children's Centre for 51 orphaned and vulnerable children in Kasese, Uganda.

Sonya Kupka, SJK Services, Canada

Sonya Kupka has over 20 years experience in healthcare (acute, extended care, mental health, home health, and public health). She has worked in not-for-profit and government settings in administration, policy development, clinical nutrition, and education. She is currently a consultant based out of British Columbia.

Ms. Kupka studied at the University of British Columbia, interned in London, Ontario and completed her Masters at St. Francis Xavier University in Nova Scotia. She started her career as a clinical dietitian in Montréal, then shifted her practice and was a Community Nutritionist in British Columbia for 10 years. Her first post was as the first, and at that time the only, community nutritionist in North Western British Columbia. Later she "moved south" to work in the densely populated lower mainland.

With this foundation, Ms. Kupka was offered a series of administrative roles outside of dietetics and public health. Over the years, she has had responsibility for multidisciplinary teams in home health, mental health, public health, extended care, rehabilitation services, and acute care geriatrics. In addition to these operational roles she was part of the team that created the governance supports for the first regional health board in one of the fastest growing areas of British Columbia.

Just prior to shifting into the consultant role, she was the inaugural Director of the BC Healthy Living Alliance Secretariat. In this role she worked with nine nongovernment organizations, the BC Health Authorities, and the provincial and federal governments to facilitate collaborative action around physical activity, healthy eating, and tobacco reduction.