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Arthritis Community Research & Evaluation Unit

**ARTHRITIS COMMUNITY RESEARCH &
EVALUATION UNIT (ACREU)**

University Health Network

**A PROPOSED EVALUATION
FRAMEWORK FOR CHRONIC
DISEASE PREVENTION AND
MANAGEMENT INITIATIVES IN
ONTARIO**

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Table of Contents

Acknowledgements.....	ii
Executive Summary.....	v
Glossary.....	viii
A. Introduction.....	1
A.1 Background.....	1
A.2 Objectives.....	3
B. Development Process.....	3
B.1 Scope of the Report.....	3
B.2 Literature Review Methods.....	4
B.3 Evaluation Framework Development.....	5
C. Overview of the Chronic Disease Management Literature.....	6
C.1 Chronic Disease Management Models.....	6
C.2 Development and Overview of Chronic Disease Prevention and Management Models ...	6
C.2.1 Report Cards and Commercial Disease Management Firms.....	6
C.2.2 The Chronic Care Model.....	7
C.2.2.1 CCM Model Elements.....	9
C.2.3 Expanded Chronic Care Models.....	11
C.2.3.1 Expanded Chronic Care Model (ECCM).....	11
C.2.3.2 Chronic Disease Prevention and Management Model (CDPM).....	14
C.3 Evaluation Literature.....	16
C.3.1 Summary of the Evaluation Literature.....	16
C.3.2 Breakthrough Series Collaboratives Evaluation Studies.....	17
C.3.3 Other Evaluation Studies.....	17
C.3.3.1 CCM Implementation.....	18
C.3.3.2 Clinical Outcomes.....	20
C.3.3.3 Process Measures.....	20
C.3.3.4 Satisfaction.....	20
C.3.3.5 Health Care Utilization.....	21
C.3.3.6 Quality of Life (QOL).....	21
C.3.3.7 Patient Knowledge.....	21
C.3.3.8 Quality Indicators.....	21
C.3.3.9 Health Status.....	22
C.3.3.10 Financial Outcomes.....	22
C.4 Results of the Evaluation Studies.....	22
C.5 Gaps and Limitations in the Literature.....	22
C.5.1 Gaps in the evaluation of chronic disease management literature.....	23
C.5.2 Gaps in both the evaluation and chronic disease management literature.....	24
D. Evaluation Framework.....	24
D.1 Overview of Evaluation Framework.....	24
D.2 Detailed Description of Domains and Components.....	27
D.2.1 Domains and Components at the Organization/Program Level.....	27
D.2.2 Domains and Components at the Health System Level.....	33
E. Comment and Next Step.....	34
E.1 Comment.....	34
E.2 Next Steps.....	35
F. Conclusion.....	36
References.....	37
Appendix A.....	51

Appendix B.....	54
Appendix C	83

Tables and Figures

Table 1: Comparison of the Chronic Care Model with the Expanded Chronic Care Model	13
Table 2: Domains and Components for Chronic Disease Prevention and Management.....	25
Table A1: Domains/components/sub-components and the corresponding evidence used to support the evaluation framework.....	52
Table A2. Domains and Indicators for Chronic Disease Prevention and Management Model Program Evaluation	56
Table A3: Rand Coding.....	84
Figure 1. Self-reported prevalence of specific physical chronic conditions, by sex, household population aged 15 years and over, Canada 2005	1
Figure 2: The Chronic Care Model.....	9
Figure 3: The Expanded Chronic Care Model	12
Figure 4: Ontario’s Chronic Disease Prevention and Management Framework.....	15
Figure 5: The Breakthrough Series Collaboratives Process	19

Executive Summary

Introduction

Chronic diseases including diabetes, chronic obstructive pulmonary disease, hypertension, asthma, depression, and arthritis are a major burden to our society and our health care system. As our population ages, the prevalence of these diseases is increasing. Chronic diseases have a huge impact on the population: chronic conditions are the primary cause of disability; and they are associated with significant direct and indirect costs to both individuals and society. Despite the impact of these diseases, the current health care system is based on an 'acute care' model, which is not conducive to the planned, organized care required to efficiently and effectively manage chronic diseases. More comprehensive chronic disease prevention and management programs and services that recognize the unique and more complex aspects of chronic diseases, such as the importance of self-management, are required. The increasing burden of chronic disease and concomitant health system challenges have led to new models of chronic disease prevention and management including the Chronic Care Model in the United States, the Expanded Chronic Care Model in British Columbia and, more recently, the Chronic Disease Prevention and Management Framework in Ontario. As care is being redesigned and programs develop, evaluation is integral to the development process and quality improvement. Thus, a comprehensive framework to guide evaluation is needed.

Objectives

The specific **objectives** of this work are to:

1. Summarize the literature on a) chronic disease prevention and management models (focusing on the most widely implemented model and Canadian models) and b) methods of evaluating these models.
2. Identify gaps or limitations in the literature.
3. Develop an evaluation framework that identifies the major areas that need to be included when evaluating chronic disease prevention and management initiatives at the program, organization or health system level.

Methods

A literature review was conducted to document 1) the most widely adopted chronic disease prevention and management models as well as the Canadian models and 2) the evaluation frameworks and methods used to evaluate chronic disease prevention and management programs. In addition, a number of interviews were conducted with experts in chronic disease prevention and management to identify gaps and limitations in the current models and evaluation frameworks, to gather baseline information about chronic disease prevention and management care in Ontario, and to advise on additional information sources.

The literature review and interviews, as well as identified gaps and limitations in the literature were used to ascertain the important elements of comprehensive and successful chronic disease prevention and management. These elements were used to inform the development of our proposed evaluation framework. This framework was based on 13 areas (domains) of importance, which were further subdivided into components and sub-components. The validity and comprehensiveness of the proposed framework was assessed by a group of 12 experts. The feedback related primarily to two areas: improving clarity of the components; and expanding comprehensiveness through potential new components or revisions to existing components. Based on this feedback, revisions were made to existing components, and a new component and sub-component were added.

Overview of the Evaluation Framework

Our proposed chronic disease prevention and management evaluation framework was not based on any one model. We identified the important elements and features of successful chronic disease prevention and management and used these to inform the development of an evaluation framework that identifies the areas that should be included in an evaluation of chronic disease prevention and management from the program, organization, or system level.

Thirteen domains of importance were identified. Ten of the domains address chronic disease prevention and management at the level of the health care or community organization or specific program. The other three domains address chronic disease management at a health system level. Each domain was further subdivided into components and sub-components. The domains are as follows:

- Organizational Characteristics
- Delivery System Design
- Linkages
- Information Systems
- Provider Decision Support
- Self-management Support
- Prevention
- Clinical Utilizations and Outcomes
- Provider Perspectives
- Client Perspectives
- Needs Assessment and Planning
- Access
- Coordination of Care Across the Continuum

While some of these elements share names and concepts with elements of the Chronic Care Model, the Expanded Chronic Care Model, or the Chronic Disease Prevention and Management Framework, many of these areas have been broadened in our proposed evaluation framework to address gaps and limitations or highlight specific concepts. In addition, most of the current evaluations of chronic disease prevention and management initiatives focus on the health care organization/program, and, to our knowledge, there is no evaluation literature that attempted to assess chronic disease prevention and management from a broader, system level. To address this limitation, we have included three domains for evaluation at the system level: the Needs Assessment and Planning; Access; and Coordination of Care Across the Continuum domains. The proposed framework is not a new model for chronic disease prevention and management. Rather, it is a guide for the future development of specific measurable indicators and instruments to evaluate chronic disease prevention and management initiatives. As such, these domains represent areas for evaluation of programs and not new elements for a chronic disease management model. However, some of the areas identified in our framework (e.g., access to care and client-initiated follow-up) are very important for successful chronic disease prevention and management, and yet they do not appear in the current chronic disease prevention and management models. Thus, these areas may be considered in the further design of chronic disease prevention and management models.

Conclusion

This report proposes an evaluation framework for chronic disease prevention and management as a first step in the process of developing methods of evaluation and instruments for measuring chronic disease prevention and management at the program, organization and health system

level. Important next steps in the further development of the evaluation framework include: developing a finance domain; assessing the feasibility of domains related to chronic disease prevention from the perspective of the upstream, broader health determinants (such as physical and social environments); developing appropriate instruments for the balanced evaluation of the domains/components; and pilot testing the evaluation framework.

Glossary

Chronic Care Model (CCM): The CCM is a specific model of chronic disease management developed by Wagner et al. in the United States (see section C).

Chronic disease management: This terminology is often used throughout the report when describing chronic disease prevention and management, particularly in sections describing the literature. This terminology was selected in order to distinguish from the specific Chronic Disease Prevention and Management Framework (see below).

Chronic Disease Prevention and Management (CDPM) Framework: The CDPM is a specific model developed in Ontario (see section C). This model was adapted from the CCM and the Expanded Chronic Care Model (see below).

Client: The terms client or person with a chronic condition are used in the section describing the evaluation framework in order to move beyond the medical model of care and emphasize the individual's responsibility and active participation in the daily management of their chronic disease (see definition patient).

Component: Within the proposed evaluation framework, domains are divided into components (see section D). Components define the specific areas of interest within each domain that will be assessed such as access to care with follow-up (a part of the delivery system design domain), provider education (a part of the decision support domain), and patient knowledge (a part of the self-management support domain). Where appropriate, components were subdivided into sub-components (see below).

Domain: Domains characterize the general area of interest such as decision support and patient perspectives in our proposed evaluation framework. As appropriate, domains are subdivided into components (see above) and subcomponents (see below).

Expanded Chronic Care Model (ECCM): The ECCM is a specific model for chronic disease management developed in British Columbia. This model was adapted from the CCM (see section C).

Instruments: The specific tools used to measure aspects of chronic disease prevention and management. Potential instruments could include questionnaires (e.g., SF-36 for the measurement of general quality of life) or clinical tests (e.g., glycosylated hemoglobin [HbA1c] for people with diabetes).

Methods of Evaluation: This refers to the methodology used to measure processes and outcomes, such as chart reviews, survey methods, or qualitative interviewing.

Organization: An organization refers to the larger entity (i.e. institution, hospital, not-for-profit organization) where people work together.

Patient: The term patient is used in the literature review section of the document when referring to people with chronic diseases to be consistent with the literature (see definition client).

Process measures: Data used to demonstrate the implementation of activities within a program or organization, such as percentage of clients with diabetes receiving a foot exam.

Program: A program refers to a specific program within an organization (e.g., chronic disease self-management program, arthritis program, diabetes education program). Programs can be based in institutions such as hospitals or community organizations such as The Arthritis Society.

Provider: Provider refers to registered health care providers as well as community workers involved in health promotion or delivering health care.

Sub-component: In the proposed evaluation framework, when the components were broad and incorporated multiple areas of interest, the components were further broken down into sub-components. These sub-components define specific areas within the component that will be measured or assessed such as team composition and roles as well as communication (a part of the practice team functioning component).

System level: The system level refers to all programs and organizations within a given geographic region.

Team: A team is a group of individuals who work together and may involve providers from an individual program or organization. Teams may cross programs or organizations.

Tools: Tools refer to procedures or mechanisms that support care delivery such as care maps or reminder systems.

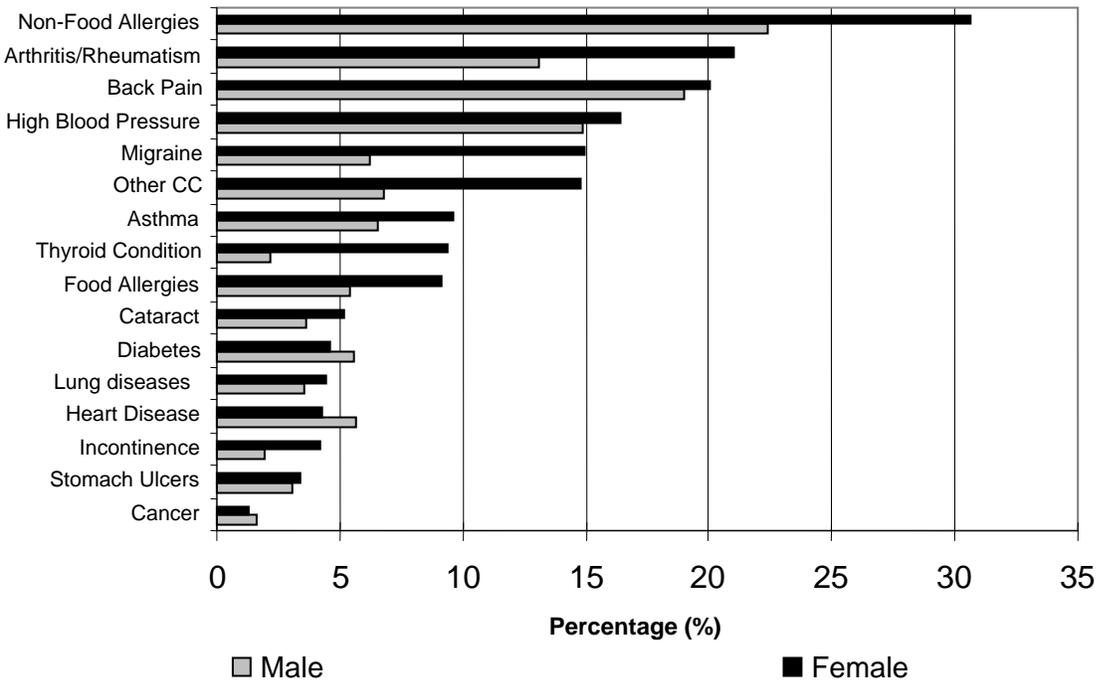
A. Introduction

A.1 Background

The current health system and the need for change

Chronic diseases are often defined as prolonged illnesses which do not resolve spontaneously and are rarely cured(1). Common chronic diseases in Canada include arthritis, hypertension, asthma, and diabetes as well as mental health conditions such as depression. Chronic diseases are highly prevalent with 70% of Ontarians over the age of 12 living with a chronic disease, and more than 2.78 million people are living with two or more chronic diseases(2). As our population ages, the prevalence of chronic disease and concurrent chronic diseases (multimorbidity) is projected to increase. **Figure 1** displays the prevalence of specific physical chronic conditions in Canada (2005).

Figure 1. Self-reported prevalence of specific physical chronic conditions, by sex, household population aged 15 years and over, Canada 2005



Data Source: Canadian Community Health Survey, 2005

The impact of chronic diseases is widespread. Chronic diseases affect the quality of life of individuals and their families, are a major cause of premature death and disability and health care utilization, and have a significant economic impact. Chronic diseases represent significant direct and indirect costs to both the individual and society: they account for over 47% (\$28 billion) of total direct and indirect costs; 49% (\$5 billion) of hospital costs, 38% (\$2 billion) of physician care costs; and almost 70% (\$9.9 billion) of disability costs(3). As the prevalence of these conditions increases, so does the economic impact. For example, by 2010, diabetes is expected to cost \$15.6 billion per year in Canada(4).

Often, chronic diseases do not occur in isolation. Population studies show that multimorbidity (the occurrence of more than one condition in the same individual) is quite common and increases in frequency with increasing age(5;6). In Ontario in 2003, 70% of people over age 45 with a chronic illness had multiple conditions(7). Multimorbidity is associated with increased mortality, length of hospital stay, hospital readmissions, health care utilization, and overall health care costs(8;9). Despite this, the health care system is organized primarily in disease 'silos', a design which does not address the needs of people with multiple chronic diseases.

Many chronic diseases can be prevented. Common modifiable risk factors underlie chronic diseases and explain the majority of chronic disease occurrence and mortality. These risk factors include unhealthy diet, physical inactivity, alcohol and tobacco use (10;11). Consequently, prevention through the modification of these risk factors has the potential to substantially reduce chronic disease in the population.

Given the prevalence and impact of chronic diseases, it is important to ensure that these conditions are properly diagnosed and treated in a timely manner. However, this is often not the case. In Ontario, 49% of people diagnosed with diabetes do not receive an eye exam within the first year after the diagnosis(12). In those over the age of 40, osteoporosis assessment after a fracture occurs less than 20% of the time(13). Of those who experience an acute myocardial infarction, 7.2% are readmitted to the hospital within 28 days of the first episode(14). Despite the recognized importance of rehabilitation services (e.g., physiotherapy and exercise) in the management of chronic musculoskeletal conditions, the median wait-time for community-based rehabilitation for those with chronic musculoskeletal diseases in 2005 in Ontario was 35 days (the highest of all conditions)(15). These are only a few of many examples that demonstrate the suboptimal care received by people with chronic diseases. This 'care-gap' (the gap between evidence-based guidelines and best practices and the care that people actually receive) is well documented, but it continues to occur because it is an unintended result of the design of the health care system: the acute care model.

The current health care system was developed at a time when the most important need was care for acute illnesses (primarily infectious diseases) and injuries; hence the name, the acute care model(16-21). This model focuses on rapid diagnosis of the problem, ruling out serious disease, and initiation of treatment(20;22;23). It is based on a passive patient who is responsible for initiating care from an activated physician(24-26). Providers are driven by the 'tyranny of the urgent', so acute conditions and symptoms are emphasized while chronic disease prevention and management is usually neglected(27;28). In this model, patients are not taught self-management skills as they are unnecessary due to the short duration of the disease or injury(29).

Norris and Olson(30) provide a description of the acute care model:

"The traditional care model: is reactive (responds to acute needs instead of promoting health); focuses on the individual rather than populations; is fragmented and unorganized; focuses on short-term outcomes; relies on provider opinion and experience for defining 'optimal' care rather than using evidence-based practice guidelines; employs providers that function as independent units instead of being part of an integrated system; and leaves patients without assistance as they try to navigate the health care delivery system."

These features make the model inappropriate for chronic diseases, resulting in suboptimal outcomes for those with chronic diseases (such as the ones described above)(21;23;25;31-34).

The Institute of Medicine (IOM) examined the quality of health care in the United States. The resulting report, *Crossing the Quality Chasm*,(35) described the fundamental problem of the health care system as the design of the system, thus, marginal modifications **would not be adequate** to fix the system. The report(35) concluded that improvements in care “cannot be achieved by further stressing current systems of care. The current care systems cannot do the job. Trying harder will not work. Changing care systems will”(35). While the IOM report is based on analysis of the health care system in the United States, these observations apply to the Canadian health care system as well.

The need to change current systems has led to the development of a number of models for chronic disease prevention and management, including the Chronic Care Model, the Expanded Chronic Care Model and the Chronic Disease Prevention and Management Framework (a description of these models is provided in Section C of this report). Guided by these models, many programs and organizations have begun to redesign their chronic disease prevention and management services. Alongside these implementation efforts, continuous quality improvement has led to the evaluation of some of these programs. While there is a large body of literature related to chronic disease prevention and management and the chronic disease prevention and management models, evaluations of these programs and models are often limited in scope and primarily focused on patient outcomes. Thus, a comprehensive, balanced approach to evaluation that considers clinical outcomes, health care utilization, health system design and outcomes, patient and provider perspectives, and costs is needed. This type of evaluation framework will enable us to better understand the impact of chronic disease management initiatives and support quality improvement. This research is the first stage in the development of an evaluation framework.

A.2 Objectives

This report outlines the development of an evaluation framework for chronic disease prevention and management initiatives. The specific objectives of this work are to:

1. Summarize the literature on a) chronic disease prevention and management models (the most widely implemented and Canadian models) and b) methods of evaluating these models.
2. Identify gaps or limitations in the literature.
3. Develop an evaluation framework that identifies the major areas of importance for evaluating chronic disease prevention and management initiatives at the program, organization or health system level.

B. Development Process

B.1 Scope of the Report

This report will focus on the interface between clients, health care organizations (e.g., hospitals), and community programs (e.g., exercise, self-management or smoking cessation programs). While we recognize the impact of the broader determinants of health (e.g.,

education, healthy environments) on chronic disease prevention and management, addressing broad population health strategies for chronic disease prevention is beyond the scope of this report. We will, however, address the linkages between the health sector and other sectors (e.g., education, finance, housing) which are important to facilitate chronic disease prevention and management.

The evaluation literature focuses on medical management of chronic disease and hospital- or clinic-based programs. For example, most of the literature focuses on diseases, such as diabetes, which require ongoing medical monitoring and pays less attention to chronic disabling diseases where medical interventions are less central, such as osteoarthritis. The terminology used in most of the literature reflects this perspective. For example, the term 'patient' is used to refer to people living with chronic conditions and chronic disease care is used to refer to chronic disease prevention and management. Throughout the literature review, we have used this terminology in order to be consistent with the literature. However, in the proposed evaluation framework, we used terminology we feel are more consistent with a client-centred approach to chronic disease management in the community (e.g. use of terms client and chronic disease prevention and management). The term chronic disease management will be used to refer to chronic disease prevention and management in some areas, particularly section C, so as to help differentiate the general use of the term chronic disease prevention and management from the instances when we are referring to the specific, Ontario Chronic Disease Prevention and Management Framework. Finally, we address the gaps and limitations in the current literature in section C.5.

B.2 Literature Review Methods

A literature review was conducted to document 1) the commonly used chronic disease management model and the Canadian models 2) the evaluation frameworks and methods used to evaluate chronic disease management programs. Both peer-reviewed and grey literature were examined.

Five databases, MEDLINE (1966 to present), EMBASE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), OVID HealthSTAR, and Google Scholar, were searched using the same general search strategy. Citations up to November 2007 were included. The following MeSH headings and keywords were used: chronic disease; disease management; patient care management; program evaluation; patient care team; patient-centered care; chronic care model; integrated care; and evaluation. The searches were limited to articles about humans and to articles in the English language. There was no restriction placed on the year of publication. The database search was supplemented with a search of relevant websites (including the Chronic Care Bibliography, created by Improving Chronic Illness Care [ICIC]) and a review of the bibliographies of selected papers.

All of the articles about the Chronic Care Model and the Institute for Healthcare Improvement (IHI) Breakthrough Series Quality Improvement Collaboratives (evaluations of the CCM) were reviewed. Due to the large volume of articles related to chronic disease care interventions that were not specifically related to the Chronic Care Model, a comprehensive search beyond the CCM was not undertaken. The CCM is an evidence-based model, and we have not attempted to replicate the assessment of the evidence that was used to support the development of this model.

B.3 Evaluation Framework Development

Our proposed chronic disease prevention and management evaluation framework was developed based on evidence from the literature, interviews, and expert review. We conducted a review of the literature regarding the evaluation of chronic disease management programs, which focused on the evaluation of programs that have implemented the Chronic Care Model. In addition, a select number of interviews were conducted with people involved in chronic disease prevention and management programs (hospital-based and community programs) to gather baseline information about chronic disease prevention and management care in Ontario and to advise on additional information sources.

The proposed evaluation framework is divided into three levels.

1.0 Domain
1.1 Component
1.1.2 Sub-components

First, there are overall areas (domains) that characterize the general area of interest such as decision support and patient perspectives. These domains are subdivided into components, which define the specific areas of interest within each domain that will be assessed such as access to care with follow-up (a part of the delivery system design domain), provider education (a part of the decision support domain), and patient knowledge (a part of the self-management support domain). As appropriate, when components were broad and incorporated multiple areas of interest, the components were further broken down into sub-components, which define specific areas within the component that will be measured or assessed. For example, the component access to care with follow-up is subdivided into three components: wait-times; organization-initiated follow-up; and patient-initiated follow-up.

The components are not the specific questions that will be measured during the evaluation process. While suggested methods of assessment (e.g., surveys, administrative and billing data) and possible instruments (e.g., SF-36) have been provided for each domain, it was beyond the scope of this initial phase of the design of the framework to provide detailed assessment instructions at the level of specific questions and instruments.

The domains, components, and sub-components were drawn from a variety of chronic disease management models (including the Chronic Care Model, the Expanded Chronic Care Model, and the Chronic Disease Prevention and Management Framework), perceived gaps in the models, expert opinion (based on the interviews described above), and chronic disease management and health promotion literature. In the design of the domains, components, and sub-components, special attention was paid to ensure that the framework was contextualized to and appropriate for the Ontario health care system. Please refer to Appendix A for a list of the domains/components/sub-components and the corresponding evidence used to support the evaluation framework.

The validity and comprehensiveness of the proposed framework, and more specifically, of the domains and components was assessed by a group of experts that included policy makers, clinicians, administrators, researchers, and people living with a chronic condition. Experts were selected to represent a range of settings (e.g., organizations and programs in hospitals, the community, and the government) and topic areas (e.g., team work, information systems) reflected in the proposed evaluation framework.

Reviewers were identified through ACREU contacts and recommendations by partners in the Ontario Ministry of Health and Long-Term Care. Eighteen expert reviewers were approached to participate. Thirteen agreed to participate, and 12 completed the review. Reviewers were asked to review specific domains and complete an electronic questionnaire (see Appendix B for the questionnaire). Reviewers were asked to rate the relevance of the domains, components, and sub-components, identify gaps in the proposed framework, and identify chronic disease prevention and management evaluation measures that are currently in use.

Each domain was reviewed by at least two experts. Expert feedback related primarily to two areas: improving clarity of the components; and expanding comprehensiveness through potential new components or revisions to existing components. Based on the comments and feedback provided in this review process, revisions were made to existing components, and a new component and sub-component were added. Many examples provided by the expert reviewers will be useful for future development of instruments for evaluation.

C. Overview of the Chronic Disease Management Literature

C.1 Chronic Disease Management Models

The following section is divided into four parts. The first section provides a description of the development and content of commonly used chronic disease management models including report cards, commercial disease management firms, the Chronic Care Model (CCM), the Expanded Chronic Care Model (ECCM), and the Chronic Disease Prevention and Management (CDPM) Framework. The second and third sections are a summary of the results of the review of the chronic disease management evaluation literature and results of the evaluations, respectively. The final section provides a description of the gaps and limitations in the chronic disease management model and evaluation literature.

C.2 Development and Overview of Chronic Disease Prevention and Management Models

C.2.1 Report Cards and Commercial Disease Management Firms

The high costs and societal burden associated with chronic diseases has led to the development of different solutions to decrease adverse outcomes by improving chronic disease prevention, treatment, and management. Solutions have included hospital and provider report cards and disease management programs run by commercial disease management firms. Hospital and provider report card efforts are limited in their ability to affect chronic disease care because they focus solely on the provider, whereas, successful care redesign must incorporate the patient(36). In 2000, Bodenheimer (37) estimated that there were more than 200 commercial disease management firms in the United States. However, these firms vary widely, and many provide disease-specific care that is completely separated from the patients' primary care team. This contributes to the siloed systems of care similar to the current acute care model and does not allow for integrated care across patients' multiple chronic diseases(20;38).

C.2.2 The Chronic Care Model

Other solutions involve the total redesign of chronic disease care. The most recognized model for redesign is the Chronic Care Model (CCM) developed by Wagner et al(39). The CCM is prefaced on the idea that most chronic disease patients, regardless of what chronic disease they have, are faced with similar issues including “symptoms, disability, emotional impacts, complex medication regimens, difficult lifestyle adjustments, and [difficulty] obtaining helpful medical care”(40). The model was developed based on a review of the literature of chronic disease drug and therapy randomized controlled trials (RCTs), and evaluations of chronic disease care specialty clinics in North America and chronic disease programs in western European primary care systems. Wagner et al. examined these models of successful care redesign to identify the types of care provided, and the common elements across the models.

RCTs were examined because the intervention group typically receives the drug or therapy in conjunction with a carefully controlled and monitored treatment program that often includes disease management and support. This treatment program provides participants with predictable, planned, homogenous care, which “contrasts vividly with the variability and ad hoc nature of patient care in usual practice”(20). The high compliance rates, and excellent short- and long-term outcomes observed in chronic disease RCTs such as the Hypertension Detection and Follow-up Program (HDFP) and the Diabetes Control and Complications Trial (DCCT), show the benefits that can be achieved through planned, organized care.

Wagner et al.(20) also examined chronic care specialty clinics such as the clinics for patients with hypertension in the Veterans Administration health system, the Mayo Clinics’ Three-Community Hypertension Control Program, and specialized clinics for low-income chronic disease patients. These clinics typically emphasized care protocols, behavioural change, and regular, planned follow-up(41).

Finally, Wagner et al.(42) examined the primary care system redesign that has taken place in western European countries. In England, general practitioners have designed ‘miniclinics’ (planned care days on which the general practitioners treat only patients with a specific chronic disease) to improve care for patients with chronic diseases such as diabetes. In Sweden, a primary-care diabetes program was developed that emphasizes diabetes training and education. Similarly, group education programs for diabetes and hypertension patients were developed in Germany(20).

Wagner et al(20) examined these models of care, their components, and their outcomes, and found significant similarities across the models:

“The common areas [fell] repeatedly and consistently into five general areas: 1. the use of explicit plans and protocols; 2. the reorganization of the practice to meet the needs of patients who require more time, a broad array of resources, and closer follow-up; 3. systematic attention to the information and behavioral change needs of patients; 4. ready access to necessary expertise; 5. supportive information systems”(20).

These elements of care were further investigated in the literature to determine the types of interventions that result in improved patient outcomes(20). Based on the evidence supporting these elements as important aspects of successful chronic disease care, a model was developed(20).

The Robert Wood Johnson Foundation funded a review of this proposed model for chronic disease care by a 40-member advisory committee of experts in “medicine, nursing, health services research, patient education, quality improvement, performance evaluation, and accreditation as related to the care of chronic illnesses”(43). This review led to the revision of the model to reflect the importance of the community, linkages between the health care system and community resources, and self-management support delivered using proven patient education techniques(43).

The final step in the development of the model was a survey of 72 leading chronic disease programs to determine how well the model reflected current chronic disease care. The advisory committee nominated the programs, and semi-structured interviews were conducted. Site visits were made for those programs that were particularly innovative or successful. Overall, it was found that programs did not provide modern self-management support or linkages with primary care. Most programs were referral-based and did not use population-based approaches to recruit patients. Thus, most programs were found to be “limited in their reach and effectiveness”(43). In addition, most programs relied on non-invasive, minor system changes, so observed improvement in patient and system outcomes was limited(43).

The advisory committee review resulted in a redesign of the model to the now well-recognized Chronic Care Model (CCM) (**Figure 2**). The model breaks down chronic disease care into six essential elements:

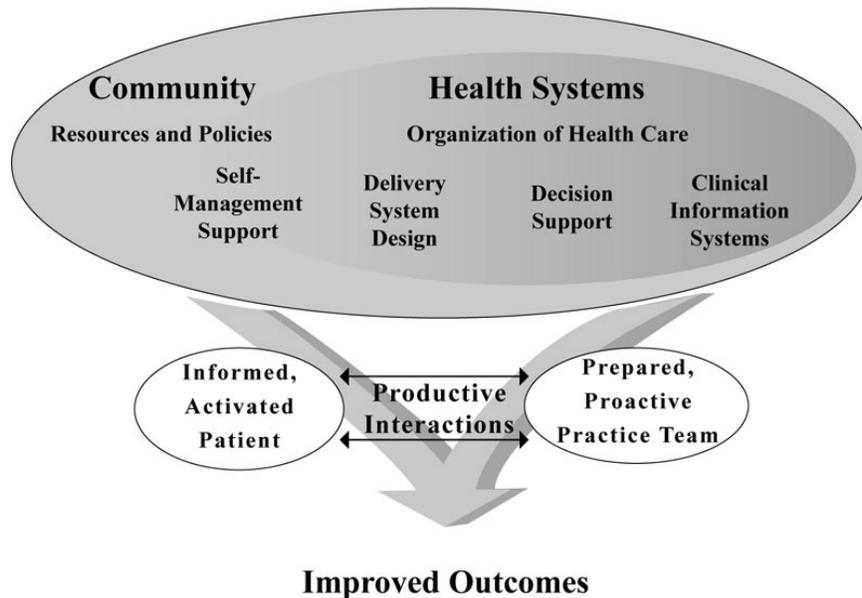
1. Health care organization
2. Delivery system design
3. Decision support
4. Self-management support
5. Clinical information systems
6. Community

The model posits that redesigning chronic disease care based on these six elements will create prepared, proactive providers and informed, activated patients. Interactions between these providers and patients will be productive, resulting in improved clinical and functional outcomes.

Wagner et al.(43) summarized the CCM in their paper, *A survey of leading chronic disease management programs: are they consistent with the literature*:

The model “views the health system as a part of the larger community. Effective chronic illness management requires an appropriately organized health care system linked with the necessary resources available in the broader community. The health system must have in place the leadership, incentives, and resources to help practice change to meet the needs of chronically ill patients. These support the development of both informed, activated patients and prepared, proactive professional practice teams. It is productive interactions between the two that assure the delivery of services that improve outcomes”(43).

Figure 2: The Chronic Care Model



Source: Improving Chronic Illness Care (44)

Developed by The MacColl Institute
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While the CCM was being developed, others were also trying to determine the elements of successful chronic disease care interventions. A Cochrane review(45) was conducted investigating diabetes interventions in primary care, outpatient, and community settings based on 41 studies involving more than 200 practices and 48,000 patients. Successful interventions were typically multifaceted and more comprehensive; however, those interventions that did not address patients and focused only on provider behaviors were not successful in improving patient outcomes(46). The review concluded that successful interventions included one or more of the following components: “provider-oriented components such as continuing education or physician feedback, organizational changes in personnel or the management of visits and follow-up, information systems changes, and patient-oriented interventions of an educational or supportive nature” (47). These four categories are very similar to the elements of the CCM identified above, with the exception of the community which was not identified in the Cochrane review.

C.2.2.1 CCM Model Elements

The purpose and components of each of the six CCM elements are outlined below. This section is based on the CCM summary provided by the ICIC (48). Except for the community element, all of the components focus on the health care provider organization.

(1) Health System: Create a culture, organization and mechanisms that promote safe, high quality care

- Visibly support improvement at all levels of the organization, beginning with the senior leader
- Promote effective improvement strategies aimed at comprehensive system change
- Encourage open and systematic handling of errors and quality problems to improve care
- Provide incentives based on quality of care

- Develop agreements that facilitate care coordination within and across organizations

Example interventions:

Common interventions in the health system area include the use of provider incentives to improve care, the development and coordination of formal quality improvement efforts, the use of funding to guide and motivate system changes, and efforts to obtain buy-in and visible support from senior leaders(49;50).

(2) Delivery System Design: Assure the delivery of effective, efficient clinical care and self-management support (changes in the organization of care delivery)

- Define roles and distribute tasks among team members
- Use planned interactions to support evidence-based care
- Provide clinical case management services for complex patients
- Ensure regular follow-up by the care team
- Give care that patients understand and that fits with their cultural background

Example Interventions:

Many of the interventions related to delivery system design involve the redesign of care delivery through the development of care teams that utilize other health professionals (e.g., nurses, physiotherapists, occupational therapists), and the redesign of patient visits to include preparation before the visit (e.g., obtaining laboratory tests) and regular follow-up(51).

(3) Decision Support: Promote clinical care that is consistent with scientific evidence and patient preferences

- Embed evidence-based guidelines into daily clinical practice
- Share evidence-based guidelines and information with patients to encourage their participation
- Use proven provider education methods
- Integrate specialist expertise and primary care

Example Interventions:

Examples of interventions related to decision support include provider education, and the institutionalization of evidence-based guidelines into daily practice to guide care(52-54).

(4) Clinical Information Systems: Organize patient and population data to facilitate efficient and effective care

- Provide timely reminders for providers and patients
- Identify relevant subpopulations for proactive care
- Facilitate individual patient care planning
- Share information with patients and providers to coordinate care
- Monitor performance of practice team and care system

Example Interventions:

Some examples of interventions in the clinical information systems area are the development and use of patient registries to (a) record all patients with a specific disease, (b) track clinical data, and (c) provide feedback to physicians. In addition, information systems can be used to develop a system of reminders or prompts to help guide timely care. Information systems may be electronic, however, paper-based systems can also be used (e.g., reminders could involve reminder notes in patient charts)(55).

(5) Self-Management Support: Empower and prepare patients to manage their health and health care

- Emphasize the patient's central role in managing their health

- Use effective self-management support strategies that include assessment, goal-setting, action planning, problem-solving and follow-up
- Organize internal and community resources to provide ongoing self-management support to patients

Example Interventions:

Examples of interventions to address self-management support include providing or referring patients for self-management education, and assisting patients to develop and monitor care goals(55).

(6) The Community: Mobilize community resources to meet needs of patients

- Encourage patients to participate in effective community programs
- Form partnerships with community organizations to support and develop interventions that fill gaps in needed services
- Advocate for policies to improve patient care

Example Intervention:

An example of an intervention in this area that a health care organization might undertake is the development of linkages with community agencies such as those that provide diet and exercise programs to promote healthy living(56).

C.2.3 Expanded Chronic Care Models

The CCM has been adopted and modified by a diverse range of countries and groups. The World Health Organization based its Innovative Care for Chronic Conditions (ICCC) Framework on the CCM with modifications to make the model congruent with the needs and challenges of developing countries(57;58). Other countries that have adopted modified versions of the CCM include the United Kingdom, Denmark, Russia, China, Australia, New Zealand, and Canada(59). In Canada, groups in British Columbia and Ontario have created expanded chronic care models, which are known as the Expanded Chronic Care Model (ECCM) and the Chronic Disease Prevention and Management Framework (CDPM), respectively. The next section will focus on these two models.

C.2.3.1 Expanded Chronic Care Model (ECCM)

British Columbia developed the first Canadian model, the ECCM. This model expands upon the CCM through greater emphasis the community, an expanded definition of and emphasis on prevention, the expansion of four of the original CCM elements, and the addition of three new elements. A short comparison of the CCM and the ECCM can be found in **Table 1**.

In the ECCM, the importance of the community and its interactions with the health care system was emphasized. This was achieved graphically by making the border between the community and the health system elements porous (**Figure 3**). Also, because the self-management support, decision support, delivery system design, and information systems elements can impact both the health system and the larger community, these elements were moved from inside the health system bubble to straddle the new porous border (60).

Figure 3: The Expanded Chronic Care Model



Created by: Victoria Barr, Sylvia Robinson, Brenda Marin-Link, Lisa Underhill, Anita Dotts & Darlene Ravensdale (2002)
 Adapted from Glasgow, R., Orleans, C., Wagner, E., Curry, S., Solberg, L. (2001). "Does the Chronic Care Model also serve as a template for improving prevention?" *The Milbank Quarterly*, 79(4), and World Health Organization, Health and Welfare Canada and Canadian Public Health Association.(1986). Ottawa Charter of Health Promotion.

Source: Hospital Quarterly (60)

The ECCM also incorporates a broader perspective of prevention. In this model, prevention is considered in terms of (a) reducing the risk of disease among individuals at high risk of developing disease and (b) broad initiatives to improve population health (this view of prevention is based on the 1986 Ottawa Charter for Health Promotion)(25). To achieve this, the CCM was broadened to include elements that address population health determinants and the connections between social, political, economic, and physical environmental conditions(60).

Table 1: Comparison of the Chronic Care Model with the Expanded Chronic Care Model

COMPONENTS OF THE CHRONIC CARE MODEL		COMPONENTS OF THE EXPANDED CHRONIC CARE MODEL		EXAMPLES
Health System - Organization of Healthcare	Program planning that includes measurable goals for better care of chronic illness			
Self-Management Support	Emphasis on the importance of the central role that patients have in managing their own care	Self-Management / Develop Personal Skills	Enhancing skills and capacities for personal health and wellness	<ul style="list-style-type: none"> • Smoking prevention and cessation programs • Seniors' walking programs
Decision Support	Integration of evidence-based guidelines into daily clinical practice	Decision Support	Integration of strategies for facilitating the community's abilities to stay healthy	<ul style="list-style-type: none"> • Development of health promotion and prevention "best practice" guidelines
Delivery System Design	Focus on teamwork and an expanded scope of practice to support chronic care	Delivery System Design / Re-orient Health Services	Expansion of mandate to support individuals and communities in a more holistic way	<ul style="list-style-type: none"> • Advocacy on behalf of (and with) vulnerable populations • Emphasis in quality improvement on health and quality of life outcomes, not just clinical outcomes
Clinical Information Systems	Developing information systems based on patient populations to provide relevant client data	Information Systems	Creation of broadly based information systems to include community data beyond the healthcare system	<ul style="list-style-type: none"> • Use of broad community needs assessments that take into account: <ul style="list-style-type: none"> • poverty rates • availability of public transportation • violent crime rate
Community Resources and Policies	Developing partnerships with community organizations that support and meet patients' needs	Build Healthy Public Policy	Development and implementation of policies designed to improve population health	<ul style="list-style-type: none"> • Advocating for / developing: <ul style="list-style-type: none"> • smoking bylaws • walking trails • reductions in the price of whole wheat flour
		Create Supportive Environments	Generating living and employment conditions that are safe, stimulating, satisfying and enjoyable	<ul style="list-style-type: none"> • Maintaining older people in their homes for as long as possible • Work towards the development of well-lit streets and bicycle paths
		Strengthen Community Action	Working with community groups to set priorities and achieve goals that enhance the health of the community	<ul style="list-style-type: none"> • Supporting the community in addressing the need for safe, affordable housing

Source: Hospital Quarterly (60)

Four of the CCM elements were also broadened. The *self-management support* element was expanded to include personal skills. These skills are non-disease-specific, which are important in population health promotion such as diet and exercise skills. The *decision support* element was expanded to include education about both improved chronic disease care and strategies for promoting health and well-being. *Delivery system redesign* was modified and renamed 're-orient health services'. The modification resulted in a more general element with a broader focus to support individuals and communities in holistic way, with an emphasis on health and prevention rather than illness. As well, the CCM's *clinical information systems* element, which addresses only health care organizations, was expanded to incorporate a broader range of users including community programs and municipalities(60).

The ECCM also added three new elements to the CCM's original six: build public health policy; create supportive environments; and strengthen community action. The *public health policy* element combines the use of legislation, fiscal measures, taxation, and organization change to promote health at the individual, organizational, and governmental levels. The *supportive environments* element focuses on the creation of "safe, stimulating, satisfying, and enjoyable" working and living environments(60). The *strengthen community action* element involves the empowerment and mobilization of communities and community groups to advocate for and to create healthy environments.

In addition, the ECCM expanded the productive interactions between health care providers and patients to include community members and community groups. Finally, the outcomes of the model were augmented to include population health outcomes as well as the individual functional and clinical outcomes.

C.2.3.2 Chronic Disease Prevention and Management Model (CDPM)

The ECCM has been adopted by jurisdictions in Alberta, Saskatchewan, and Manitoba to inform their redesign of chronic disease care(25). Ontario has begun the process of redesigning chronic disease care by creating its own model, the Chronic Disease Prevention and Management Framework (CDPM), based on the CCM and the ECCM.

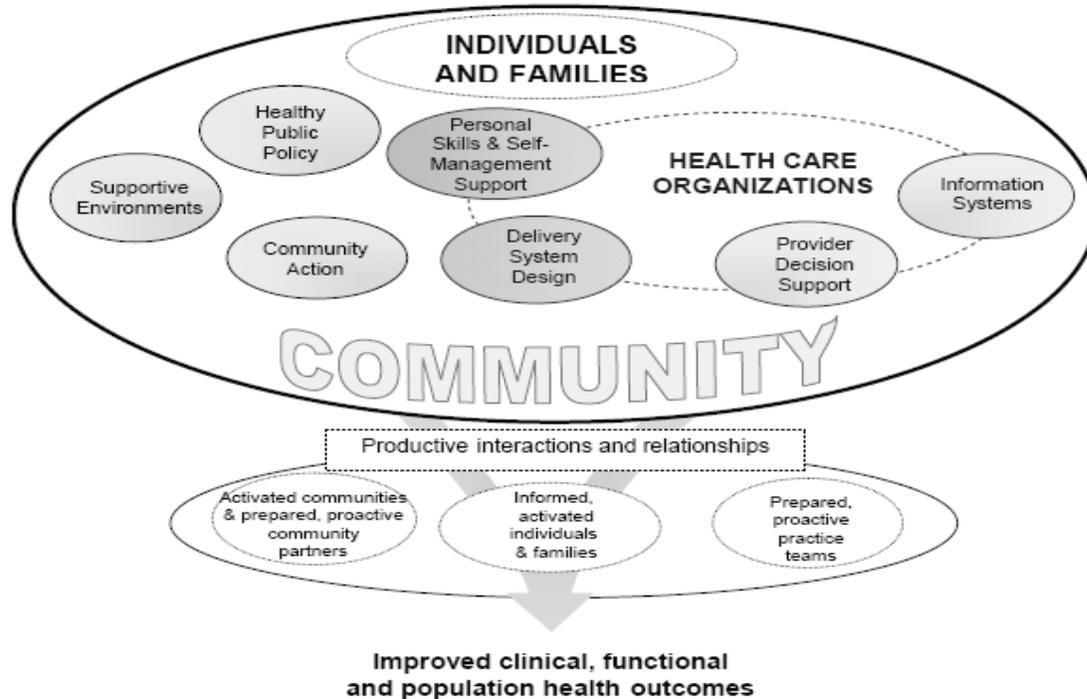
The CDPM model consists of eight elements: health care organization; personal skills and self-management supports; delivery system design; provider decision support; information systems; healthy public policy; supportive environments; and community action. Like the ECCM, the CDPM framework posits that chronic disease care based on these eight elements will result in productive interactions between activated communities and prepared, proactive community partners, informed activated individuals and families, and prepared proactive practice teams. These interactions lead to improved individual clinical and functional outcomes and improved population health outcomes (**Figure 4**). A brief description of each of these elements and their key components is provided below.

Like in the ECCM, the self-management support element was also expanded to include personal skills. This element incorporates "personal skills to [develop] and [maintain] lifestyle behaviours that keep people healthy and prevent chronic disease" and self-management supports to help people with chronic diseases manage their disease(25). The key components of personal skills are: "effective support services; social marketing and other population health strategies; collaboration between community and health care organizations"(25). The key components of self-management supports are as follows: clients are part of the care team and engaged in shared decision making; individuals are empowered to be self-managers; self-

management support services are organized for clients; shared clinical guidelines are utilized; and regular follow-up is incorporated(25).

Similarly, the information systems element has been expanded to include a wider variety of users and a focus on the collection of population health data. The key components of the information systems element are: “client registries; electronic health records; provider portals; client portals; and population health data”(25).

Figure 4: Ontario’s Chronic Disease Prevention and Management Framework



Source: Ontario Ministry of Health and Long-Term Care (25)

The delivery system design element addresses the way health care practice is organized and conducted, including an important focus on prevention and population needs-based care. The key components of this element are: “interdisciplinary care teams with defined roles and responsibilities; innovative patient interactions; care planning, care paths, and care management; enhanced health promotion and prevention; outreach and population needs-based care and cultural sensitivity”(25).

The provider decision support element is similar to the original CCM element. The key components are: “evidence-based guidelines embedded into daily practice; provider education; access to specialist expertise; clinical care and client management tools; routine reporting and feedback”(25).

The CDPM Framework has incorporated a healthy public policy element, based on the element of the same name in the ECCM. This element focuses on the development and implementation of policies to improve health at the individual and population level and to decrease inequities among groups in the population. The key components of this element are: “legislation and regulations; fiscal policies; guidelines; and organizational policies and programs”(25).

The key components of the supportive environments element are supportive physical and social environments. These supportive environments are: “living and working conditions that promote health and prevent chronic disease by being stable, secure, and safe as well as stimulating, satisfying, and enjoyable”(25).

The final element of the CDPM Framework is community action, which represents the actions undertaken at the community level to promote and affect health issues. The key components of this element are: “building partnerships across sectors; public participation; and enhancing local knowledge, skills, and resources”(25).

C.3 Evaluation Literature

C.3.1 Summary of the Evaluation Literature

A literature search was conducted to examine the body of literature addressing the evaluation of chronic disease management programs (the search strategy is summarized in the section B. Development Process). Fifty-six studies were reviewed (we reviewed all of the identified studies related to the evaluation of the CCM as well as some general chronic disease management evaluation studies, which incorporated components of the CCM). Thirty-nine of these studies were specific to the implementation of the chronic care model, and 17 studies addressed chronic disease care interventions that were not specific to a CCM implementation program, but fell into one or more of the CCM domains. Most of the studies (45/56) were conducted in the United States. Two studies were conducted in Canada, two in the United Kingdom, and one in Sweden. The other six studies were reviews or meta-analyses, so they combined studies from a variety of countries (once again, most component studies were conducted in the United States). Study settings were primary or community care settings or hospital-based clinics.

Of the 55 studies, 43 addressed a single chronic disease. Diabetes was the most common chronic disease studied (23 studies), followed by asthma (five studies), depression care (four studies), heart failure (three studies), rheumatoid arthritis (two studies), and hypertension, multiple sclerosis, human immunodeficiency virus, chronic obstructive pulmonary disorder, bipolar disorder, and preventive care at one study each. Eleven studies addressed multiple chronic diseases. Most of these studies looked at two chronic diseases (combinations included diabetes and depression, diabetes and cardiovascular disease, and diabetes and hypertension), but three of the studies were much broader and included up to 11 different chronic diseases.

Numerous studies designs were employed including before-and-after studies (12 studies), cross-sectional studies (11 studies), cohort studies (one retrospective and eight prospective cohort studies), randomized controlled trials (nine RCTs), qualitative studies (two studies), quazi-experimental studies (one study), case series (five studies), and systematic reviews and meta-analyses (six studies).

Most of the chronic care model literature focuses on specific interventions such as diabetes registries or disease self-management programs. There are some studies that attempt to examine the complete CCM, but these efforts have been hampered by the fact that many practices do not implement interventions aimed at each of the six elements of the CCM and because the interventions vary widely making them difficult to compare across practices.

While many study designs have been used, most of the chronic disease care evaluation studies fall into four main categories: cross-sectional studies; before-and-after studies; cohort studies;

and randomized controlled trials. The cross sectional surveys assess the relationship between elements of the CCM and patient clinical outcomes. The before-and-after studies, the cohort studies, and the randomized controlled trials typically assess several aspects of the physician practice: use of the CCM; patient clinical outcomes (e.g., glycosylated hemoglobin (HbA1c values for diabetes)); and clinical process measures (e.g., frequency of feet and eye exams in those with diabetes). Some studies also examine health care utilization (e.g., number of physician, emergency room, or hospital visits) or quality of life (typically using the SF-36). Finally, a few studies included financial measures such as personnel-related costs.

Many different methods of assessment have been used. Both qualitative and quantitative evaluations are common, and there is growing support for the use of both (mixed method evaluation). Chart reviews are commonly used to assess patient clinical outcomes. Patient and provider interviews and, to a lesser extent, observations are also common techniques. When assessing the use of elements of the CCM model, there are three main methods of assessment: the Assessment of Chronic Illness Care (ACIC) Questionnaire; the Patient Assessment of Chronic Illness Care (PACIC) Questionnaire; and RAND Evaluations.

C.3.2 Breakthrough Series Collaboratives Evaluation Studies

Since its design, the CCM has been implemented in more than 300 diverse health care systems through the Institute for Health Improvement (IHI) and the Robert Wood Johnson Foundation National Program on Improving Chronic Illness Care (ICIC) Breakthrough Series (BTS) Collaboratives(61;62).

The BTS collaboratives were designed as models of continuous quality improvement through which participating health care programs and systems would implement and test the CCM. Each collaborative consists of about 20 to 40 health care organizations that focus on a particular chronic disease. Over the course of a year, the organizations send a team of three to five health care providers to three, two-day sessions where they learn quality improvement methods, methods for inducing organizational change, and strategies for improving care. The teams work with the session leaders to develop improvement plans for their organization. Each session is followed by a two to six month 'action period' during which the teams use continuous quality improvement techniques such as Plan-Do-Study-Act (PDSA) cycles to implement interventions based on the CCM and to measure change. During the action periods, teams keep in contact with session leaders through email, conference calls, and monthly reports that describe their progress. Based on the results of the small-scale interventions, the interventions are refined and expanded in the organization(63-66). **Figure 5** summarizes the BTS collaborative process. Chronic conditions that have been examined using the BTS collaborative method include diabetes, preventing frailty in the elderly, congestive heart failure, asthma, and depression.

C.3.3 Other Evaluation Studies

In addition to the BTS Collaboratives, the literature documents numerous studies in which health care systems (e.g., a health maintenance organization (HMO)) or organizations implement and evaluate the CCM. These studies employed many similar techniques and outcomes to evaluate CCM. The commonly evaluated indicators/outcomes can be grouped into ten categories as described below. While most of the categories measure traditional outcome indicators, productivity measures, or process indicators, the first category, CCM implementation, is focused on the organization of care. Thus, it is the only indicator that directly assesses the use of interventions and design of care associated with the CCM. The other indicators/outcomes are proxy measures for the success of the chronic disease management

program. For example, clinical outcomes are proxy measures because these measures are based on the assumption that if the chronic disease management interventions implemented are successful, then clinical outcomes will improve; however, clinical outcomes do not evaluate the actual interventions or overall chronic disease care.

Common Categories of Indicators/Outcomes in the Literature

1. CCM Implementation
2. Clinical Outcomes
3. Process Measures
4. Satisfaction
5. Health Care Utilization
6. Quality of Life
7. Client Knowledge
8. Quality Indicators
9. Health Status
10. Financial Outcomes

C.3.3.1 CCM Implementation

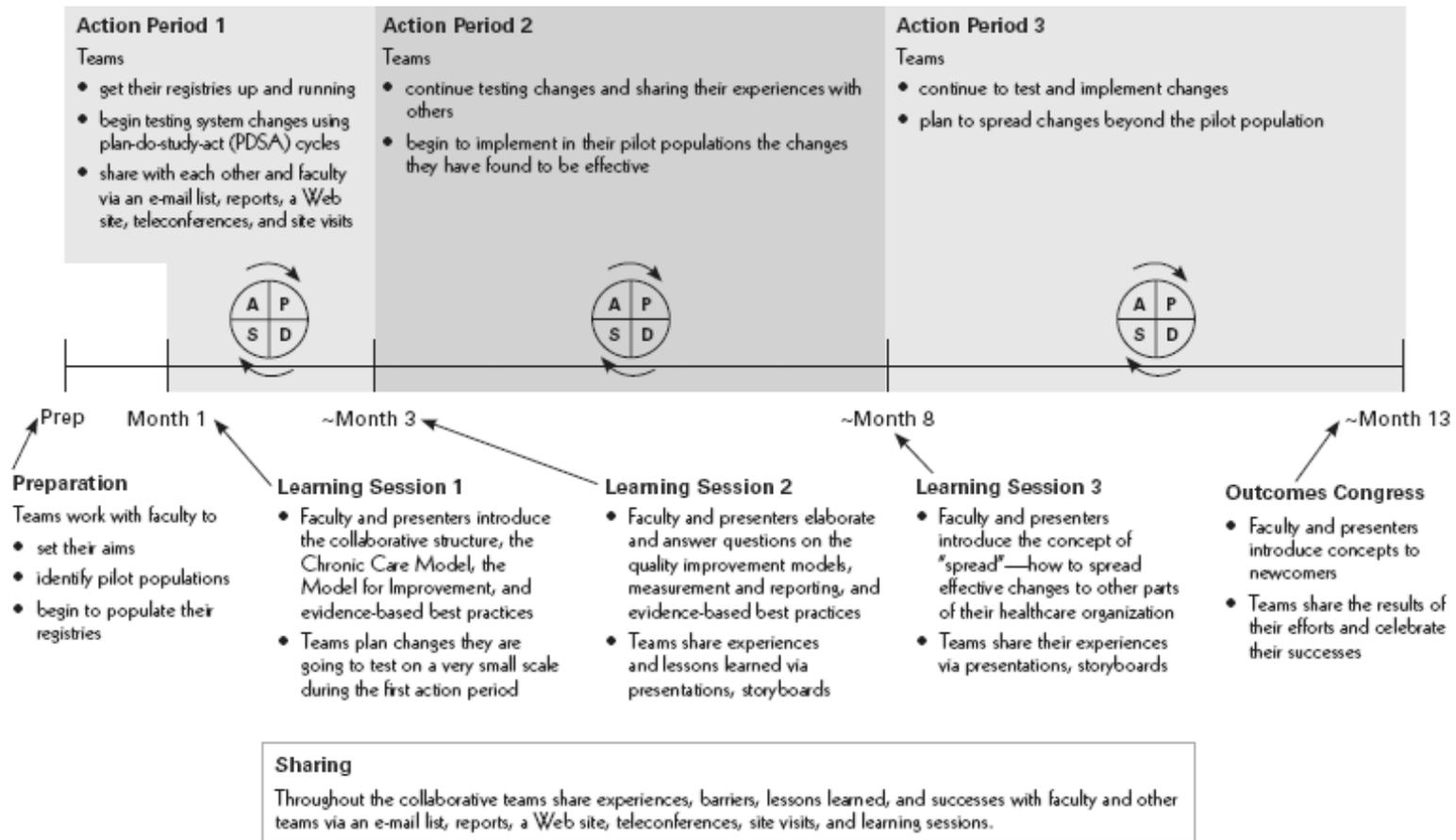
The implementation of the CCM was most commonly evaluated in the BTS Collaborative studies, mainly through one of two methods.

(1) ACIC/PACIC Questionnaires

Two questionnaires, the Assessment of Chronic Illness Care (ACIC) and the Patient Assessment of Chronic Illness Care (PACIC) have been developed to evaluate the implementation of the CCM. The ACIC is a self-administered questionnaire that is completed by health care providers within an organization that has implemented the CCM. The respondents rate 34 elements on a scale of 0 to 11 in seven categories: organization of health care delivery system; community linkages; patient self-management resources; provider decision support, delivery system design; clinical information management; and integration of chronic care model components(67;68). By rating the individual elements within each category, the ACIC allows organizations to identify areas in their current care delivery that need improvement as well as to evaluate the nature of and level of improvements that have been made(69).

The PACIC questionnaire was developed to assess chronic disease care from the perspective of the patient. It is a self-administered questionnaire to be filled out by patients to assess the extent to which the chronic disease care that they received is aligned with the CCM. The PACIC is a 20-item questionnaire in which respondents rate the frequency that care was provided in the past six months on a scale of 1 to 5. Five subscales are evaluated: patient activation; delivery system design/decision support; goal setting; problem-solving/contextualization counseling; and follow-up/coordination(70;71).

Figure 5: The Breakthrough Series Collaboratives Process



Source: Joint Commission journal on quality and safety (72)

(2) RAND Evaluation

The BTS Collaboratives were evaluated by the RAND Corporation. During the action periods, improvement teams submitted monthly reports on what interventions had been implemented and measurements of progress in care and patient outcomes. The RAND evaluation was based on these monthly reports, telephone interviews with key informants, and observations of the health care organizations. A detailed coding pathway was developed to classify each type of intervention by the CCM element to which it corresponds (Appendix C)(50). The interventions were evaluated based on the fidelity to the CCM and intensity, which was measured by the *quantity* of the organization's interventions and the *depth of change* associated with the interventions. Depth of change was measured on a scale of zero to two based on a qualitative assessment of the likelihood of the intervention to result in change: zero indicates no change activity; one indicates that the change activity is not likely to have an impact; and two indicates that the change is likely to have an impact(50;73).

C.3.3.2 Clinical Outcomes

In the evaluation studies, clinical outcomes were the most commonly measured outcomes. Clinical outcomes are defined as the actual patient outcome values obtained from clinical tests and measures. For instance, clinical outcomes evaluated when examining care provided to people with diabetes included: HbA1c levels; the percentage of the organization's diabetic patients who had blood pressure readings less than 130/80 mmHg in the past six months; and the percentage of patients who had a low-density-lipoprotein (LDL) reading of less than 100 in the past 14 months.

Typical methods of evaluation for this indicator are chart reviews, the extraction of administrative data, and self-administered questionnaires or telephone interviews directly with patients.

C.3.3.3 Process Measures

Process measures are common indicators measured in the literature. These measures are based on the percentage of patients in a practice or study group that meet specific guidelines. For instance, for a diabetes program, typical process measures are the percentage of patients with at least one HbA1c test in the past 12 months, the percentage of patients with a documented self-management plan, the percentage of patients with a foot exam or retinal exam in the past 12 months; the percentage of patients who received diabetes self-management training; and the percentage of patients who received smoking cessation counseling.

Typical methods of evaluation for this indicator include chart reviews, extraction of administrative data, patient interviews, and self-administered questionnaires mailed to patients.

C.3.3.4 Satisfaction

CCM evaluation studies in the literature often assess some measure of satisfaction. This could include the evaluation of one or more of the following aspects of satisfaction: patient satisfaction; provider satisfaction; satisfaction with communication; and satisfaction with treatment.

Typical methods of evaluating satisfaction include patient comments to staff or, more commonly, the use of a questionnaire filled out by providers or patients. Specific instruments used include questionnaires that were developed from the provider communication composite of the

Consumer Assessment of Health Plans, the Patient Satisfaction Questionnaire, and the Leeds Satisfaction Questionnaire.

C.3.3.5 Health Care Utilization

Health care utilization was often measured using a combination of the following indicators: number of hospital admissions (disease-specific or general admissions); length of stay; number of ambulatory-care clinic visits; number of emergency room visits; number of physician, nurse, or specialty visits; and time spent with providers. Administrative and billing data, chart review, and telephone interviews with patients were the most common methods used to evaluate health care utilization.

C.3.3.6 Quality of Life (QOL)

Several aspects of QOL were assessed in the chronic disease evaluation studies, which included: general QOL; disease-specific QOL; role limitation; physical discomforts; functioning; and energy or fatigue.

Common instruments for the measurement of general QOL include: the Medical Outcome Short Form Health Survey (SF-36, SF-12, and SF-15); the World Health Organization (Ten) Quality of Well-being Index; PedsQL4.0, the Impact on Family Scale; the Mood Adjective Check List; the Sickness Impact Profile (SIP); and the self-rated health scale in the National Health Interview Survey.

Instruments for the measurement of disease-specific QOL varied by disease, but examples of some useful instruments include: the Marks' Asthma Quality of Life Questionnaire; the Children's Health Survey for Asthma; the PedsQL 3.0 SF-22 Asthma Module Symptoms Scale; the Diabetes Quality of Life Questionnaire (DQOL); the Epidemiological Studies Depression Scale; the Health Assessment Questionnaire (HAQ); and the Functional Assessment of Cancer Therapy Scale.

C.3.3.7 Patient Knowledge

Patient knowledge (both general healthy life-style knowledge and disease-specific knowledge) was commonly assessed to measure the success of self-management support interventions. While instruments used in the literature varied by disease, some examples are the Diabetes Knowledge Test, the National Asthma Education Program Asthma Knowledge Questionnaire, the Patient Knowledge Questionnaire, and items from the Partners in Care survey.

C.3.3.8 Quality Indicators

Quality indicators measure the quality of care provided to patients by comparing the care that is provided against benchmarks from evidence-based guidelines and best practices. Disease-specific quality indicators (e.g., peak expiratory flow rate measurements taken annually for asthma) and general indicators of quality of care (e.g., the rate of influenza vaccination within a practice's patient population) have been used in the literature. Chart reviews and administrative data are most often used to evaluate quality indicators.

C.3.3.9 Health Status

Examples of commonly used health status indicators are bed disability days, missed work days, and restricted activity days. These indicators are usually assessed through telephone interviews. The Arthritis Impact Measurement Scales is an example of a specific instrument that has been used to assess health status.

C.3.3.10 Financial Outcomes

Financial performance outcomes are the least commonly evaluated indicators of chronic disease care in the literature. Only a few indicators have been used (personnel costs and net losses). Financial outcomes were primarily assessed using administrative and billing data.

C.4 Results of the Evaluation Studies

When reviewing the literature related to the evaluation of chronic disease management programs, results fell into one of two categories. First, there were the results of the clinical outcomes and process measures evaluated in the study. A detailed description and analysis of the clinical outcomes and process measures is beyond the scope of this report. However, an example of these results from a meta-analysis of randomized and non-randomized controlled trials of interventions for asthma, congestive heart failure, depression, and diabetes that included at least one element of the CCM showed a 0.30 to 0.47% reduction in HbA1c levels(74). Overall, this meta-analysis found that “interventions with at least one CCM element had consistently beneficial results on clinical outcomes and process of care across all conditions measured. The effects on quality of life were mixed with only the congestive heart failure and depression studies showing benefit”(75).

Second, there were results that provide insight into the types of interventions that were successful, and the elements of the CCM that were particularly important to address. Examples of the commonly reported components of the CCM that were important for success include: major roles for other health care providers (e.g., case managers, nurses, physiotherapists, occupational therapists)(76); and visible support and promotion of the chronic disease improvement project by organizational leaders(77).

C.5 Gaps and Limitations in the Literature

In the research process, we were able to assess the gaps and limitations in both the literature and the evaluation frameworks used in the literature. One of the most obvious gaps in the literature is the limited number of chronic diseases included in the evaluations. The current literature primarily focuses on programs for people with diabetes. There is very limited or no literature pertaining to the implementation of chronic disease management programs and evaluation initiatives for other chronic conditions such as musculoskeletal diseases like arthritis, cardiovascular diseases like hypertension, cancer, and mental illness even though these chronic conditions are very prevalent and have a significant impact on the population and health care system. In addition, these reviewed diseases are primarily conditions that are managed with pharmacological therapies and medical monitoring, while there is limited literature that addresses chronic disabling conditions such as osteoarthritis. Whether this limitation is due to the lack of implementation of chronic disease management programs in other disease areas or a lack of evaluation of programs in these other areas is not known.

The following sections describe two main categories of gaps in the literature.

C.5.1 Gaps in the evaluation of chronic disease management literature

First, there are gaps in the evaluation of chronic disease management programs. These gaps are related to issues that are recognized as important in the chronic disease management models and literature, but are not included in the evaluations of the programs or the associated literature. Examples of this include the integration of care across multiple chronic conditions and the integration and coordination of care between health care organizations and the community.

Many people suffer from multiple chronic conditions. Of people with type II diabetes, 50% or more also have concurrent hypertension, and more than 67% have concurrent clinically significant coronary artery disease(20). The issue of multimorbidity and the additional associated requirements of coordination, communication, and care across multiple providers and organizations are well recognized in the chronic disease management literature. However, this issue is relatively absent in chronic disease management programs and their evaluations.

Chronic disease management models place increased emphasis on communication and coordination of care between health care organizations and the community. However, in practice, the increased coordination and communication rarely extends beyond team members within a particular program, and when it does, it remains within the organization. Thus, despite the recognized importance of the community aspect of the chronic disease care, very few of the evaluations assess linkages across programs or any aspect of the CCM's community domain. When this is excluded from evaluation frameworks, we miss an opportunity to emphasize the importance of this aspect as well as to highlight it as an important area for improvement.

Similarly, the chronic disease management models recognize that community programs (e.g., exercise or smoking session programs) play an important role in chronic disease management. However, in the reviewed literature to date, only health care organizations and programs have been evaluated. No evaluations of community programs providing chronic disease management were found. As well, although the expanded chronic disease management models (ECCM, CDPM) recognize the importance of broader health determinants (such as physical environment, education and literacy, income and social status, employment and working conditions) for chronic disease prevention and management, the evaluations in the literature do not include assessments of linkages and coordination between the health sector and non-health sectors (e.g., education, housing).

Another notable gap in the literature is the lack of an assessment/measurement of the implementation of the CCM in most evaluations (exceptions are the evaluations conducted as a part of the IHI Breakthrough Series Collaboratives). The model itself provides a guide for programs/organizations to redesign care by highlighting the areas of importance for improved care. When its implementation is excluded from the evaluation, the program/organization does not gain insight into the success, or lack of success, in the individual areas of chronic disease management, and it loses the opportunity to recognize areas of chronic disease management that are not currently addressed.

The last major gap identified in this category is the evaluation of client perspectives and satisfaction. The models of chronic disease management, especially the ECCM and CDPM, emphasize the importance of the patient and their family as an integral part of the health care team. However, the evaluation literature is primarily focused on the health care provider and

their organization. Patient perspectives and satisfaction are rarely assessed, and when they are, the evaluation is often informal and/or inadequate.

C.5.2 Gaps in both the evaluation and chronic disease management literature

The second category of gaps are the issues that are absent from or inadequately addressed in **both** the evaluation literature and the underlying chronic disease management models and literature. Examples of these gaps include access to care and assessment of chronic disease care from a systems perspective.

The CCM and the current evaluation efforts focus on the actual care that is provided. Access to care is not addressed. However, good chronic disease management care requires timely and adequate access to health care and community programs and services, to ensure positive outcomes; therefore, this is an important area to address in an evaluation framework.

The CCM views chronic disease management care as primarily “intrinsic to the provider organization”(55). Thus, evaluation efforts are centred in individual health care programs or organizations, and there is no attempt to assess care from a broader, systems-level perspective. (While the expanded versions of the model have increased focus on some of the system level issues such as public health policy and supportive environments, currently the literature does not include evaluations of these expanded models.) A comprehensive chronic disease evaluation framework should incorporate a broader, systems-level examination of the issues. This approach makes it possible to examine the overarching issues of chronic disease management such as overall access to and distribution of services, coordination of care across the continuum, integration between programs and organizations, and public awareness.

D. Evaluation Framework

The current evidence, models, evaluations, and gaps and limitations described in section C of this report (above) were used to identify the important elements of comprehensive and successful chronic disease management. This information was used to inform the development of the proposed evaluation framework described below.

D.1 Overview of Evaluation Framework

Thirteen areas (domains) of importance for chronic disease prevention and management were identified. Ten of the domains address chronic disease prevention and management at the level of the health care organization, community organization, or specific program. The other three domains address chronic disease management at a health system level.¹ Each domain has a list of components and corresponding sub- components (See **Table 2**). Whenever possible, we have included suggested methods of evaluation for each domain (e.g., survey methods or chart review), the level of assessment (e.g., health care organization, provider, or patient level) appropriate for the measurement of the components, and specific instruments (e.g., Health Assessment Questionnaire, SF-36) for evaluation within the description of the domains and components.

¹ The public awareness component, a part of the prevention domain, is measured at both the system level and the health care/community organization or program.

Table 2: Domains and Components for Chronic Disease Prevention and Management

<p>1.0 Domain 1.1 <i>Component</i> 1.1.2 Sub-components</p>
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Domains, Components, and Sub-components
I. Domains and Components for Evaluation of Organizations or Programs
1.0 Organizational Characteristics
1.1 <i>Leadership</i> 1.2 <i>Culture</i> 1.2.1 Chronic Disease Prevention and Management Culture 1.2.2 Quality Improvement Culture 1.2.3 Patient Safety Culture 1.3 <i>Use of Evidence in Planning</i>
2.0 Delivery System Design
2.1 <i>Practice Team Functioning</i> 2.1.1 Team Composition and Roles 2.1.2 Communication 2.2 <i>Coordination of Care</i> 2.2.1 Planned Visit 2.2.2 One-Stop-Shopping 2.2.3 Continuity of Care 2.3 <i>Client-Centered Care</i> 2.4 <i>Access to Care with Follow-up</i> 2.4.1 Wait-times 2.4.2 Organization-Initiated Follow-up 2.4.3 Client-Initiated Follow-up
3.0 Linkages
3.1 <i>Linkages Between programs and across Organizations</i> 3.1.1 Coordination 3.1.2 Partnerships 3.2 <i>Development of Outside Resources</i>
4.0 Information Systems
4.1 <i>Registry</i> 4.2 <i>Reminders/Prompts</i> 4.3 <i>Shared Client Data</i> 4.3.1 Shared Client Data between Team Members 4.3.2 Shared Client Data between Teams, Programs and Organizations 4.4 <i>Feedback to Clients and Providers</i> 4.4.1 Feedback to Clients 4.4.2 Feedback to Providers
5.0 Provider Decision Support
5.1 <i>Evidence-based Guidelines and Best Practices</i> 5.1.1 Access 5.1.2 Integration into Practice 5.1.3 Communication of Guidelines 5.2 <i>Provider Education</i>

Domains, Components, and Sub-components
<i>5.3 Access to Specialist Expertise</i>
6.0 Self-Management Support
<i>6.1 Knowledge</i>
<i>6.2 Self-efficacy</i>
<i>6.3 Self-Management Assessment</i>
<i>6.4 Self-Management Support Strategies</i>
7.0 Prevention
<i>7.1 Preventive Care</i>
<i>7.2 Public Awareness</i>
8.0 Clinical Utilization and Outcomes
<i>8.1 Disease-Specific Clinical Outcomes</i>
<i>8.2 Disease-Specific Process Outcomes</i>
<i>8.3 Health-Related Quality of Life</i>
<i>8.4 Health Care Utilization Data</i>
<i>8.4.1 Inpatient Service Use</i>
<i>8.4.2 Emergency Room Use</i>
<i>8.4.3 Ambulatory Service Use</i>
<i>8.4.4 Home Care Use</i>
9.0 Provider Perspectives
<i>9.1 Provider Perspectives</i>
10.0 Client Perspectives
<i>10.1 Care and Treatment</i>
<i>10.2 Participation in Decision-Making and Goal Setting</i>
<i>10.3 Communication and Education</i>
<i>10.4 Family Involvement</i>
<i>10.5 Access to Care</i>
<i>10.6 Coordination of Care</i>
<i>10.7 Emotional Support</i>
II. Domains and Components for Evaluation at a System Level
11.0 Needs Assessment and Planning
<i>11.1 Needs Assessment</i>
<i>11.1.1 Burden</i>
<i>11.1.2 Current Resources</i>
<i>11.2 Health Planning</i>
<i>11.2 Ongoing Evaluations</i>
12.0 Access
<i>12.1 Referrals</i>
<i>12.2 Ongoing Access to Care</i>
<i>12.3 Wait-Times</i>
13.0 Coordination of Care across the Continuum
<i>13.1 Coordination of Care</i>

D.2 Detailed Description of Domains and Components

D.2.1 Domains and Components at the Organization/Program Level

The following domains and components can be used to evaluate an organization or specific chronic disease prevention and management program within an organization².

1.0 Organizational Characteristics

Organizational characteristics encompasses the attitudes, experiences, beliefs, values, and norms that are shared by an organization's members(78). These characteristics also affect the way members interact with each other and with external stakeholders, which promotes and supports safe, high quality chronic disease prevention and management across chronic diseases. This domain is divided into components that address the organization's leadership, commitment to and strategies for integrating principles of chronic disease prevention and management, quality improvement, and patient safety into practice. The data to evaluate these components will be obtained by surveying the organization's leaders.

1.1 *Leadership*: This component addresses senior leadership support through funding and resources for chronic disease prevention and management, quality improvement, and client-centered care. It addresses the importance of leaders visibly participating in efforts to implement or improve chronic disease prevention and management, and whether specific people are held accountable for chronic disease prevention and management and its integration with the organization's long-term strategy, mission, and vision.

1.2 *Culture*: This component refers to the organization's formal policies and processes to foster a culture of chronic disease prevention and management, quality improvement (QI), and patient safety. This includes communication and awareness of such policies and processes at all levels of the organization.

1.2.1 *Chronic Disease Management Culture*: This sub-component refers to the existence of formal policies and procedures to foster a culture that supports chronic disease prevention and management.

1.2.2 *QI Culture*: This sub-component refers to the existence of formal policies and procedures to foster a culture of continuous quality improvement as related to chronic disease prevention and management.

1.2.3 *Patient³ Safety Culture*: This sub-component refers to the existence of formal policies and procedures to foster patient safety including the promotion of patient safety, monitoring of near-misses and adverse events, and the implementation of processes to improve patient safety as it relates to chronic disease management.

1.3 *Use of Evidence in Planning*: This component addresses the extent to which the organization fosters an evidence based approach to strategic planning and program development (e.g., use of evidence/information in determining and setting organization priorities and strategies).

2.0 Delivery System Design

"Delivery system design refers to the way in which chronic disease prevention and management is organized and carried out"(25) to assure delivery of effective, efficient chronic disease prevention and management and self-management support in organizations or program within

² In this report, organization refers to both a health care organization (e.g., hospital) and an organization in the community (e.g., The Arthritis Society). See glossary for definitions.

³ Note, that we have used the term 'patient' here to be consistent with the commonly accepted terminology.

an organization(79). It includes the “design of the system, the range of professionals involved and their roles and responsibilities, client interactions, care planning, and care management”(25). The data for these components will be obtained from the organizations or programs by questionnaire. Client perspectives in these components are addressed in the Client Perspectives Domain.

2.1 Practice Team Functioning: This component addresses the functioning of individual teams and inter-team work through team roles, communication, and horizontal collaboration. Teams may include formal health care teams and designated community partnerships to address chronic disease.

2.1.1 Team composition and roles: This sub-component addresses the use of multidisciplinary teams for education and service delivery, the use of clearly defined roles for team members, and the distribution of tasks across team members and across teams.

2.1.2 Communication: This sub-component refers to the mechanisms to promote information exchange and collaboration among team members (e.g., existence of regular team meetings), and across programs and organizations.

2.2 Coordination of Care: This component refers to the extent that care is coordinated within and across diseases for individual clients to ensure integrated and comprehensive care (prevention and management interventions) that is “planned, pro-active, and includes mechanisms to ensure that plans are followed properly”(25).

2.2.1 Planned visit: This sub-component addresses whether providers or provider-teams plan processes to be performed during a visit and prepare for the visit in advance (e.g., soliciting tests and reviewing data **before** the appointment).

2.2.2 One-Stop-Shopping: This sub-component addresses whether there is a formal process (e.g., appointment system) to facilitate individuals seeing multiple providers or participating in multiple prevention and/or management programs or services in a single visit.

2.2.3 Continuity of care: This sub-component addresses whether there is a formal process to ensure continuity of care across the continuum. This includes use of consistent providers or provider-teams involved in individual client care/programming (e.g., is there one consistent point of contact for the individual such as a case manager or primary care physician) and mechanisms to support people as they transition through the system including hospital to community-based care.

2.3 Client-Centered Care: “This component refers to the extent to which [prevention and management] at the client level is being provided using a client-centered approach”(80). This component addresses aspects of client-centered care such as the dissemination of results to clients and incorporation of results into prevention and management, mechanisms for client involvement in decision-making and goal setting, provision of client-centered and family-centered education, mechanisms for family involvement, and emotional support mechanisms for clients, family, and staff.

2.4 Access to Care with Follow-up: This component addresses the accessibility of prevention and management interventions by measuring timely access through wait-times and the ability to continue to access programs and services through program/organization- or client-initiated follow-up. Since the needs of people with chronic diseases change over time, timely access to programs and services across the disease trajectory is important to support disease management.

2.4.1 Wait-times: The wait-times sub-component addresses whether wait-times for and during an appointment are reasonable and prioritized.

2.4.2 Program/Organization Initiated Follow-up: This sub-component addresses whether pro-active follow-up exists and is customized to client needs, which may vary in intensity and by methodology (e.g., by phone, in person, or by email).

2.4.3 Client Initiated Follow-up: This sub-component addresses whether policies and procedures are in place to ensure that individuals are able to easily initiate an appointment or re-access the system if/when needed.

3.0 Linkages

Programs and organizations "work together in organizing, integrating, streamlining, and enhancing"(25) chronic disease prevention and management. This domain addresses the partnerships and coordination between programs within an organization and across organizations to ensure the optimal utilization of health care and community resources, "continuity of care, help in care planning and follow-up, and [to] enable practice teams [and community providers] to direct clients to the services they need"(25). The data will be obtained from the organizations or programs by questionnaire.

3.1 Linkages between Programs and across Organizations: This component addresses the presence of formal linkages between programs within an organization. For example, for those persons with multiple chronic diseases, formal linkages between the relevant disease-specific programs will be evaluated (e.g., linkage between a diabetes education program and an arthritis program). In addition, this component addresses the coordination and partnerships between programs and organizations. This could be between health care organizations/programs, between community or government programs/organizations (these programs/organizations could be health care related or non-health care resources such as finance, education, housing), or between health care organizations/programs and community or government organizations/programs. For example, for those individuals with cardiovascular disease, formal linkages between the relevant health care disease-specific program and a community smoking cessation program. This also includes formal mechanisms to help individuals navigate the system to ensure appropriate referrals to health care or community providers or programs.

3.1.1 Coordination: This sub-component will address whether mechanisms or processes exist for active coordination (i.e. cooperation, collaboration and working together) between programs and organizations. This also includes formal mechanisms to help clients navigate the system to ensure appropriate referrals to providers or programs.

3.1.2 Partnerships: This sub-component addresses the existence of formalized programs, policies and networks across programs and organizations.

3.2 Development of Outside Resources: This component refers to the organization's participation in the development of outside resources, including general health (e.g., diet and exercise), disease-specific and non-health related (e.g., finance, education, housing) external resources as needed for effective and efficient chronic disease prevention and management.

4.0 Information Systems

Information systems allow a program or organization to organize client data to facilitate efficient and effective chronic disease management across the continuum. "Information systems need to be fully integrated to ensure client information is accessible to all members of the practice team"(25) and to effectively link information across practice teams, programs and organizations "in order to support case management and care coordination; and to improve decisions about [chronic disease] care"(25). Areas of importance in this domain include the use of information systems for disease registries, the provision of feedback to both clients and providers, the integration of reminders and prompts into the system, and the integration of client data across providers, programs, and organizations. The data will be obtained from the programs or organizations by questionnaire.

4.1 *Registry*: This component refers to the existence and use of client registries (general or disease-specific) to ensure efficient and adequate chronic disease management. This might include use of a registry to track clients and plan interventions (e.g., reminder telephone calls). In addition, this component will evaluate the integration of registries across chronic diseases to ensure adequate management across co-morbid conditions.

4.2 *Reminders/Prompts*: This component refers to the existence and use of prompts and reminders (either electronic or paper-based) to ensure timely and appropriate management using evidence-based guidelines and best practices. For example, this includes reminders to providers to refer their clients with diabetes for annual foot and retinal exams.

4.3 *Shared Client Data*: This component addresses the integration of information systems to ensure that all team members, practice teams, programs, and organizations have access to client data as necessary to perform their role in the client's chronic disease management.

4.3.1 *Between team members*: This sub-component addresses whether everyone on a practice team has access to the client information needed to deliver planned programs and services.

4.3.2 *Between teams, programs and organizations*: This sub-component addresses whether information systems are integrated between practice teams and across programs and organizations to allow for efficient sharing of client data as necessary. This includes whether providers have access to comprehensive information about an individual's health (including all health issues and conditions).

4.4 *Feedback to Clients and Providers*: This component refers to whether feedback is given to clients and providers regarding their health and quality of care, respectively.

4.4.1 *Feedback to Clients*: This sub-component addresses whether clients are provided with helpful and timely feedback concerning their health including information regarding screening, test results, and progress.

4.4.2 *Feedback to Providers*: This sub-component addresses whether a program or organization gives feedback to providers regarding their performance and quality of care or service including adherence with guidelines and client outcomes. This may also incorporate a comparison of outcomes across providers in a clinic, hospital or program.

5.0 Provider decision support

"Provider decision supports improve the quality of chronic disease management by integrating practice guidelines or protocols into daily practice, supported by effective provider training and behavioral change methods"(25) to promote chronic disease management that is consistent with scientific evidence and client preferences. The data for this domain will be obtained through surveys of organizations and community programs.

5.1 *Evidence-Based Guidelines and Best Practices*: This component refers to the extent to which an organization or program fosters evidence-based practice (EBP). This component addresses a provider's access to scientific literature, EBP integration into daily practice, and communication of guidelines with clients or participants. The term provider refers to all individuals involved in care delivery (e.g., regulated health professionals and community workers).

5.1.1 *Access*: This sub-component addresses the provider's access to current scientific literature, evidence-based guidelines and best practices, and decision support tools (e.g., care maps, reminder systems, web links) to enable decisions based on scientific evidence. In addition, it addresses the availability of professional development opportunities for providers and mechanisms to support knowledge translation.

5.1.2 *Integration into Practice*: This sub-component addresses whether guidelines and best practices are embedded into daily practice.

5.1.3 *Communication of Guidelines*: This component addresses whether providers share relevant guidelines with clients or participants.

5.2 *Provider Education*: This component refers to a provider's access to continuing education using proven techniques to promote and support effective chronic disease management.

5.3 *Access to Specialist Expertise*: This component refers to a provider's access to specialist expertise through joint or shared assessment of clients and/or communication between routine care providers and those with specialist expertise to increase the capacity of providers. Note that any provider (e.g., physicians, rehabilitation therapists, dieticians, social workers etc.) could be considered the routine provider or specialist depending on the situation.

6.0 Self-Management Support

Self-management support empowers and prepares individuals and their families to effectively manage their health and health care. This domain addresses the knowledge and confidence of individuals to manage their chronic condition(s) as well as provider support and promotion of ongoing client self-management. The data for this domain will be obtained from surveys of clients (components one and two), programs and organizations (components three and four).

6.1 *Knowledge*: This component addresses an individual's knowledge about his/her chronic condition(s), self-management skills, and healthy lifestyle skills (e.g., diet and exercise).

6.2 *Self-Efficacy*: Self-efficacy is a measure of a person's belief in his/her ability to succeed in specific situations(81). This component refers to a client's confidence in managing his/her condition(s).

6.3 *Self-Management Assessment*: This component addresses whether providers regularly collaborate with the individual to set self-management goals and review and document the individual's self-management skills and goals to promote and support ongoing self-management and adherence to evidence-based guidelines.

6.4 *Self-Management Support Strategies*: This component addresses whether the organization or community program offers and/or refers clients to external or internal self-management programs and peer support programs including behaviour modification programs and support groups.

7.0 Prevention⁴

Prevention refers to maintaining health and preventing diseases from occurring as well as preventing diseases from progressing following diagnosis and minimizing disability. It also includes a valuing of the health determinants that affect health and the risk factors common to a number of chronic diseases when providing programs and services to individuals. This domain will be measured by survey of programs or organizations and government representatives.

7.1 *Preventive Care*: This component refers to the extent of provision of key preventive services. For example, evaluation measures could include the rate of pneumococcal vaccination, the annual influenza vaccination rate in seniors, and the proportion of individuals who received healthy lifestyle counselling (such as smoking cessation, diet or exercise counseling) and improved risk factor screening and early detection of chronic disease.

7.2 *Public Awareness*: This component addresses the use of chronic disease public awareness strategies (by organizations or governments) to educate the public about chronic diseases, chronic disease risk factors, and available services for chronic disease management.

⁴ This domain is specific to primary prevention. Secondary and tertiary prevention are addressed throughout the evaluation framework in other domains (e.g., Self-Management Support Domain).

8.0 Clinical Utilization and Outcomes

This domain addresses client health outcomes and health care utilization. These components will help to evaluate the chronic disease management provided by programs or organizations. The data for these components will be collected from the organization and clients using chart reviews, client surveys, and administrative data.

8.1 *Disease-Specific Clinical Outcomes*: The disease-specific clinical outcomes are defined as the actual values obtained from clinical tests or assessments (by participant/client or provider). The disease-specific clinical outcomes component will be informed by data measuring: symptoms and functional outcomes (such as pain and activities of daily living); health status (such as days of restricted activity and days of school missed); and clinical outcomes (for example, for diabetes, clinical outcomes would include HbA1c levels, blood pressure, and low density lipoprotein cholesterol levels, and for asthma, number of days with any asthma symptom in 14 days preceding health care contact and annual rate of oral steroid bursts).

8.2 *Disease-Specific Process Outcomes*: The disease-specific process outcomes measure the proportion of clients in a practice that meet specific guidelines or benchmarks. For example, for diabetes, the proportion of clients with a foot exam in the past 12 months, and for asthma, the percentage of clients who had an asthma attack in the past 12 months.

8.3 *Health-Related Quality of Life (HRQoL)*: HRQoL component will include measures of disease-specific (e.g., for arthritis, the Rheumatoid Arthritis Quality of Life Questionnaire [RAQoL] or the Health Assessment Questionnaire [HAQ]) and general quality of life (e.g., SF-36, Health Utilities Index [HUI]).

8.4 *Health Care Utilization Data*: Health care utilization measures the volume of utilization of specific health care services.

8.4.1 Inpatient service use: This sub-component will include measures such as the number of hospital admissions, unplanned readmissions, and length of stay by diagnosis and/or service type (e.g., total joint replacement and amputation).

8.4.2 Emergency room use: This sub-component will include measures such as the number of emergency room visits.

8.4.3 Ambulatory service use: This sub-component will include measures such as the number of visits to any health care provider, including the number of primary care visits, specialist visits, and visits with non-physician health professionals such as nurses, physiotherapists, occupational therapists, social workers, by diagnosis, service type and/or intervention, such as dialysis.

8.4.4 Home care use: This sub-component will include measures such as the number of home care visits by service provider (e.g., personal support worker, nurse) and diagnosis.

9.0 Provider Perspectives

This domain will evaluate the use of employee satisfaction measures to obtain information from providers as well as the implementation of initiatives based on the results or outcomes of these surveys for program improvement. The data will be obtained from surveys of providers in the organization or programs.

9.1 *Provider Perspectives*: This component addresses the frequency of provider satisfaction measurements, and whether the results are disseminated to providers and integrated into quality improvement and program planning initiatives. From the provider perspective, this component includes measures of employee satisfaction such as satisfaction with: feedback regarding chronic disease prevention and management; quality improvement; patient safety efforts and the tools and processes that affect providers' practice and patient outcomes; communication and role distribution across team-members; and partnerships with community programs.

10.0 Client Perspectives

“Client-centered care is an approach to prevention and management that embraces a philosophy and respect for and partnership with people receiving services”(80). This domain addresses the components of client-centered care from the client’s perspectives, and the data will be obtained from client surveys.

10.1 *Care and Treatment (Prevention and Management Interventions)*: This component refers to the outcomes and quality of prevention and management interventions received from the client’s perspective(80).

10.2 *Participation in Decision-Making and Goal Setting*: This component addresses the extent to which clients and their families are included in decision-making and goal setting(80).

10.3 *Communication and Education*: This component addresses the client’s perspectives on the quality of communication and education received as well as the extent to which it reflected their needs and cultural background.

10.4 *Family Involvement*: This component refers to the extent to which families are involved in chronic disease prevention and management. This includes provision of support and information to families.

10.5 *Access to Care*: This component refers to the accessibility of care and services appropriate to the client’s needs from the client’s perspective by measuring timely access through wait-times and the ability to continue to access care (both in the health system and community) through program/organization- or client-initiated follow-up.

10.6 *Coordination of Care*: This component refers to the extent to which clients’ care was coordinated. It encompasses assistance for navigating the system (including various programs and organizations, and other non-health sector support services including finance, education and housing) as well as the continuity of care received (e.g., consistent point of contact).

10.7 *Emotional Support*: This component refers to the “extent to which clients feel they are receiving emotional support from [providers]”(80).

D.2.2 Domains and Components at the Health System Level

The following domains and components address evaluation of chronic disease prevention and management from a health system perspective. In other words, these components are meant to evaluate care in a region rather than one organization or program.

11.0 Needs Assessment and Planning

This domain addresses the use of population needs assessments, assessment of current resources (e.g., services, programs, human resources, equipment), and health planning at the system level to ensure adequate chronic disease management across a health region or regions. This will be measured through surveys of relevant system-level respondents (e.g., government ministries and Local Health Integration Networks (LHINs)).

11.1 *Needs Assessment*: This component addresses whether data are used to examine the burden of chronic diseases (e.g., the rate of arthritis, diabetes etc. in the population) and availability of resources for chronic disease management in the population.

11.1.1 *Burden*: This sub-component refers to the use of up-to-date population needs assessments to examine the burden and impact of chronic diseases (by disease and by demographics) in the population.

11.1.2 *Current Resources*: This sub-component refers to the extent to which the availability of current chronic disease management programs and services are

examined to ensure they meet the needs of the population (including both hospital-based and community programs).

11.2 *Health Planning*: This component refers to the existence of formalized processes (e.g., use of strategic planning committees and working groups and health planners) to address gaps in current chronic disease management through the planning of programs or services. This component includes the extent to which clients and family members are involved in needs assessment and planning (e.g., participation in health planning committees).

11.3 *Ongoing Evaluations*: This component addresses the use of ongoing evaluations of the impact of chronic disease management programs (e.g., assessment of changes in health care utilization or the health of the population).

12.0 Access

This domain addresses issues of access to chronic disease management programs and services (wait-times and provider- and client-initiated access for the whole population, including vulnerable groups) from a health systems perspective. The data will be obtained from administrative data, and surveys of patients and providers.

12.1 *Referrals*: This component refers to the utilization of specialist care (specialist care can include physician specialties, other health care providers such as nurses, rehabilitation providers, social workers, etc.) compared with the burden of the chronic disease.

12.2 *Ongoing Access to care*: This component refers to the existence of formalized policies that allow individuals or clients to re-access the system if/when needed.

12.3 *Wait-Times*: This component refers to wait-times for chronic disease management programs, services, and relevant procedures.

13.0 Coordination of Care across the Continuum

This domain addresses the extent of the coordination of care (prevention and management interventions) across the continuum from the system level. This will be measured through surveys of relevant representatives from governments, organizations, and programs.

13.1 *Coordination of Care*: This component refers to the existence and use of policies and processes to facilitate horizontal integration between programs and organizations, between health and non-health sectors (e.g., finance, education, housing), and between programs/organizations and government. This includes policies and procedures that facilitate linkages, coordination, communication, and shared client data.

E. Comment and Next Step

E.1 Comment

This research is the first step in the development of a comprehensive evaluation framework to measure chronic disease management. The research is based on chronic disease models (CCM, ECCM, CDPM), the chronic disease management evaluation literature, other frameworks used for quality improvement purposes (such as the balanced scorecard approach used in evaluation of Ontario hospitals(80)), and expert opinion. Each of these sources of information was used to identify the important components and features of good chronic disease management, which were used to develop the proposed evaluation framework. While some of these elements share names and concepts with elements of the CCM, the ECCM, or the CDPM Framework, many of these areas have been broadened in our proposed evaluation framework to address gaps and limitations or highlight specific concepts.

We identified gaps and limitations in the current chronic disease models and evaluation literature in order to design a more comprehensive evaluation framework. Expert opinion and a review of other evaluation frameworks (e.g., hospital report cards) were important in this step. A detailed description of the identified gaps is provided in section C.5. We have addressed these gaps/limitations as appropriate in the proposed evaluation framework.

People often have more than one chronic condition and require support for disease management across the continuum of care, including the community. To address this, we have included multiple components in a variety of domains to evaluate coordination of care across multiple chronic diseases, providers, organizations, and programs (including health care organizations/programs, the community, and non-health care sectors).

While the individual and his/her family are components in all of the models of chronic disease management, we have emphasized the importance of the individual and his/her family's involvement in chronic disease management by including clients and families in numerous domains and components as appropriate (e.g., client satisfaction and health care design domains).

Given the growing burden of chronic disease and health human resource shortages in Canada (both primary and specialist care), access to care is a major concern. A number of initiatives have been developed to improve access to priority services and measure waiting times. We have addressed the need for an evaluation of access to care in our framework at the system level and organization/program level.

Most of the CCM literature and evaluations have focused on health care institutions such as hospitals and clinics. We have designed the framework so that **both** health care and community programs/organizations will be able to use it to evaluate their chronic disease management programs. In addition, to address the need for a broad, systems-level evaluation of chronic disease management, we included three domains (Needs Assessment and Planning, Access, and Coordination of Care across the Continuum) to be evaluated at the system level.

In this stage of development, all of the domains and components are considered of equal importance. It is recognized that some components may be more important in some organizations, settings or populations, so weighting of components within domains may be necessary in future development.

In summary, the proposed framework is not a new model for chronic disease prevention and management. Rather, it is a guide for the future development of specific measurable indicators and instruments to evaluate chronic disease prevention and management initiatives.

E.2 Next Steps

This report represents only the beginning. Further steps are recommended to further develop the evaluation framework. One of the first steps to ensure a comprehensive evaluation framework is to develop a finance domain and its associated components and sub-component components. While we recognized the importance of a finance domain, due to the limited use of financial outcomes/components in the current chronic disease management program evaluation literature, it was not developed as a part of the proposed framework presented in this report.

Future work could also include an assessment of the feasibility of including broader aspects of prevention and population health in our evaluation framework. The proposed framework encompasses prevention as it relates to the interaction between the health care or community program and the patient. This includes prevention of additional comorbidities (i.e., primary prevention through vaccination programs, smoking cessation programs, etc.), secondary prevention (early identification and treatment of disease), and tertiary prevention, the prevention of disease progression and symptoms (e.g., ensuring people with diabetes have annual foot exams to decrease the need for amputations). While we recognize the importance of prevention addressing the upstream, broad health determinants such as physical and social environments, these issues are beyond the scope of the current framework.

Beyond the addition of any necessary domains/components, the next step in the process is to develop specific measurable indicators and appropriate methods and instruments for the balanced evaluation of the domains/components. Within the proposed evaluation framework, we have included suggested methods of evaluation for each domain (e.g., survey or chart review), and the level of assessment (e.g., health care organization, provider, or patient level) appropriate for the measurement of the components. In addition, where appropriate, we have included examples of common instruments used to evaluate the components. For instance, there are many commonly used, validated instruments to measure both general quality of life (e.g., SF-36) and disease-specific quality of life (e.g., for asthma: the Marks' Asthma Quality of Life Questionnaire). However, validated instruments do not exist to measure all of the components and sub-components that have been developed for this evaluation framework. Thus, it will be necessary to develop or modify instruments and methods for some areas. Since not every domain will be applicable to every program, and programs will need different disease-specific instruments, a general toolbox should be created from which the individual programs or organizations can pick and choose the most relevant and effective methods of evaluation and instruments for their needs.

The final step in the development process is to pilot test the evaluation framework to determine the feasibility, reliability, and acceptability of the instruments, methods of evaluation, and framework. The pilot test would need to include programs and assessments at every level included in the framework: individual health care and community programs; health care and community organizations; and the system level. Results from piloting testing would be used to finalize the framework, methods of evaluation and instruments.

F. Conclusion

As the burden of chronic disease in Canada escalates, the impact on people living with the conditions, their families and society at large is one of the biggest challenges of this century. It has been recognized that the current acute care model of health care is inadequate to meet the needs of people living with a chronic condition. As new models of chronic disease prevention and management evolve to meet the needs of people with chronic diseases, evaluation of these initiatives is critical. This report proposes an evaluation framework for chronic disease prevention and management as a first step in the process of developing methods of evaluation and instruments for measuring chronic disease prevention and management at the program, organization and health system level.

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Appendix A

Table A1: Domains/components/sub-components and the corresponding evidence used to support the evaluation framework

The asterisk (*) refers to the evidence used to support develop of CCM; all of the specific literature used in the development of the CCM is not referenced here. Additional references are included, where appropriate, to support further development of the components of the evaluation framework.

Domains, Indicators, and Components	Evidence
1.0 Organizational Characteristics	
1.1 <i>Leadership</i>	*
1.2 <i>Culture</i>	*
1.2.1 Chronic Disease Prevention and Management Culture	*
1.2.2 Quality Improvement Culture	*
1.2.3 Patient Safety Culture	*
1.3 <i>Use of Evidence in Planning</i>	(82)
2.0 Delivery System Design	
2.1 <i>Practice Team Functioning</i>	*
2.1.1 Team Composition and Roles	*
2.1.2 Communication	(83-86)
2.2 <i>Coordination of Care</i>	*
2.2.1 Planned Visit	*
2.2.2 One-Stop-Shopping	*
2.2.3 Continuity of Care	* (87)
2.3 <i>Client-Centered Care</i>	* (88;89)
2.4 <i>Access to Care with Follow-up</i>	
2.4.1 Wait-times	(90;91)
2.4.2 Organization-Initiated Follow-up	*
2.4.3 Client-Initiated Follow-up	(92;93)
3.0 Linkages	* (94-96)
3.1 <i>Linking between Programs and across Organizations</i>	*
3.1.1 Coordination	* (97-100)
3.1.2 Partnerships	*
3.2 <i>Development of Outside Resources</i>	*
4.0 Information Systems	
4.1 <i>Registry</i>	*
4.2 <i>Reminders/Prompts</i>	*
4.3 <i>Shared Client Data</i>	* (101)
4.3.1 Shared Client Data between Team Members	*
4.3.2 Shared Client Data between Teams, Programs and Organizations	
4.4 <i>Feedback to Clients and Providers</i>	*
4.4.1 Feedback to Clients	*
4.4.2 Feedback to Providers	*
5.0 Provider Decision Support	
5.1 <i>Evidence-based Guidelines and Best Practices</i>	*

Domains, Indicators, and Components	Evidence
5.1.1 Access	(80;102)
5.1.2 Integration into Practice	*
5.1.3 Communication of Guidelines	*
5.2 Provider Education	*
5.3 Access to Specialist Expertise	*
6.0 Self-Management Support	
6.1 Knowledge	* (103-110)
6.2 Self-efficacy	* (111-115)
6.3 Self-Management Assessment	*
6.4 Self-Management Support Strategies	*
7.0 Prevention	
7.1 Preventive Care	(116-122)
7.2 Public Awareness	(84;123-126)
8.0 Clinical Utilization and Outcomes	
8.1 Disease-Specific Clinical Outcomes	(127-130)
8.2 Disease-Specific Process Outcomes	(131-135)
8.3 Health-Related Quality of Life	(136-139)
8.4 Health Care Utilization Data	
8.4.1 Inpatient Service Use	(140-144)
8.4.2 Emergency Room Use	(145-147)
8.4.3 Ambulatory Service Use	(148-151)
8.4.4 Home Care Use	(152;153)
9.0 Provider Perspectives	
9.1 Provider Perspectives	* (84;154-156)
10.0 Client Perspectives	
10.1 Care and Treatment	(80;157)
10.2 Participation in Decision-Making and Goal Setting	(80;158)
10.3 Communication and Education	*
10.4 Family Involvement	(80)
10.5 Access to Care	(159;160)
10.6 Coordination of Care	(80)
10.7 Emotional Support	(80)
11.0 Needs Assessment and Planning	
11.1 Needs Assessment	(161)
11.1.1 Burden	
11.1.2 Current Resources	
11.2 Health Planning	(162;163)
11.2 Ongoing Evaluations	(164)
12.0 Access	
12.1 Referrals	(4;165-168)
12.2 Ongoing Access to Care	Expert opinion; (169)
12.3 Wait-Times	(4;90;170)
13.0 Coordination of Care across the Continuum	
13.1 Coordination of Care	Expert Opinion; (171-175)

Appendix B

Chronic Disease Prevention and Management Model Evaluation Framework

Expert Review Questionnaire

Research is currently being carried out by the Arthritis Community Research and Evaluation Unit (ACREU) in partnership with the Ontario Ministry of Health and Long-Term Care to develop an **evaluation framework** that can be used to evaluate chronic disease prevention and management (CDPM) efforts.

Thirteen areas (domains) of importance for CDPM have been identified and for each domain, a set of indicators have been developed that could be used to evaluate a given program or service. Ten of the domains address chronic disease prevention and management at the level of the health care or community organization, or specific program while three of the domains address chronic disease prevention and management at a health system level (indicated by an asterisk in **Table A2**). One indicator addresses chronic disease prevention and management at both a health care or community organization level and a health system level (indicated by a double asterisk in **Table A2**).

Please refer to **Table A2** for an overview of domains, indicators and indicator components.

Instructions:

While this is a general evaluation framework you are being asked to comment on only one or two domains. Within each domain there are various indicators that can be used to measure CDPM. Some of these indicators have sub-levels or indicator components.

We are asking you to 1) rate the relevance of the indicators for CDPM; 2) identify gaps or missing constructs for each domain, and 3) identify indicators that are currently in use to measure CDPM. The results will be used to refine the domains and indicators that we have developed to ensure a comprehensive CDPM evaluation framework.

Table A2. Domains and Indicators for Chronic Disease Prevention and Management Model Program Evaluation

Domains, Indicators and Components
Organizational Characteristics
1. <i>Leadership</i>
2. <i>Culture</i>
a. Quality Improvement Culture
b. Patient Safety Culture
c. Dissemination of Organizational Values
Delivery System Design
1. <i>Practice Team Functioning</i>
a. Team Composition and Roles
b. Communication
2. <i>Linkages</i>
3. <i>Access to Care with Follow-up</i>
a. Wait-times
b. Organization-Initiated Follow-up
c. Client-Initiated Follow-up
4. <i>Coordination of Care</i>
a. Planned Visit
b. One-Stop-Shopping
c. Continuity of Care
5. <i>Client-Centered Care</i>
Decision Support
1. <i>Evidence-based Guidelines and Best Practices</i>
a. Access
b. Integration into Practice
c. Communication of Guidelines
2. <i>Provider Education</i>
3. <i>Access to Specialist Expertise</i>
Information Systems
1. <i>Registry</i>
2. <i>Reminders/Prompts</i>
3. <i>Shared Client Data</i>
a. Shared Client Data between Team Members
b. Shared Client Data between Teams and Organizations
4. <i>Feedback to Clients and Providers</i>
a. Feedback to Clients
b. Feedback to Providers
Self-Management Support
1. <i>Knowledge</i>
2. <i>Self-efficacy</i>
3. <i>Self-Management Assessment</i>
4. <i>Self-Management Support Strategies</i>
Community Linkages
1. <i>Linking clients to Outside Resources</i>
a. Coordination
b. Partnerships

Domains, Indicators and Components
2. <i>Development of Outside Resources</i>
Clinical Utilization and Outcomes
1. <i>Disease-Specific Clinical Outcomes</i>
2. <i>Disease-Specific Process Outcomes</i>
3. <i>Health-Related Quality of Life</i>
4. <i>Health Care Utilization Data</i>
a. <i>Inpatient Service Use</i>
b. <i>Emergency Room Use</i>
c. <i>Ambulatory Service Use</i>
Prevention
1. <i>Preventive Care</i>
2. <i>Public Awareness**</i>
Client Perspectives
1. <i>Care and Treatment</i>
2. <i>Participation in Decision-Making and Goal Setting</i>
3. <i>Communication and Education</i>
4. <i>Family Involvement</i>
5. <i>Access to Care</i>
6. <i>Coordination of Care</i>
7. <i>Emotional Support</i>
Provider Perspectives
1. <i>Provider Perspectives</i>
Needs Assessment and Planning*
1. <i>Needs Assessment</i>
a. <i>Burden</i>
b. <i>Current Resources</i>
2. <i>Health Planning</i>
3. <i>Ongoing Evaluations</i>
Access*
1. <i>Referrals</i>
2. <i>Wait-Times</i>
3. <i>Re-Access</i>
Coordination of Care across the Continuum*
1. <i>Coordination of Care</i>

* Health system level

** Organizational and health system levels

Review of the Chronic Disease Prevention and Management Model Evaluation Framework

Please review the domain(s) that you have been assigned in the accompanying background document, which you received by email: ***Domains and Indicators for Chronic Disease Prevention and Management Model Program Evaluation***, and answer the following questions:

1. Relevance

Using the 5-point framework provided, for each domain, *indicator* and indicator component in the Chronic Disease Prevention and Management Model Evaluation Framework below, please **rate** how **relevant** the construct of interest is to evaluate chronic disease prevention and

management. Relevance is defined as how appropriate, important, pertinent or applicable this information is to evaluate chronic disease prevention and management.

A. ORGANIZATIONAL CHARACTERISTICS

a. How relevant is the domain of **organizational characteristics** to evaluate chronic disease prevention and management?

Domain: Organizational Characteristics

Organizational characteristics addresses an organization’s attitudes, experiences, beliefs, values, and norms that are shared by an organization’s members and affects the way members interact with each other and with external stakeholders which promotes and supports safe, high quality chronic disease care across chronic diseases.

1	2	3	4	5
Not at all relevant			Completely relevant	

b. How relevant are the following indicators to capture the domain of **organizational characteristics**?

Indicator: Leadership

This indicator measures senior leadership support for chronic disease prevention and management, quality improvement, and client-centered care through funding and resources. It also evaluates whether leaders visibly participate in efforts to implement or improve chronic disease prevention and management, and whether specific people are held accountable for chronic disease prevention and management and its integration with the organization or community program’s long-term strategy, mission, and vision.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Culture

This indicator evaluates the organization or community program’s formal policies and processes to foster a culture of quality improvement (QI) and patient safety.

1	2	3	4	5
Not at all relevant			Completely relevant	

c. How relevant are the following indicator components to capture the indicator of *culture*?

Indicator component: Quality Improvement Culture

The existence of formal policies and procedures to foster a culture of continuous quality improvement.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: Patient Safety Culture

The existence of formal policies and procedures to foster patient safety.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator component: Dissemination of Organizational Values

Whether the organization or community program's members (at all levels) are aware of and understand the Chronic Disease Prevention and Management Model, QI, and patient safety goals and policies as relevant to their position.

1	2	3	4	5
Not at all relevant				Completely relevant

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **organizational characteristics**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **organizational characteristics**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
--

B. DELIVERY SYSTEM DESIGN

a. How relevant is the domain of **delivery system design** to evaluate chronic disease prevention and management?

Domain: Delivery System Design

Delivery system design refers to the way in which chronic disease care is organized and carried out to assure delivery of effective, efficient chronic disease care and self-management support in health care organizations and community programs. Client perspectives on these indicators are addressed in the Client Perspectives Domain.

1	2	3	4	5	
Not at all relevant				Completely relevant	

b1. How relevant is the following indicator to capture the domain of **delivery system design**?

Indicator: Practice Team Functioning

The functioning of individual teams and inter-team work through team roles, communication, and horizontal collaboration. Teams may include formal health care teams and designated community partnerships to address chronic disease.

1	2	3	4	5	
Not at all relevant				Completely relevant	

c1. How relevant are the following indicator components to capture the indicator of *practice team functioning*?

Indicator component: Team composition and roles

The use of multidisciplinary teams for education and service delivery; clearly defined roles for team members; and the distribution of tasks across team members and across teams.

1	2	3	4	5	
Not at all relevant				Completely relevant	

Indicator component: Communication

Mechanisms to promote information exchange and collaboration among team members (e.g., existence of regular team meetings), among teams within an organization, among various health care organizations, and between health care organizations and community programs.

1	2	3	4	5	
Not at all relevant				Completely relevant	

b2. How relevant are the following indicators to capture the domain of **delivery system design**?

Indicator: Linkages

The presence of formal linkages between health care organizations, between community programs, and between health care organizations and community programs and relevant disease-specific programs, as well as formal mechanisms to help individuals navigate the system to ensure appropriate referrals to health care or community providers or programs.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Access to Care with Follow-up

Timely access as assessed by wait-times and the ability to re-access programs and services through organization- or individual/client-initiated follow-up.

1	2	3	4	5
Not at all relevant			Completely relevant	

c2. How relevant are the following indicator components to capture the indicator of *access to care with follow-up*?

Indicator component: Wait-times

Whether wait-times for and during an appointment are reasonable and prioritized.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: Organization-Initiated Follow-up

Whether pro-active follow-up exists and is customized to client needs, which may vary in intensity and by methodology (e.g., by phone, in person, or by email).

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: Client-Initiated Follow-up

Whether policies and procedures are in place to ensure that individuals are able to easily initiate an appointment or re-access the system if/when needed.

1	2	3	4	5
Not at all relevant			Completely relevant	

b3. How relevant is the following indicator to capture the domain of **delivery system design**?

Indicator: Coordination of Care

The extent that care (prevention and management interventions) is coordinated for individual clients to ensure integrated and comprehensive care that is planned, pro-active, and includes mechanisms to ensure that plans are followed properly.

1	2	3	4	5
Not at all relevant			Completely relevant	

c3. How relevant are the following indicator components to capture the indicator of *coordination of care*?

Indicator component: Planned visit

Whether providers or provider-teams plan processes to be performed during a visit and prepare for the visit in advance (e.g., soliciting test and reviewing data).

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: One-Stop-Shopping

The presence of a formal process (e.g., appointment system) to facilitate individuals seeing multiple providers or participating in multiple prevention and/or management programs or services in a single visit.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: Continuity of care (prevention and management programs and services)

Whether there is a formal process to ensure continuity of providers or provider-teams involved in individual client care/programming (e.g., is there one consistent point of contact for the individual such as a case manager or primary care physician).

1	2	3	4	5
Not at all relevant			Completely relevant	

b4. How relevant is the following indicator to capture the domain of **delivery system design**?

Indicator: Client-Centered Care

The extent to which prevention and management at the individual client level is being provided using the client-centered approach. This indicator will measure aspects of client-centered care such as the dissemination of results to clients and incorporation of results into prevention and management, mechanisms for client involvement in decision-making and goal setting, provision of client-centered and family-centered education, mechanisms for family involvement, and emotional support mechanisms for clients, family, and staff.

1	2	3	4	5
Not at all relevant			Completely relevant	

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **delivery system design**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **delivery system design**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
--

C. DECISION SUPPORT

a. How relevant is the domain of **decision support** to evaluate chronic disease prevention and management?

Domain: Decision Support

Provider decision supports improve the quality of chronic disease prevention and management by integrating practice guidelines or protocols into daily practice, supported by effective provider training and behavioral change methods to promote chronic disease prevention and management that is consistent with scientific evidence and client preferences.

1	2	3	4	5	
Not at all relevant				Completely relevant	

b1. How relevant is the following indicator to capture the domain of **decision support**?

Indicator: Evidence-Based Guidelines and Best Practices

The extent to which an organization or community program fosters evidence-based practice (EBP) (i.e. providers' access to scientific literature, EBP integration into daily practice, and communication of guidelines with clients or participants).

1	2	3	4	5	
Not at all relevant				Completely relevant	

c. How relevant are the following indicator components to capture the indicator of *evidence-based guidelines and best practices*?

Indicator component: Access

A program's access to current scientific literature and evidence-based guidelines and best practices, as well as professional development opportunities in EBP and mechanisms to support knowledge translation to enable providers to make decisions based on scientific evidence.

1	2	3	4	5	
Not at all relevant				Completely relevant	

Indicator component: Integration into Practice

Whether guidelines and best practices are embedded into daily practice.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: Communication of Guidelines

Whether providers share relevant guidelines with clients or participants.

1	2	3	4	5
Not at all relevant			Completely relevant	

b2. How relevant are the following indicators to capture the domain of **decision support**?

Indicator: Provider Education

Providers' access to continuing education using proven techniques to promote and support effective chronic disease prevention and management.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Access to Specialist Expertise

Providers' access to specialist expertise through joint or shared assessment of individuals and/or communication between routine care providers and those with specialist expertise to increase the capacity of providers.

1	2	3	4	5
Not at all relevant			Completely relevant	

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **decision support**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **decision support**. This may include

indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>

D. INFORMATION SYSTEMS

a. How relevant is the domain of **information systems** to evaluate chronic disease prevention and management?

Domain: Information Systems

Information systems allow an organization or community program to organize client or participant data to facilitate efficient and effective chronic disease prevention and management across the continuum. Information systems need to be fully integrated to ensure client or participant information is accessible to all members of the practice team and effectively linked across practice teams, health care organizations, and community programs in order to support case management and care coordination; and to improve decisions about chronic disease care.

1	2	3	4	5
Not at all relevant				Completely relevant

b1. How relevant are the following indicators to capture the domain of **information systems**?

Indicator: Registry

The existence and use of client registries (general or disease-specific) to ensure efficient and adequate prevention and management. This might include use of a registry to track clients and plan interventions (e.g., reminder calls) and integration of registries across chronic diseases.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Reminders/Prompts

The existence and use of prompts and reminders (either electronic or paper-based) to ensure timely and appropriate prevention and management, based on evidence-based guidelines and best practices (e.g., for diabetes, reminders to refer client for annual foot and retinal exams).

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Shared Client Data

The integration of information systems to ensure that all team members, practice teams, organizations, and community programs have access to participant or client data as necessary to perform their role in the client's chronic disease prevention and management.

1	2	3	4	5
Not at all relevant				Completely relevant

c1. How relevant are the following indicator components to capture the indicator of *shared client data*?

Indicator component: Between team members

Whether everyone on a practice team has access to the client information needed to deliver planned prevention and management programs and services.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator component: Between teams and organizations

Whether information systems are integrated among practice teams, organizations, and community programs to allow efficient sharing of client data. This includes whether providers have access to comprehensive information about an individual's health (including all health issues and conditions).

1	2	3	4	5
Not at all relevant				Completely relevant

b2. How relevant is the following indicator to capture the domain of **information systems**?

Indicator: Feedback to Clients and Providers

Whether feedback is given to both participants/clients and providers regarding their health and quality of care, respectively.

1	2	3	4	5
Not at all relevant				Completely relevant

c2. How relevant are the following indicator components to capture the indicator of *feedback to clients and providers*?

Indicator component: Feedback to Clients

Whether individuals are provided with helpful and timely feedback concerning their health including things such as screening and test results and progress.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator component: Feedback to Providers

Whether an organization or community program gives feedback to providers regarding their performance and quality of care or service including adherence with guidelines and client

outcomes. This may also include a comparison of outcomes across providers in a clinic, hospital or program.

1	2	3	4	5
Not at all relevant			Completely relevant	

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **information systems**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **information systems**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
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E. SELF-MANAGEMENT SUPPORT

a. How relevant is the domain of **self-management support** to evaluate chronic disease prevention and management?

Domain: Self-Management

Self-management support empowers and prepares individuals and families to effectively manage their health and health care.

1	2	3	4	5
Not at all relevant			Completely relevant	

b. How relevant are the following indicators to capture the domain of **self-management support**?

Indicator: Knowledge

An individual's knowledge about his/her chronic condition(s), self-management skills, and healthy lifestyle skills (e.g., diet and exercise).

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Self-Efficacy

Our belief in our ability to succeed in specific situations. This indicator will measure a client's confidence in managing their condition(s).

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Self-Management Assessment

Whether providers regularly collaborate with the individual to set self-management goals and review and document the individual's self-management skills and goals to promote and support ongoing self-management and adherence to evidence-based guidelines.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Self-Management Support Strategies

Whether the organization or community program offers and/or refers clients to external or internal self-management programs and peer support programs including behaviour modification programs.

1	2	3	4	5
Not at all relevant				Completely relevant

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **self-management support**. If there are no gaps, please check 'Not Applicable'.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>
<p>Indicator components – Please list and define/describe and specify the indicators to which they refer:</p> <p><input type="checkbox"/> Not Applicable</p>

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **self-management support**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>

F. COMMUNITY LINKAGES

a. How relevant is the domain of **community linkages** to evaluate chronic disease prevention and management?

Domain: Community Linkages

Community linkages refers to the partnerships and coordination of health care organizations with community programs and other resources to ensure optimal utilization of community resources(25) for effective, efficient chronic disease prevention and management.

1	2	3	4	5
Not at all relevant				Completely relevant

b1. How relevant is the following indicator to capture the domain of **community linkages**?

Indicator: Linking Clients to Outside Resources

The coordination and partnerships between health care organizations and community resources.

1	2	3	4	5
Not at all relevant				Completely relevant

c. How relevant are the following indicator components to capture the indicator of *linking clients to outside resources*?

Indicator component: Coordination

Whether mechanisms or processes exist for active coordination (i.e. cooperation, collaboration and working together) between the organization and community programs. This also includes formal mechanisms to help clients navigate the system to ensure appropriate referrals to health care or community providers or programs and seeking expert advice of communities as indicated.

1	2	3	4	5	
Not at all relevant				Completely relevant	

Indicator component: Partnerships

The existence of formalized programs, policies and networks across organizations and community programs.

1	2	3	4	5	
Not at all relevant				Completely relevant	

b2. How relevant is the following indicator to capture the domain of **community linkages**?

Indicator: Development of Outside Resources

Participation in the development of outside resources, general (e.g., diet and exercise) and disease-specific, as needed.

1	2	3	4	5	
Not at all relevant				Completely relevant	

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **community linkages**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **community linkages**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
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G. CLINICAL UTILIZATION AND OUTCOMES

a. How relevant is the domain of **clinical utilization and outcomes** to evaluate chronic disease prevention and management?

Domain: Clinical Utilization and Outcomes

Clinical utilization and outcomes addresses client health outcomes and health care utilization.

1	2	3	4	5
Not at all relevant				Completely relevant

b. How relevant are the following indicators to capture the domain of **clinical utilization and outcomes**?

Indicator: Disease-Specific Clinical Outcomes

The actual values obtained from clinical tests or assessments (by participant/client or provider). The disease-specific clinical outcomes indicator will be informed by data measuring: symptoms and functional outcomes (such as pain and activities of daily living); health status (such as days of restricted activity and days of school missed); and clinical outcomes (e.g., for diabetes, clinical outcomes would include hemoglobin A1c levels, blood pressure, and low density lipoprotein cholesterol levels).

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Disease-Specific Process Outcomes

The proportion of clients in a practice that meet specific guidelines or benchmarks. (e.g., for diabetes, the proportion of clients with a foot exam in the past 12 months).

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Health-Related Quality of Life (HRQoL)

Measures of disease-specific and general quality of life.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Health Care Utilization Data

Inpatient service use, emergency room use and ambulatory service use

1	2	3	4	5
Not at all relevant			Completely relevant	

c. How relevant are the following indicator components to capture the indicator of *health care utilization data*?

Indicator component: Inpatient service use

Measures such as the number of hospital admissions and length of stay.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: Emergency room use

Measures such as the number of emergency room visits.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator component: Ambulatory service use

Measures such as the number of visits to any health care provider, including the number of primary care visits, specialist visits, and visits with non-physician health professionals such as RNs, PTs, OTs, social workers.

1	2	3	4	5
Not at all relevant			Completely relevant	

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **clinical utilization and outcomes**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **clinical utilization and outcomes**. This

may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>

H. PREVENTION

a. How relevant is the domain of **prevention** to evaluate chronic disease prevention and management?

Domain: Prevention

Prevention refers to maintaining health and preventing diseases from occurring as well as preventing diseases from progressing following diagnosis and minimizing disability. It also includes a valuing of the health determinants that affect health and the risk factors common to a number of chronic diseases when providing programs and services to individuals.

1	2	3	4	5
Not at all relevant				Completely relevant

b. How relevant are the following indicators to capture the domain of **prevention**?

Indicator: Preventive Care

The extent of provision of key preventive services (e.g., rate of pneumococcal vaccination, annual influenza vaccination rate in seniors, and proportion of individuals who received healthy lifestyle counselling, such as smoking cessation, diet or exercise counselling and improved risk factor screening).

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Public Awareness

Use of chronic disease public awareness strategies to address education about diseases and their risk factors and available services for chronic disease prevention and management. It may be done by organizations or at the health system level.

1	2	3	4	5
Not at all relevant				Completely relevant

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **prevention**. If there are no gaps, please check 'Not Applicable'.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>
<p>Indicator components – Please list and define/describe and specify the indicators to which they refer:</p> <p><input type="checkbox"/> Not Applicable</p>

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **prevention**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check ‘Not Applicable’.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>

I. CLIENT PERSPECTIVES

a. How relevant is the domain of **client perspectives** to evaluate chronic disease prevention and management?

Domain: Client Perspectives

Client-centered care is an approach to prevention and management that embraces a philosophy and respect for and partnership with people receiving services and will be measured from the individual’s or client’s perspectives.

1	2	3	4	5
Not at all relevant				Completely relevant

b. How relevant are the following indicators to capture the domain of **client perspectives**?

Indicator: Care and Treatment

The outcomes and quality of prevention and management interventions received from the individual’s or client’s perspective.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Participation in Decision-Making and Goal Setting

The extent to which clients and family are included in decision-making and goal setting.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Communication and Education

The quality of communication and education received as well as the extent to which it reflected their needs and cultural background.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Family Involvement

The extent to which families are involved in chronic disease prevention and management. This includes provision of support and information to families.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Access to Care

The accessibility of care (prevention and management interventions) from the individual's or client's perspective by measuring timely access through wait-times and the ability to re-access care through organization- or individual/client-initiated follow-up.

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Coordination of Care

The extent to which an individual's or client's care (prevention and management interventions) was coordinated and assistance required in navigating the system (both health care and community programs) as well as the continuity of care received (e.g., consistent point of contact).

1	2	3	4	5
Not at all relevant			Completely relevant	

Indicator: Emotional Support

The "extent to which individuals or clients feel they are receiving emotional support from [providers]."

1	2	3	4	5
Not at all relevant			Completely relevant	

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **client perspectives**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **client perspectives**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check ‘Not Applicable’.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
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J. PROVIDER PERSPECTIVES

a. How relevant is the domain of **provider perspectives** to evaluate chronic disease prevention and management?

Domain: Provider Perspectives

Provider perspectives refers to obtaining information from providers through the use of employee satisfaction measures as well as implementing the results or outcomes of these surveys for program improvement.

1	2	3	4	5
Not at all relevant				Completely relevant

b. How relevant is the following indicator to capture the domain of **provider perspectives**?

Indicator: Provider Perspectives

From an organization perspective, this indicator will address the frequency of provider satisfaction measurements, and whether the results are disseminated to providers and integrated into quality improvement and program planning initiatives. From the provider perspective, this indicator will include measures of employee satisfaction such as satisfaction with: feedback regarding chronic disease prevention and management, quality improvement, and patient safety efforts; and communication and role distribution across team-members and partnerships with community programs.

1	2	3	4	5
Not at all relevant				Completely relevant

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **provider perspectives**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **provider perspectives**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
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K. NEEDS ASSESSMENT AND PLANNING

a. How relevant is the domain of **needs assessment and planning** evaluate chronic disease prevention and management?

Domain: Needs Assessment and Planning

Needs assessment and planning refers to the use of population needs assessments and assessments of current resources and health planning by the system to ensure adequate chronic disease prevention and management across a health region or regions.

1	2	3	4	5	
Not at all relevant				Completely relevant	

b1. How relevant is the following indicator to capture the domain of **needs assessment and planning**?

Indicator: Needs Assessment

Needs assessment would evaluate the burden of chronic diseases and availability of resources for chronic disease prevention and management in the population.

1	2	3	4	5
Not at all relevant				Completely relevant

c. How relevant are the following indicator components to capture the indicator of *needs assessment*?

Indicator component: Burden

The use of up-to-date population needs assessments to examine the burden and impact of chronic diseases (by disease and by demographics) in the population.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator component: Current Resources

The extent to which the availability of current chronic disease prevention and management resources (programs and services) are examined to ensure they meet the needs of the population (including both hospital-based and community programs).

1	2	3	4	5
Not at all relevant				Completely relevant

b2. How relevant is the following indicator to capture the domain of **needs assessment and planning**?

Indicator: Health Planning

The existence of formalized processes to address gaps in current chronic disease prevention and management through the planning of programs or services.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Ongoing evaluations

The use of ongoing evaluations of the impact of chronic disease prevention and management programs (e.g., assessment of changes in health care utilization or the health of the population).

1	2	3	4	5
Not at all relevant				Completely relevant

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing *indicators* and/or *indicator components* you think are important to include that relate to **needs assessment and planning**. If there are no gaps, please check 'Not Applicable'.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>
<p>Indicator components – Please list and define/describe and specify the indicators to which they refer:</p> <p><input type="checkbox"/> Not Applicable</p>

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **needs assessment and planning**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

<p>Indicators – Please list and define/describe:</p> <p><input type="checkbox"/> Not Applicable</p>

L. ACCESS

a. How relevant is the domain of **access** to evaluate chronic disease prevention and management?

Domain: Access

Issues of access to chronic disease prevention and management (wait-times and provider- and patient-initiated access) from a health systems perspective.

1	2	3	4	5
Not at all relevant				Completely relevant

b. How relevant are the following indicators to capture the domain of **access**?

Indicator: Referrals

The utilization of specialist care (specialist care can include physician specialties, non-physician providers such as nurses, rehabilitation providers, social workers, etc.) compared with the burden of the chronic disease.

1	2	3	4	5
Not at all relevant				Completely relevant

Indicator: Wait-Times

Wait-times for chronic disease prevention and management programs, services, and relevant procedures.

1	2	3	4	5	
Not at all relevant				Completely relevant	

Indicator: Re-Access

The existence of formalized policies that allow individuals or clients to re-access the system if/when needed.

1	2	3	4	5	
Not at all relevant				Completely relevant	

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **access**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **access**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
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M. COORDINATION OF CARE ACROSS THE CONTINUUM

a. How relevant is the domain of **coordination of care across the continuum** to evaluate chronic disease prevention and management?

Domain: Coordination of Care Across the Continuum

Coordination of care across the continuum relates to the extent of the coordination of care (prevention and management interventions) across the continuum at the system-level.

1	2	3	4	5
Not at all relevant				Completely relevant

b. How relevant are the following indicators to capture the domain of **coordination of care across the continuum**?

Indicator: Coordination of Care

The existence and use of policies and processes to facilitate horizontal integration among programs (both hospital-based and community programs), and between programs and government. This includes those that facilitate linkages, coordination, communication and shared client data.

1	2	3	4	5
Not at all relevant				Completely relevant

d. Please identify any **gaps** in the Chronic Disease Prevention and Management Model Evaluation Framework by describing any missing **indicators** and/or **indicator components** you think are important to include that relate to **coordination of care across the continuum**. If there are no gaps, please check 'Not Applicable'.

Indicators – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

e. Please describe any **indicators** you are aware of that are **currently being used** by programs, organizations or health systems to capture **coordination of care across the continuum**. This may include indicators identified in our document or gaps you identified in the previous question. If you are not aware of any indicators currently being used, please check 'Not Applicable'.

Indicators – Please list and define/describe:
 Not Applicable

2. Gaps

Please refer to the domains in the Chronic Disease Prevention and Management Evaluation Framework document. After reviewing the list of all domains, indicators and indicator components, please identify *and* describe any additional missing **domains** you think are important to include. Please also identify any **indicators** and/or **indicator components** you think apply to that domain. If there are no gaps, please check 'Not Applicable'.

Domains – Please list and define/describe: <input type="checkbox"/> Not Applicable
Indicators – Please list and define/describe and specify the domains to which they refer: <input type="checkbox"/> Not Applicable
Indicator components – Please list and define/describe and specify the indicators to which they refer: <input type="checkbox"/> Not Applicable

3. Additional Comments

Do you have any additional comments?

Thank you! We appreciate your time and feedback!

Appendix C

Table A3: Rand Coding

CCM ELEMENT	Level 2	Level 3
Delivery System Redesign	Care Management Roles	Increase physicians' role for care management
		Increase non-physicians' role for care management
		Increase existing care managers' role
		Specify a new role of care management to a non-physician
		Other
	Team Practice	Specify practice team
		Specify practice team activities
		Other
	Care Delivery/Coordination	Coordinate care/communication among providers and/or across settings
		Delegate care from physician to non-physician
		Other
	Proactive Follow-up	Follow-up with patients for scheduling, reassessment, or treatment
		Coordinate/consult with other providers
		Other
	Planned Visit	Plan/Structure processes to be performed during visit
Prepare for the visit in advance (e.g., soliciting tests, reviewing data)		
Visit System Change	Provide group visit	
	Provide phone visit	
	Provide home visit	
	Provide back-to-back scheduling	
	Coordination/schedule appointments with other providers	
	Streamline appointment system	
	Relocate service	
Other		
Self-Management Strategies	Patient Education	Education materials provided
		Person-to-person education provided (including in-person, telephone, group classes)
		Referral provided
	Patient Activation / psychosocial support	Other
		Use motivational interviewing techniques
	Prepare patient for clinical visit (e.g., questions or preview of issues)	
	Apply other specific behavior change strategies to assist self-management	

		Provide psychosocial support (including support group)	
		Tailor self-management strategies to individual patients	
		Other	
	Self-management assessment	Assess readiness to self-manage	
		Assess self-management skills and needs	
	Self-management support	Offer self-management guidance (e.g., cooking classes, label reading)	
		Provide self-management tool (e.g., weight log, weight scale, CHF calendar, reminder)	
		Collaborate with other provider resources to provide self-management support	
		Offer patient incentives to improve care and adhere to guidelines	
		Other	
	Collaborative decision making with patients	Forms/prompts/tools for collaboration provided (to provider and/or patient)	
		Patient participates in defining problems	
		Patient preferences for treatment solicited	
		Patient participates in planning (action plans, targets, priorities, contracts) over and above stating treatment preferences	
		Patient participates in evaluating progress and goals	
		Other	
	Guidelines available to patients	On routine basis (e.g., through patient education materials or in organization publications)	
		On patient request	
Decision Support and Expert System	Institutionalization of guidelines, protocols, or prompts	Guide clinical decisions (e.g., diagnostics, therapy)	
		Guide self-management support (e.g., patient activation, education)	
		Guide individualized care planning	
		Guide other care management activities (e.g., planned visit, follow-up)	
		Guide coordination of care	
			Other
	Provider Education	Educational materials provided	
		Lectures, in-services, seminars, CME courses	
		Academic detailing, individual visits. Promotion by opinion leaders	
			Other
Expert Consultation Support	Facilitate specialty / expert consultation on individual cases		
		Facilitate practice consultation by experts	
Information Support	Patient Registry System	Primarily for identification of patient population	
		Fuller registry system (includes additional data e.g. on risk, treatment, or outcomes)	

		Other
	Use of information for care management	Implement / improve data support for planned visit, care planning, management, and/or reassessment
		Provide data collection tools
		Share data and or care plan with other providers
		Provide Reminders for care planning and management
		Other
	Provision of Performance Data	Feedback of provider-specific data
		Provide group / organization-specific data for QI monitoring (e.g., outcome measures)
Community Linkages	For Patients	Provide information on or refer to community resources to support patient needs
		Seek community resources or collaborate with community to meet patient/population needs
		Provide services or program for members at community level
		Other
	For Community	Provide services or program for community
		Collaborate with community to meet community needs
Other		
Health Systems Support	Leadership Support	Acquire leadership support for chronic care improvement
		Acquire resources for chronic care changes
		Other
	Provider Participation	Offer incentives to providers to improve care and adhere to guidelines
		Acquire / increase providers' participation to support chronic care changes (e.g., marketing/buy-in)
		Other
	Coherent System Improvement Including Spread	Coordinate chronic care improvement with formal QI efforts
		Participate in IHI-type QI efforts
		Coordinate/communicate among subsystems
Spread QI successes		
		Other

Source: Pearson, M.L.; Wu, S.; Schaefer, J.; Bonomi, A.E.; Shortell, S.M.; Mendel, P.J.; Marsteller, J.A.; Louis, T.A.; Rosen, M.; Keeler, E. Assessing the Implementation of the Chronic Care Model in Quality Improvement Collaboratives: Methods Appendix. Working Paper.