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**Rapid Synthesis:  
Comparing Multi-component Chronic-disease Programs to  
Disease-specific Programs**

21 May 2015

#### McMaster Health Forum

For concerned citizens and influential thinkers and doers, the McMaster Health Forum strives to be a leading hub for improving health outcomes through collective problem solving. Operating at regional/provincial levels and at national levels, the Forum harnesses information, convenes stakeholders, and prepares action-oriented leaders to meet pressing health issues creatively. The Forum acts as an agent of change by empowering stakeholders to set agendas, take well-considered actions, and communicate the rationale for actions effectively.

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#### Timeline

Rapid syntheses can be requested in a three-, 10- or 30-business day timeframe. This synthesis was prepared over a 30-business day timeframe. An overview of what can be provided and what cannot be provided in each of the different timelines is provided on the McMaster Health Forum's Rapid Response program webpage (<http://www.mcmasterhealthforum.org/policymakers/rapid-response-program>).

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#### Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the rapid synthesis. The funder played no role in the identification, selection, assessment, synthesis or presentation of the research evidence profiled in the rapid synthesis.

#### Merit review

The rapid synthesis was reviewed by a small number of policymakers, stakeholders and researchers in order to ensure its scientific rigour and system relevance.

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## KEY MESSAGES

### Question

- How effective are multi-component chronic-disease programs (i.e., those including several strategies and focused on managing chronic diseases in general, rather than one specific disease) compared to disease-specific programs, particularly diabetes-specific programs, at improving health outcomes and the patient experience?
- In restructuring or reorganizing disease-specific programs into multi-component chronic-disease programs, what referral/transition, training and other supports are needed to ensure (seamless) integration (from a patient and provider perspective)?

### Why the issue is important

- The provincial Chronic Disease Prevention and Management strategy began with a focus on diabetes (Ontario Diabetes Strategy, 2008-2012, and renewed until 2016) with a stated intention to expand beyond diabetes to a broader chronic-disease management approach.
- However, to determine whether it would be beneficial to evolve diabetes programs into more generalized chronic-disease prevention and management models, there is a need to review evidence that compares the effectiveness of general chronic-disease programs to disease-specific programs.

### What we found

- We did not identify any systematic reviews that directly address the first question, but we identified:
  - one overview of systematic reviews, 10 systematic reviews and one primary study evaluating the implementation and/or elements of general chronic-disease programs and interventions;
  - one overview of systematic reviews, four systematic reviews and one cost-effectiveness study focusing on diabetes-specific programs and interventions; and
  - three systematic reviews that identified barriers to and supports for general chronic-disease programs.
- *Multi-component chronic-disease programs (question 1):*
  - The included reviews focused on four groups of programs/interventions: 1) Chronic Care Model (CCM); 2) collaborative care models; 3) integrated/comprehensive care programs; and 4) other multi-component chronic-disease management interventions.
  - The reviews found a range of benefits related to an array of clinical- and process-related outcomes across different chronic diseases and settings, and key findings include:
    - as part of the CCM, delivery-system and self-management support interventions had somewhat strong effects on improving clinical and process-of-care outcomes; and
    - interventions targeted at specific combinations of common conditions/issues for patients with multiple chronic conditions are likely to be more effective than those targeted at specific diseases.
- *Disease-specific programs focused on diabetes (question 1):*
  - A recent overview of systematic reviews found consistent evidence from high-quality reviews that patient education and support, provider role changes, and telemedicine improved glycemic control and vascular risk factors.
  - The same overview also found evidence from high-quality reviews that multi-component interventions have been found to improve patient self-management outcomes (glycemic control and cholesterol levels) as well as process-of-care behaviours (HbA1c and retinopathy monitoring) compared to usual care or other intervention(s).
- *Referral/transition, training and other supports needed to ensure integration (question 2):*
  - Findings from reviews highlight the importance of finding common ground between patients and providers (e.g., through sharing of power and responsibility for multiple chronic diseases), and that policy and programming related to self-management support should be aligned with achieving overall patient goals (e.g., by addressing common functional challenges identified by patients with multiple chronic diseases), rather than targeted to the control of one specific condition.
  - Key facilitators to the implementation of CCM models include: supporting strong networks and increased communication between healthcare providers and organizations; fostering an organizational culture that promotes multidisciplinary and patient-centred care. and recognizes and commits to organizational and provider change efforts; making structural and policy changes (e.g., expanding scope of practice of non-physician staff); engaging goal-directed and supportive leadership (e.g., appointing an ‘intervention champion’ to promote the uptake of the CCM); and increasing provider knowledge about CCM interventions and their effectiveness.

## **QUESTIONS**

- How effective are multi-component chronic-disease programs (i.e., those including several strategies and focused on managing chronic diseases in general, rather than one specific disease) compared to disease-specific programs, particularly diabetes-specific programs, at improving health outcomes and the patient experience?
- In restructuring or reorganizing disease-specific programs into multi-component chronic-disease programs, what referral/transition, training and other supports are needed to ensure (seamless) integration (from a patient and provider perspective)?

## **WHY THE ISSUE IS IMPORTANT**

The provincial Chronic Disease Prevention and Management Strategy from 2008-12 (and then renewed until 2016) began with a focus on diabetes.<sup>(1)</sup> The strategy had a stated intention to expand beyond diabetes to a broader chronic-disease management approach. However, to determine whether it would be beneficial to evolve diabetes programs into more generalized chronic-disease prevention and management models, there is a need to review evidence that compares the effectiveness of general chronic-disease programs to disease-specific programs.

## **WHAT WE FOUND**

We did not identify any systematic reviews that directly address the first question. However, while not directly relevant to the first question, we identified one overview of systematic reviews, 10 systematic reviews and one primary study evaluating or describing the implementation and/or elements of general chronic-disease programs and interventions. We also identified one overview of systematic reviews, four systematic reviews and one cost-effectiveness study focusing on diabetes-specific programs and interventions that provided insight for question one. For the second question, we found three relevant systematic reviews identifying barriers to and supports for general chronic-disease programs, two from the perspective of providers and one from the perspective of patients. We provide below a summary of the research evidence that we identified related to each of these areas. Details of each of the reviews and primary studies that we identified are provided in Appendices 1 and 2.

### **Multi-component chronic-disease management programs and interventions (question 1)**

Multi-component chronic-disease management models/programs are designed to improve care in health systems at the community, organization, practice and patient levels. Despite variance in nomenclature, these models/programs integrate a number of substantially overlapping elements and interventions for the management of chronic illnesses across the care continuum. The reviews we identified related to multi-component chronic-

#### **Box 1: Background to the rapid synthesis**

This rapid synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid synthesis summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies, and to synthesize data from the included studies. The rapid synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

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This rapid synthesis was prepared over a 30-business day timeframe and involved five steps:

- 1) submission of a question from a health system policymaker or stakeholder (in this case the Toronto Central Local Health Integration Network);
- 2) identifying, selecting, appraising and synthesizing relevant research evidence about the question;
- 3) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence; and
- 4) finalizing the rapid synthesis based on the input of at least two merit reviewers.

disease management focused on four groups of programs/interventions: 1) Chronic Care Model (CCM); 2) collaborative-care models; 3) integrated/comprehensive-care programs; and 4) other multi-component chronic-disease management interventions. Evidence from systematic reviews related to each of these is summarized below.

#### *Chronic Care Model*

Four systematic reviews (two of medium quality and two of low quality) evaluated the effects of various elements of the chronic care model (CCM) (i.e., patient self-management support, clinical information systems, delivery-system redesign, and provider decision support) on clinical- and process-related outcomes across different chronic diseases. One medium-quality systematic review addressing CCM interventions to improve care for asthma, congestive heart failure, depression and diabetes found that, overall, clinical outcomes, process measures, and to a lesser extent quality of life, were improved with the implementation of one or more element of the CCM across all chronic conditions.(2) The review indicated that no single element of the CCM or the number of CCM elements incorporated into the interventions were essential to improving outcomes. However the elements of CCM for which significant effects were somewhat stronger included delivery-system interventions (e.g., care management roles, team practice, care delivery coordination, and proactive follow-up) for clinical outcomes and process-of-care outcomes, and self-management support interventions (e.g., patient education, motivational counselling and distribution of educational materials) for clinical outcomes.(2) The second medium-quality review found that collaborative-care models that made use of the four elements of the CCM had small to medium effects on mental and physical outcomes across mental health conditions (most studies were focused on depression), but inconsistent effects on addressing comorbid conditions for people with mental health disorders.(3)

The low-quality reviews found evidence regarding the effects of different elements of the CCM in primary care practice settings for a variety of chronic diseases. For delivery-system interventions, most of the evidence found in one of the reviews indicated that multidisciplinary team care had positive effects on provider adherence to guidelines as well as on physiological patient outcomes in Type 2 diabetes, hypertension, lipid disorders and heart disease.(4) In addition, the other review found that the addition of new staff and other resources to facilitate implementation of CCMs in primary care is important for effectively managing chronic diseases, including comorbid diseases (e.g., cancer and depression).(5)

Both of the low-quality reviews also found self-management support interventions to be effective for improving processes of care and patient outcomes for different chronic conditions. Specifically, one review indicated that self-management support was effective for improving outcomes for patients with Type 2 diabetes and hypertension, and some evidence indicating that it improved outcomes for those with arthritis (but unclear evidence for those with asthma and COPD).(4) The second review found that patients in practices with formal self-management support interventions:

- more actively participated in collaborative care models;

#### **Box 2: Identification, selection and synthesis of research evidence**

We identified research evidence (systematic reviews and primary studies) by searching (in April 2015) Health Systems Evidence ([www.healthsystemsevidence.org](http://www.healthsystemsevidence.org)) and PubMed. We searched Health Systems Evidence on 2 April 2015 by combining the following topic categories: package of care/care pathways/disease management OR skill mix – role performance OR staff – training OR staff – continuity of care OR site of service delivery OR integration of services OR continuity of care, AND chronic disease prevention and management AND systematic review of effects OR systematic review addressing other questions.

The results from the searches were assessed by one reviewer for inclusion. A document was included if it fit within the scope of the questions posed for the rapid synthesis.

For each review we included in the synthesis, we documented the focus of the review, key findings, last year the literature was searched (as an indicator of how recently it was conducted), methodological quality using the AMSTAR quality appraisal tool (see the Appendix for more detail), and the proportion of the included studies that were conducted in Canada. For primary research (if included), we documented the focus of the study, methods used, a description of the sample, the jurisdiction(s) studied, key features of the intervention, and key findings. We then used this extracted information to develop a synthesis of the key findings from the included reviews and primary studies.

- were more knowledgeable about their disease;
- used recommended therapies more often;
- visited the ER less often;
- experienced 35% less days in hospitals;
- were more likely to monitor important indicators;
- were more likely to have a written action plan;
- experience improved quality of life;
- achieved improved disease-specific outcomes (e.g., for Type 1 and Type 2 diabetes); and
- had increased satisfaction with care.(5)

For other components of the CCM model, one of the reviews found evidence that decision-support interventions, clinical information systems (e.g., those providing audit and feedback), and disease registries are effective at encouraging professional adherence to guidelines.(4) These same elements were also identified in the second review as key components of “high-performing organizations”.(5)

#### *Collaborative-care models*

We identified two recent systematic reviews (one of high quality and one of medium quality) addressing the effects of collaborative-care models on clinical and process-of-care outcomes in the area of comorbid mental health conditions. The high-quality review found limited evidence (based on seven short-to-medium term randomized controlled trials) that, as compared to usual care, collaborative care significantly improves depression and glycemia outcomes (HbA1c level) independently, as well as in people with comorbid depression and Type 1 or Type 2 diabetes.(6) The effects of specific elements of the collaborative-care interventions in the included studies were not assessed in this review.(6) One of the medium-quality reviews also assessed collaborative care for patients with comorbid depression and Type 1 or Type 2 diabetes, which was defined as any intervention that met four criteria: 1) multi-professional patient care; 2) a structured management plan; 3) scheduled patient follow up; and 4) enhanced interprofessional communication).(7) The review found that as compared to usual care, collaborative care significantly reduced depression treatment response and depression remission, and improved rates of adherence to antidepressant medication and oral hypoglycemic medication.(7) However, non-significant reductions in HbA1c values were found across all studies included in the review.(7)

#### *Integrated/ comprehensive care programs*

One recent, high-quality overview of systematic reviews focused on the elements of integrated care programs for adults with multiple chronic conditions.(8) The included studies covered a broad range of medical conditions including chronic heart failure, diabetes (both Type 1 and Type 2), chronic obstructive pulmonary disease (COPD), asthma, hypertension, cancer and rheumatoid arthritis. The principles of integrated care addressed in these studies included providing comprehensive services across the care continuum, ensuring standardized care delivery through interprofessional teams, focusing on patient-centred care, supporting performance management and physician integration, using information systems, and fostering organizational culture and leadership that is supportive of integrated approaches. Improvements that were associated with the use of integrated care models were consistent for:

- use of healthcare resources (reduced hospital admissions, readmissions, length of stay and emergency department visits) for chronic heart failure, diabetes, COPD and asthma;
- processes of care (improved adherence to treatment guidelines) for diabetes, COPD and asthma; and
- patient-centred care (improved quality of life for diabetes and higher patient satisfaction for diabetes, COPD and asthma).

Only three of 17 systematic reviews in the meta-review found that costs were reduced, and no review found evidence of harm from integrated care programs.

An additional low-quality review described the characteristics of comprehensive-care programs for patients with multiple chronic conditions, and assessed the impact of these programs on patients, and informal and professional caregivers.(9) This review describes 33 studies evaluating 28 comprehensive-care programs that varied greatly in terms of target patient groups, implementation settings, number of interventions, and number of chronic-care model components. Moderate evidence was found for a beneficial effect of comprehensive care on inpatient

healthcare utilization and healthcare costs, health behaviour of patients (including physical activity, dietary habits and immunization compliance), perceived quality of care, and satisfaction of patients and caregivers. However, the review found insufficient evidence to determine whether there was a beneficial effect of comprehensive care on several important outcomes, including health-related quality of life, mental/cognitive functioning, medication use, outpatient healthcare, depressive symptoms, functional status, mortality and caregiver burden.(9)

*General chronic-disease management interventions*

We identified four reviews and one cost-effectiveness analysis focusing on other multi-component chronic-disease management interventions (i.e., they were not ascribed to any of the above models) across a variety of settings (primary, home and community care) and chronic illnesses.

One recent high-quality review focused on interventions targeted toward improving health outcomes in patients with multiple chronic conditions in primary and community care settings. This review analyzed 10 randomized controlled trials, of which eight focused on patients with a broad range of conditions, and two investigated patients with either coexisting depression and hypertension, or coexisting depression and diabetes (both Type 1 and Type 2), or heart disease.(10) Six of these studies demonstrated that organizational interventions (involving case management and coordination of care or enhancement of skill mix in multidisciplinary teams) aimed at management of a specific risk factor, and those focusing on areas difficult for patients, were the most likely to be effective, but that those with a broader scope (e.g., change in delivery of care) appeared to be less effective. The studies also found that organizational interventions significantly improved physical health outcomes, as well as depression-related outcomes. Four of the studies focused on patient-oriented interventions and found that interventions focused on particular risk factors or on areas where patients with multiple chronic conditions have specific areas of concern and difficulties, were more effective than those with a broader organizational focus (e.g., the implementation of a 'guided care' model targeted at high risk people with multiple chronic conditions). Overall, the review concluded that interventions targeted at specific combinations of common conditions or at specific problems for patients with multiple chronic conditions, are likely to be more effective than those targeted at specific diseases.

Another recent medium-quality review focused on in-home care for optimizing chronic-disease management.(11) This review provided moderate-quality evidence indicating that activities of daily living improved in people with multiple chronic conditions who received in-home care, and low-quality evidence indicating that health-related quality of life was improved as a result of in-home care.(11) Overall, in-home care was found to reduce the risk for the outcome measure of combined events (this included all-cause mortality and hospitalizations) and resulted in an average of one less unplanned hospitalization and emergency department visit.(11)

The last review, which was also of medium quality but older, found significant improvements in disease control in those enrolled in programs that used education, feedback and reminders for providers.(12) These interventions were associated with significant improvements in provider adherence to guidelines. Additionally, education, reminders and financial incentives for patients resulted in significant improvements in patient disease control. However, while the review found that many interventions are associated with significant improvements in provider guideline adherence and patient disease control, the included literature did not directly compare different interventions, and therefore could not identify which interventions produce the greatest (relative) improvements.(12)

Lastly, the cost-effectiveness analysis evaluated a variety of interventions used in chronic-disease management and demonstrated a statistically significant improvement in quality-adjusted life-years (QALYs) and cost savings compared with usual care for the following interventions: discharge planning plus post-discharge support for chronic heart failure in-home care for heart failure patients; specialized nursing alone for chronic-disease management; specialized nursing plus physicians for chronic-disease management; and electronic tools for health information exchange in Type 2 diabetes patients.(13) The incremental cost savings per patient receiving an intervention ranged from \$15 per patient (i.e., diabetic patient with specialized nursing) to \$10,665 per patient (i.e., patient with congestive heart failure receiving in-home care). The authors note that the savings are principally attributable to reductions in emergency department visits and hospitalizations because of the intervention.(13)



## Disease-specific programs (question 1)

This section focuses on findings from one overview of reviews, four systematic reviews and one cost-effectiveness analysis that we identified from our searches that focus specifically on the management of diabetes. We also included findings from one recent high-quality review focused on COPD management that provided relevant findings. While some of the programs and interventions described below draw on components of the models/programs above, we describe them separately, given their focus on a specific disease rather than on managing chronic diseases more generally.

The overview of reviews was conducted recently and includes key findings from 50 high-quality systematic reviews that evaluated the effectiveness of interventions designed to improve patient outcomes and process-of-care measures for people living with Type 1 or Type 2 diabetes.<sup>(14)</sup> The included reviews addressed several type of interventions, including broad-based interventions (i.e., those including several strategies) (n=8), patient education and support (n = 21), telemedicine (n = 10), provider role changes (n = 7), and organizational changes (n = 4). The reviews that focused on broad-based interventions included a mix of quality-improvement interventions targeted to patients (e.g., information and education provision), providers (e.g., educational materials, meetings and outreach, as well as reminders and prompts) and health systems (e.g., modifying the structure of healthcare facilities, introducing the use of health-record systems/registries and changing the site of service delivery). Across these reviews, it was found that these interventions resulted in improvement in patient self-management outcomes (glycemic control and cholesterol levels) as well as process-of-care behaviours (HbA1c and retinopathy monitoring), but had mixed results for controlling blood pressure.<sup>(14)</sup> Based on findings from the remaining 42 reviews, it was found that “patient education and support interventions improved HbA1c, blood pressure, cholesterol, and diabetic foot outcomes in patients; telemedicine interventions were associated with improved glycaemic control in patients; and provider role change interventions improved glycaemic and vascular risk factor control in patients.” However, findings related to the impact of organizational interventions on glycemic control were unclear as were findings related to the impact of all the interventions on monitoring HbA1c, vascular risk factors, retinopathy, or diabetic foot outcomes.

The additional reviews we identified included three older medium-quality reviews and one recent low-quality review. The first medium-quality review focused on specialized multidisciplinary community-based care for the management of Type 2 diabetes.<sup>(15)</sup> In this review, five RCTs focused on care provided by at least a nurse, dietitian, and primary care and/or specialist physician (model 1), and three focused on care provided by at least a pharmacist and primary care physician (model 2). The review found:

- statistically and clinically significant reduction of HbA1c of 1.0% for model 1 compared with usual care based on moderate-quality evidence;
- an uncertain estimate of effect on systolic blood pressure (SBP) for model 1 compared to usual care based on very-low quality evidence;
- statistically and clinically significant reduction of HbA1c of 1.0% for model 2 compared with usual care based on high-quality evidence; and
- statistically and clinically significant reduction in HbA1c for model 2 compared to usual care based on moderate-quality evidence.<sup>(15)</sup>

A subsequent cost-effectiveness analysis of these multi-disciplinary diabetes programs found them to be cost effective for the treatment and management of adults with Type 2 diabetes.<sup>(16)</sup> The evidence for either model did not suggest a preferred setting of care delivery (i.e. primary care versus hospital outpatient versus community clinic).

The second older medium-quality review focused on a diabetes-specific chronic-care model employing chronic-care model-oriented interventions, and found that such models were associated with a significant reduction in HbA1c when compared to controls for patients with Type 1 or Type 2 diabetes.<sup>(17)</sup> Additionally, the same review noted that studies including interventions aimed at ‘organizational influence’ (such as incentives, quality improvement strategies, and set goals and resources for chronic illness care) showed the greatest reduction in Hb1Ac (0.69%), and those with interventions aimed at elements of delivery-system design (such as practice team functioning, patient care planning and follow-up, or coordination between primary and specialist care) also showed a large reduction (0.58%). Chronic-care model interventions were also shown to be associated with a significant

reduction in systolic and diastolic blood pressure and total cholesterol when compared to control.(17) The third older medium-quality review found low-quality evidence indicating that the most effective components of disease-management programs for improving HbA1c levels in adults with diabetes (both types) were those that had a moderate or high frequency of contact between patients and providers, and where disease managers had the ability to start or modify treatment independently from the primary care physician.(18) Lastly, the recent low-quality review provided an overview of current research and development of the organization and delivery of diabetes education and self-care support.(19) The review suggests that structured models of education (with a set curriculum and delivered to a quality standard) have a greater impact on self-care and clinical benefits in patients with Type 1 diabetes (who require more complex competencies) than individuals with Type 2 diabetes. Moreover, an evaluation of an education program providing combined education for both Type 1 and Type 2 diabetes showed benefits for self-care and psychological wellbeing, but not that it was clinically beneficial. Overall, this review found conflicting accounts of the relationship between the duration and intensity of diabetes education programs and clinical outcomes.

The recent high-quality review focused on COPD reported on the effects of integrated disease-management programs or interventions and found:

- high-quality evidence indicating that the number of participants with one or more hospital admissions over three to 12 months was reduced compared to the control group;
- hospitalization days were significantly lower in integrated disease-management programs as compared with controls after 12 months;
- integrated disease management resulted in clinically significant improvement in disease-specific quality of life after 12 months; and
- statistically and clinically significant reduction in HbA1c for model 2 compared to usual care based on moderate-quality evidence.(15)

### **Referral/transition, training and other supports needed to ensure integration**

We found three systematic reviews that could aid in the identification of referral/transition, training and other supports to help to ensure (seamless) integration of restructuring or reorganizing disease-specific programs into more general chronic-disease programs. One of these reviews is specific to patients and the other two are specific to providers.

The review focused on patients is recent and of low quality, and assessed the findings from 23 qualitative studies about the challenges of self-management when living with multiple chronic conditions.(20) The review found that patients' perspectives of living with multiple chronic conditions are clearly linked to common functional challenges as opposed to specific diseases. Patients identified many barriers to self-management including:

- undesirable physical and emotional symptoms often impairing their ability to effectively self-manage;
- confusion related to multiple information sources and providers providing conflicting information about their conditions, needs and management strategies;
- difficulties with managing medications (lack of skill to address side effects, medication coordination and overreliance on medications);
- complexity of navigating different social support networks;
- unsatisfactory provider/patient communication; and
- a strain on financial resources.(20)

The key theme that emerged from the review was the importance of finding common ground between patients and providers, and specifically sharing power and responsibility for care related to multiple chronic diseases. The authors conclude that policy and programming in self-management support should be better aligned with achieving overall patient goals (e.g., by addressing common functional challenges identified by patients with multiple chronic diseases), rather than targeted to the control of one specific condition.(20)

For providers, one recent medium-quality review assessed general practitioners' perspectives on the management of patients with multiple chronic conditions.(21) From the 10 included studies, four areas of difficulty specific to

the management of chronic conditions were identified: 1) disorganization and fragmentation of healthcare; 2) inadequacy of guidelines and evidence-based medicine; 2) challenges in delivering patient-centred care; and 4) barriers to shared decision-making.(21) A second recent but low-quality review assessed qualitative evidence to identify facilitators and barriers for implementing the chronic care model in primary-care settings. The factors identified as facilitators for the implementation of the CCM included:

- supporting strong networks (collaborations across disciplines and specializations) and increased communication (regular meetings, computerized information sharing, clinical assessment tools) between healthcare providers and organizations;
- fostering an organizational culture that promotes multidisciplinary or patient-centred care, recognizes and commits to organizational and provider change efforts, and supports change (e.g., by incentivizing provider buy-in using financial incentives);
- making structural and policy changes such as expanding scope of practice of non-physician staff (e.g., nurse practitioners), and developing care teams to meet implementation needs;
- engaging goal-directed and supportive leadership, including the appointment of an ‘intervention champion’ to promote the uptake of the CCM; and
- increasing provider knowledge about CCM interventions and their effectiveness (e.g., through education and identifying its benefits to providers’ practice and patients’ health).

The barriers to implementation identified by the review included:

- difficulty executing the implementation of the CCM due to required staff time and organizational resources;
- structural characteristics of the organization that may slow down or impede implementation (e.g., organizational size, flexibility for reorganizing care, frequent turnover of leadership and staff, and increased workload/burden on existing providers);
- lack of organizational support and accountability from leadership; and
- lack of knowledge about or belief in the CCM.

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## APPENDICES

The following tables provide detailed information about the systematic reviews and primary studies identified in the rapid synthesis. The ensuing information was extracted from the following sources:

- systematic reviews - the focus of the review, key findings, last year the literature was searched and the proportion of studies conducted in Canada; and
- primary studies - the focus of the study, methods used, study sample, jurisdiction studied, key features of the intervention and the study findings (based on the outcomes reported in the study).

For the appendix table providing details about the systematic reviews, the fourth column presents a rating of the overall quality of each review. The quality of each review has been assessed using AMSTAR (A MeaSurement Tool to Assess Reviews), which rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, a review that scores 8/8 is generally of comparable quality to a review scoring 11/11; both ratings are considered “high scores.” A high score signals that readers of the review can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the review should be discarded, merely that less confidence can be placed in its findings and that the review needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8).

All of the information provided in the appendix tables was taken into account by the authors in describing the findings in the rapid synthesis.

**Appendix 1: Summary of findings from systematic reviews about general chronic disease and disease-specific chronic-disease programs**

Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
How effective are general chronic-disease programs compared to disease-specific programs, particularly diabetes-specific programs, at improving health outcomes and the patient experience?	The effects of chronic-disease management interventions in primary care (4)	<p>A total of 141 studies and 23 systematic reviews contributed to a qualitative synthesis of effects of chronic-disease management interventions in the primary-care setting.</p> <p>Self-management support interventions (patient education, motivational counselling, and distribution of educational materials) were found to be effective interventions improving both process of care and patient outcomes, with the most evidence for effectiveness of self-management support for diabetes and hypertension, some evidence for arthritis and less clear evidence for asthma and COPD.</p> <p>The most evidence for the effectiveness of delivery-system interventions was related to the effectiveness of multidisciplinary team care on both process and patient outcomes in diabetes, hypertension, lipid disorders and heart disease.</p> <p>Decision support interventions (the implementation of evidence-based guidelines, educational meetings for health professionals, and distribution of educational materials among professionals) were found effective in improving health professional adherence to guidelines and some patient outcomes.</p> <p>Clinical information systems that provide audit and feedback, and disease registries were shown to be effective in encouraging professional adherence to guidelines.</p> <p>Little evidence for the effective use of community resources or healthcare organization to support chronic -disease management in primary care was found.</p>	2006	4/10 (AMSTAR from McMaster Health Forum)	Countries were not reported in detail.
	Interventions to improve care for chronic illnesses (focusing on asthma, congestive heart failure, depression and diabetes) (22)	<p>One hundred and twelve studies were included in this review, including 93 randomized and 19 non-randomized controlled trials: 27 on asthma, 21 on congestive heart failure, 33 on depression and 31 on diabetes.</p> <p>Fifty-two studies reporting continuous clinical outcomes for diabetes and depression found a significant improvement in the intervention group in comparison with the control group</p> <p>In studies across all conditions, significant effects in favour of the</p>	2003	6/11(AMSTAR rating from McMaster Health Forum)	5/112

*Comparing Multi-component Chronic-disease Programs to Disease-specific Programs*

Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		<p>intervention group were found in 46 studies reporting dichotomous clinical outcomes, in 24 studies reporting quality-of-life outcomes. and in 32 studies reporting process outcomes.</p> <p>Significant effects were somewhat stronger in favour of delivery-system design for continuous clinical outcomes (33 studies), dichotomous clinical outcomes (30 studies), and process of care (21 studies); and in favour of self-management support interventions for continuous clinical outcomes (35 studies) and dichotomous clinical outcomes (36 studies). Significant effects for decision support were only found for process of care (18 studies). Clinical information systems, community resources and healthcare organization were not shown to have significant effects when compared with control. The authors note that no single element of the CCM was essential to improved outcomes, and a random-effects meta regression analyses found that the number of CCM elements incorporated in the study intervention was not associated with better outcomes.</p> <p>Continuous clinical outcomes in studies of depression (27 studies) and diabetes (25 studies) were found to be significantly in favour of the intervention. Dichotomous clinical outcomes in studies of asthma, congestive heart failure and depression were also found to be significantly in favour of the intervention. Process-of-care outcomes were significantly improved in studies of depression and diabetes. Quality-of-life outcomes were only found to be significantly improved in studies of depression and congestive heart failure, however, the low number of included studies for depression for this outcome may affect the reliability of the result.</p> <p>The authors conclude that clinical outcomes, process measures, and to a lesser extent quality of life, were improved with the implementation of <math>\geq 1</math> element of the CCM.</p>			
	<p>Redesigning primary-care practices in accordance with the chronic-care model (5)</p>	<p>The review included a total of 82 studies of which 14 were systematic reviews or meta-analyses, 11 described nine randomized control trials, and six were related to costs or cost-effectiveness. Evidence suggests that redesigning practices in accordance with the CCM generally improves the quality of care and outcomes for patients with various conditions.</p> <p>High performing organizations more often used reminders, involved practioners on quality-improvement teams, employed guidelines supported by clinician education or computer support, and had formal self-management support programs and patient registries. Trials that included the</p>	<p>2008</p>	<p>3/10 (AMSTAR rating from McMaster Health Forum)</p>	<p>2/82</p>



McMaster Health Forum

Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		<p>addition of new staff and other resources to facilitate implementation of CCMs found the implementation of the CCM significantly improved at least some processes and outcome measures compared to controls across a variety of diseases, including comorbid depression and cancer.</p> <p>Compared to patients in control practices, patients of providers in redesigned practices:</p> <ul style="list-style-type: none"> <li>• actively participating in a congestive heart failure (CHF) collaborative were more knowledgeable, used recommended therapies more often, visited the ER less often and experienced 35% less days in hospitals;</li> <li>• were more likely to monitor their peak flow, have a written asthma action plan and improved quality of life;</li> <li>• with diabetes experienced reduced risk for CVD (for every 48 patients receiving care from a redesigned practice, risk decreased by one CV event; and</li> <li>• had stronger diabetes quality outcomes and increased satisfaction with care.</li> </ul> <p>The authors note that most of the included studies focused on highly motivated practices with a focus on patients with a single chronic condition.</p>			
	Collaborative care for comorbid depression and diabetes (6)	<p>Seven short-to-medium term RCTs included in the review reported effects of collaborative care on depression outcomes in 1,895 participants, and glycated hemoglobin (HbA1c) level in 1,556 participants.</p> <p>Defining features of the collaborative care models investigated included a case manager/officer (usually a nurse or non-physician mental health worker for coordination of care) with proactive follow-ups, a structured management plan delivered within a stepped care framework, relapse prevention, an integrated diabetes care program, and consideration for lifestyle risk factors.</p> <p>Limited evidence from the RCTs (predominantly conducted in the U.S.A.) suggests that collaborative care for depression significantly improves both depression and glycemia outcomes independently, in people with comorbid depression and diabetes.</p>	2013	9/11 (AMSTAR rating from McMaster Health Forum)	0/7
	Collaborative care for patients with depression and diabetes (7)	<p>Summary of evidence from eight RCTs comprising 2,238 patients. An intervention was considered 'collaborative care' if it met four criteria – multi-professional patient care, a structured management plan, scheduled patient follow up and enhanced interprofessional communication.</p>	2013	8/11 (AMSTAR rating from McMaster Health Forum)	0/8

*Comparing Multi-component Chronic-disease Programs to Disease-specific Programs*

Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		As compared to usual care, the review found collaborative care significantly improved depression treatment response (RR=1.33, 95% CI=1.05-1.68), depression remission (adjusted RR=1.53, 95% CI=1.11-2.12), and rates of adherence to antidepressant medication (RR=1.79, 95% CI=1.19-2.69) and oral hypoglycemic agent (RR=2.18, 95% CI=1.61-2.96). A non-significant reduction in HbA1c values was found across all studies.			
	Collaborative chronic-care models for mental health conditions across disorders and treatment settings (3)	<p>The majority of the studies in this review focused on depression (n=39) and made use of the four original elements of CCMs (patient self-management support, clinical information systems, delivery system redesign and provider decision support).</p> <p>The review found that total health costs did not differ between collaborative chronic-care models and comparison models across conditions and outcome domains. The meta-analysis showed significant small-to-medium effects of collaborative chronic-care models, while net healthcare cost remained the same across multiple disorders.</p> <p>The review also showed that trials for chronic conditions showed a more variable effect due to the presence of multiple comorbidities accompanying these disorders.</p> <p>The review concluded that individuals with mental health conditions can see improvements in their mental and physical outcomes through collaborative chronic-care models, which can be extended to patients with chronic or comorbid disorders, but that the model needs to be further developed to include or remove certain components in deploying the collaborative chronic-care model for the greatest benefit to public health. These components were not clearly identified.</p>	2011	6/11 (AMSTAR rating from McMaster Health Forum)	0/55
	Integrated care programs for adults with chronic conditions (8)	The meta-review focused on the methodological quality of the 27 systematic reviews (reported in 28 studies) and the elements of integrated care programs assessed within them. The principles of integrated care addressed in the studies included comprehensive services across the care continuum, standardized care delivery through interprofessional teams, patient focus, performance management and physician integration, information systems, organizational culture and leadership. The studies covered a broad range of medical conditions including chronic heart failure (CHF), diabetes mellitus (DM), chronic obstructive pulmonary disease (COPD), asthma, hypertension, cancer and rheumatoid arthritis).	2012	8/10 (AMSTAR rating from McMaster Health Forum)	1/28

McMaster Health Forum

Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		<p>Positive trends or significant improvements (<math>p &lt; 0.05</math>) associated with integrated care models were consistent for use of healthcare resources (reduced hospital admissions, readmissions, length of stay and ED visits for CHF, CM, COPD and asthma); process of care (improved adherence to treatment guidelines for DM, COPD and asthma); and patient-centred care (improved quality of life for DM and higher patient satisfaction for DM, COPD and asthma).</p> <p>Only three of 17 reviews found that costs were reduced, and no review found evidence of harm of integrated care programs.</p> <p>The average quality rating of the included studies was an AMSTAR of 5 (out of 10).</p>			
	<p>Characteristics of comprehensive care programs for patients with multiple chronic conditions and their impact on patients, and informal and professional caregivers (9)</p>	<p>The review included 42 articles describing 33 studies evaluating 28 comprehensive care programs that varied greatly in terms of target patient groups, implementation settings, number of interventions, and the number of chronic-care model components.</p> <p>The review found moderate evidence for a beneficial effect of comprehensive care on inpatient healthcare utilization and healthcare costs, health behaviour of patients (including physical activity, dietary habits and immunization compliance), perceived quality of care, and satisfaction of patients and caregivers.</p> <p>The review found insufficient evidence for a beneficial effect of comprehensive care on health-related quality of life in terms of mental functioning, medication use and outpatient healthcare costs.</p> <p>The review found no evidence for a beneficial effect of comprehensive care on cognitive functioning, depressive symptoms, functional status, mortality, quality of life in terms of physical functioning, and caregiver burden.</p>	<p>2011</p>	<p>4/9 (AMSTAR rating from McMaster Health Forum)</p>	<p>4/42</p>
	<p>Interventions targeted toward improving health outcomes in patients with multimorbidity in primary-care and community settings (10)</p>	<p>The review analyzed 10 randomized controlled trials, of which eight focused on patients with a broad range of conditions and two investigated patients with either coexisting depression and hypertension or coexisting depression and diabetes or heart disease. As no study attempted to link outcomes to specific intervention components, interventions were classified as either organizational or patient oriented and results were presented in these groupings. Of the 10 studies, six had organizational interventions involving any change to the organization of care delivery (i.e. case management or enhancement of skill mix in multidisciplinary teams), and four of the studies</p>	<p>2011</p>	<p>9/10 (AMSTAR rating from McMaster Health Forum)</p>	<p>1/10</p>

Comparing Multi-component Chronic-disease Programs to Disease-specific Programs

Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		<p>focused on patient oriented interventions (i.e., patient education or self-management support). The review found that these interventions have mixed effects, with a tendency to improve prescribing and medication adherence.</p> <p>More specifically, organizational interventions that have a broader focus (e.g., case management or changes in care delivery) appear less effective. Similarly, patient-oriented interventions that are not linked to healthcare delivery appear less effective, with the exception of one study that examined interventions targeting functional difficulty and fall prevention, which found significantly reduced mortality.</p> <p>The authors conclude that interventions targeted either at specific combinations of common conditions or at specific problems for patients with multiple conditions, may be more effective.</p>			
	<p>Interventions utilized in disease management programs for patients with chronic illnesses (12)</p>	<p>The review looked at 102 studies which represented a total of 118 unique intervention programs. The most common intervention in these programs (92/118) was patient education, followed by provider education (47/118) and provider feedback (32/118). The majority of programs also used more than one intervention (70/118).</p> <p>Overall, significant improvements in disease control were seen amongst programs using provider education (0.35, 95% CI 0.19 to 0.51), provider feedback (0.17, 95% CI 0.1-0.25), and provider reminders (0.22, 95% CI 0.1-0.37). These three interventions were also associated with significant improvements in provider adherence to guidelines (provider education, 0.44, 95% CI 0.19 to 0.68; provider feedback, 0.61, 95% CI 0.28 to 0.93; and provider reminders, 0.52, 95% CI 0.35 to 0.69).</p> <p>Additionally, patient education also produced a significant improvement in patient disease control (0.24, 95% CI 0.07 to 0.4), as did patient reminders (0.27, 95% CI 0.17 to 0.36) and patient financial incentives (0.4, 95% CI 0.26 TO 0.54).</p> <p>The authors note that while the study demonstrated that many interventions are associated with significant improvements in provider guideline adherence and patient disease control, the literature surveyed does not directly compare different interventions, and as a result, little is known about which interventions produce the greatest (relative) improvements in care.</p>	<p>2001</p>	<p>6/11 (AMSTAR rating from McMaster Health Forum)</p>	<p>4/102</p>

McMaster Health Forum

Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
	In-home care for optimizing chronic-disease management (11)	<p>The review included 12 randomized controlled trials, four systematic reviews and one health technology assessment. In-home care was found to reduce the risk for the outcome measure of combined events (this included all-cause mortality and hospitalizations) by 12% (RR: 0.88; 95% CI: 0.80–0.97; I2: 62%; P=0.07) and resulted in an average of one less unplanned hospitalization and emergency department visit.</p> <p>Heart failure patients receiving in-home care had on average about one less unplanned hospitalization compared with heart failure patients receiving usual care (MD: -1.03; 95% CI: -1.53 to -0.53; P &lt; 0.001; I2: n/a; P = n/a), about one-and-a-half fewer ED visits compared with those receiving usual care (MD: -1.32; 95% CI: -1.87 to -0.77; P &lt; 0.001; I2: n/a; P = n/a), and were more likely to have increased HRQOL compared with those receiving usual care. Statistically significant and clinically relevant effects were shown for physical well-being (MD: -11.00, 95% CI: -16.45 to -5.55; P &lt; 0.001), and for nurse-led in-home interventions on HRQOL specific to heart failure (MD: -11.45; 95% CI: -16.08 to -6.82; P &lt; 0.001; I2: 0%, P = 0.75).</p> <p>Moderate-quality evidence indicated that activities of daily living improved among patients with multiple chronic conditions who received in-home care, and low-quality evidence indicated that health-related quality of life was improved.</p>	2012	5/11 (AMSTAR rating from McMaster Health Forum)	1/12
	Specialized multidisciplinary community-based care for the management of Type 2 diabetes (15)	<p>A total of 22 RCTs and nine systematic reviews were retrieved. Of these, eight RCTs were included in the meta-analysis, five focused on care provided by at least a nurse, dietitian, and primary care and/or specialist physician model of care (Model 1), and 3 threeon care provided by at least a pharmacist and primary-care physician (Model 2).</p> <p>A meta-analyses examining the effects of these two models of multidisciplinary care demonstrated:</p> <ul style="list-style-type: none"> <li>• statistically and clinically significant reduction of HbA1c of 1.0% for Model 1 compared with usual care based on moderate-quality evidence;</li> <li>• an uncertain estimate of effect on systolic blood pressure (SBP) for Model 1 compared to usual care based on very low-quality evidence;</li> <li>• statistically and clinically significant reduction of HbA1c of 1.0% for Model 2 compared with usual care based on high-quality evidence; and</li> <li>• statistically and clinically significant reduction in HbA1c for Model 2 compared to usual care based on moderate-quality evidence.</li> </ul> <p>For both models, the evidence did not suggest a preferred setting of care</p>	2008	6/11 (AMSTAR rating from McMaster Health Forum)	1/22

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Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		delivery (i.e. primary care versus hospital outpatient versus community clinic).			
	Chronic-care models for improving diabetes care (17)	In total, 62 studies encompassing 69 comparisons were included in the review. The majority of these studies were randomized controlled trials (63%), and the rest were controlled before-after studies (37%). Overall, chronic-care model interventions were found to be associated with a significant reduction in HbA1c (0.46%, 95% CI 0.38-0.54) when compared to control. Additionally, it was noted that studies including organizational influence (n=2; controlled before-after studies) showed the greatest reduction in Hb1Ac (0.69%), and those with delivery-system design also showed a large reduction (0.58%; n=24). Chronic-care model interventions were also shown to be associated with a significant reduction in systolic blood pressure when compared to control (2.2 mm/Hg, 95% CI 0.9-3.5), diastolic blood pressure (1.3 mm/Hg, 95% CI 0.6-2.1) and total cholesterol (0.24 mmol/L, 95% 0.06-0.41).	2004	6/11 (AMSTAR rating from McMaster Health Forum)	1/64
	Disease-management programs for improving glycemic control in adults with diabetes (18)	In the review of 41 randomized controlled trials, disease-management programs were found to moderately reduce HbA1c levels in adults with diabetes.  The most effective components of disease-management programs were a moderate or high frequency of contact (programs with a high frequency of contact led to a significantly greater reduction in HbA1c levels compared with low frequency contact programs [SMD -0.56 v. -0.30, p = 0.03]), and the ability of disease managers to independently start or modify treatment with or without prior approval from the primary-care physician (greater improvement in HbA1C levels were found in trials with no approval to do so [SMD -0.60 v. -0.28 in trials with no approval to do so; p < 0.001]).  No overall difference in mortality between groups was found.	2009	4/11 (AMSTAR rating from McMaster Health Forum)	4/41
	Improving quality of care for people with diabetes (14)	The overview of reviews includes key findings from 50 high-quality systematic reviews that evaluated the effectiveness interventions designed to improve patient outcomes and process-of-care measures for people living with any type of diabetes.  The included reviews addressed several types of interventions, including broad-based interventions (i.e., those including a several strategies) (n=8), patient education and support (n = 21), telemedicine (n = 10), provider role changes (n = 7), and organizational changes (n = 4).	2011	No rating tool available for this type of document (overview of systematic reviews)	Not applicable (included reviews, not individual studies)

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Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		<p>The reviews that focused on broad-based interventions included a mix of quality-improvement interventions targeted to patients (e.g., information and education provision), providers (e.g., educational materials, meetings and outreach, as well as reminders and prompts) and health systems (e.g., modifying the structure of healthcare facilities, introducing the use of health-record systems/registries and changing the site of service delivery). Across these reviews, it was found that these interventions resulted in improvement in patient self-management outcomes (glycemic control and cholesterol levels) as well as process-of-care behaviours (HbA1c and retinopathy monitoring), but had mixed results for controlling blood pressure.</p> <p>Based on findings from the remaining 42 reviews, it was found that “patient education and support interventions improved HbA1c, blood pressure, cholesterol, and diabetic foot outcomes in patients; telemedicine interventions were associated with improved glycaemic control in patients; and provider role change interventions improved glycaemic and vascular risk factor control in patients.” However, findings related to the impact of organizational interventions on glycemic control were unclear, as were findings related to the impact of all the interventions on monitoring HbA1c, vascular risk factors, retinopathy, or diabetic foot outcomes.</p>			
	<p>Organizing and delivering diabetes education and self-care support (19)</p>	<p>This overview of current research and development on the organization and delivery of diabetes education and self-care support included a literature review (159 papers and 52 items from the grey literature), a patient participation event, an online survey of professionals and patients, and a conference.</p> <p>The narrative summary suggests that structured models of education (with a set curriculum and delivered to a quality standard) have a greater impact on self-care and clinical benefits in patients with Type 1 diabetes (who require more complex competencies) than individuals with Type 2 diabetes.</p> <p>An evaluation of an education program providing combined education for both Type 1 and Type 2 diabetes showed benefits for self-care and psychological wellbeing, but no data demonstrating the approach is clinically beneficial.</p> <p>Overall, the literature review found conflicting accounts of the relationship between the duration and intensity of diabetes education programs and clinical outcomes.</p>	<p>2011</p>	<p>2/9 (AMSTAR rating from McMaster Health Forum)</p>	<p>Not reported</p>

Comparing Multi-component Chronic-disease Programs to Disease-specific Programs

Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
	Integrated disease-management (IDM) programs or interventions for people with chronic obstructive pulmonary disease (COPD) (23)	<p>The review evaluated 26 studies in 2,997 people with COPD. Compared with controls, the review found moderate evidence that IDM resulted in clinically significant improvement in disease-specific QoL on all domains of the Chronic Respiratory Questionnaire (CRQ) after 12 months. The St. George's Respiratory Questionnaire (SGRQ) for QoL reached the clinically relevant difference of four units only for the impact domain (high-quality evidence). On the activity domain of the SGRQ, IDM showed a significantly improved disease-specific QoL: MD -2.70 (95% CI -4.84 to -0.55, P = 0.01) (high-quality evidence). There was no significant difference on the symptom domain of the SGRQ: MD -2.39 (95% CI -5.31 to 0.53, P = 0.11). There was moderate-quality evidence for a clinically relevant improvement in six-minute walking distance.</p> <p>There was high-quality evidence of a reduction in the number of participants with one or more hospital admissions over three to 12 months from 27 per 100 participants in the control group to 20 per 100 participants in the IDM group, and that hospitalization days were significantly lower in the IDM group compared with controls after 12 months.</p> <p>There was no evidence of an effect on mortality; and insufficient evidence to refute or confirm the longer term effectiveness of IDM. No adverse effects were reported in the intervention group.</p>	2012	9/11 (AMSTAR rating from McMaster Health Forum)	1/26
	Disease-specific education programs for patients with COPD (24)	<p>A total of 12 trials were included in this meta-analysis, representing patients from outpatient clinics, community clinics, medical centres, primary-care settings, and a general practice. The education model intervention involved group education in five trials, individual education in seven trials and action plans in six.</p> <p>Nine trials presented data on St. George Respiratory Questionnaire (SGRQ) scores. The total and domain scores were lower (therefore indicating a higher HRQoL) or equal to scores in usual care groups in all studies.</p> <p>Four trials reported data on the rate of COPD-related emergency department visits, and the meta-analysis indicated a significantly lower rate in patients receiving disease-specific education programs (OR 0.38, 95% CI 0.29-0.50, p&lt;0.00001).</p> <p>Four trials reporting data on COPD-related hospital admissions also demonstrated a significant reduction in hospital admission rates for patients receiving disease-specific education programs (OR 0.55, 95% CI 0.43-0.71, p&lt;0.00001).</p>	2011	8/11 (AMSTAR rating from McMaster Health Forum)	2/12
	Chronic-disease management	All of the programs analyzed within the 10 randomized-controlled trials	2005	6/10 (AMSTAR	1/10



McMaster Health Forum

Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
	programs for individuals living with COPD (25)	included an education component, and nine included exercise training. The interventions lasted from two to 18 months, and the frequency of contact with care providers necessitated by each one varied widely (i.e., between two hours a week and four hours daily). Within the pool of studies, five demonstrated a significant positive effect on one or more subscales of the quality-of-life instruments used (e.g., Chronic Respiratory Questionnaire [CRQ]) for intervention versus control groups). Two studies in the pool looked at the effects of self-management interventions, and only one of these reported improved outcomes with regard to quality of life. The authors noted that positive effects surrounding quality of life were especially seen when the disease-specific CRQ was used in assessing quality of life.		rating from McMaster Health Forum)	
	Chronic-care management for heart failure (26)	<p>Definitions of CCM and the nature of interventions varied among the 15 systematic reviews and 44 primary studies included in the review. A focus on the reduction of hospital admissions and on post-discharge planning and self-management was common to most studies. Patient satisfaction and quality-of-life outcomes were measured by less than half of the reviews.</p> <p>Twenty-two studies were included in a meta-analysis on all-cause hospitalization. The pooled relative risk for all-cause hospitalization with chronic-care management compared with the control (mostly usual care) was 0.82 (95% CI: 0.72-0.94; I<sup>2</sup>: 84%).</p> <p>Twenty-nine studies included in a meta-analysis on all-cause mortality demonstrated that chronic-care management reduced mortality by a mean of 18 percent (95 percent CI: 0.72–0.94)</p> <p>Seven studies were included in a meta-analysis on quality of life. There was a significant improvement in quality of life indicated by an increase of 7.14 points on the Minnesota Living with Heart Failure Questionnaire (95 percent CI: 9.55 to 4.72).</p> <p>The authors note that although positive effects on hospitalization and quality of life were shown, the substantial heterogeneity in effectiveness is not explained by study quality, length of follow-up, or the number of chronic-care model components.</p>	2009	6/11 (AMSTAR rating from McMaster Health Forum)	3/44
In restructuring or reorganizing disease-specific programs into more	General practitioners' perspectives on the management of patients with multimorbidity (21)	From the 10 included studies, four areas of difficulty specific to the management of multimorbidity were identified: 1) disorganization and fragmentation of healthcare; 2) inadequacy of guidelines and evidence-based medicine; 3) challenges in delivering patient-centred care; and 4) barriers to	2012	6/9 (AMSTAR rating from Program in Policy Decision-	0/10

Comparing Multi-component Chronic-disease Programs to Disease-specific Programs

Question addressed	Focus of systematic review	Key findings	Year of last search/publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
<p>general chronic-disease programs, what referral/transition, training and other supports are needed to ensure (seamless) integration (from a patient and provider perspective?</p>		<p>shared decision-making.</p>		<p>making)</p>	
	<p>Facilitators and barriers of implementing the chronic-care model in primary care (27)</p>	<p>A total of 22 studies were qualitatively analyzed to identify barriers and facilitators to the implementation of the chronic-care model (CCM) in various primary-care settings. The findings highlight that organizational capacity and needs, and healthcare providers' and organizational perspective are important to assess prior to and during the implementation of the CCM.</p> <p>Facilitators for the implementation of the CCM were identified as: strong networks (collaborations across disciplines and specializations) and increased communication (regular meetings, computerized information sharing, clinical assessment tools) between healthcare providers and organizations; an organizational culture that promotes multidisciplinary or patient-centred care or offers support from clinical providers and a recognition of change efforts; an organizational climate that recognizes the need for and commitment to change or supports change by incentivizing provider buy-in using financial incentives; making structural changes such as expanding scope of practice of non-physician staff such as nurse practitioners, or changing policies and development of care teams to meet implementation needs, engaging leadership of goal-directed, supportive administration and supervisors, including the appointment of an 'intervention champion' to promote the uptake of the CCM; and increasing provider knowledge about CCM interventions through education and observation of its execution. and fostering beliefs of the effectiveness of the CMM by demonstrating benefits to practice and sharing reports of patient improvements.</p> <p>Barriers to implementation included: difficulty executing the implementation of the CCM due to staff time; the structural characteristics of the organization, such as size and flexibility, in reorganizing care and staff turnover and loss, particularly as regards to leadership turnover and increased burdens on existing providers; lack of organizational resources; lack of organizational support and accountability from leadership or a champion of the intervention; and lack of knowledge of or belief in the CCM.</p>	<p>2015</p>	<p>2/9 (AMSTAR rating from McMaster Health Forum)</p>	<p>2/22</p>
	<p>Challenges of self-management when living with multiple chronic conditions (20)</p>	<p>This review of 23 qualitative studies found that patients' perspectives of living with multiple chronic conditions are clearly linked to common functional challenges as opposed to specific diseases.</p> <p>The barriers to self-management identified were undesirable physical and emotional symptoms impairing their ability to effectively self-manage; confusion related to multiple information sources and providers providing</p>	<p>2013</p>	<p>2/9 (AMSTAR rating from McMaster Health Forum)</p>	<p>0/23</p>

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Question addressed	Focus of systematic review	Key findings	Year of last search/ publication date	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada
		<p>conflicting information about their conditions, needs and management strategies; difficulties with medications (lack of skill to address side effects, medication coordination and overreliance on medications); complexity of social support; unsatisfactory provider/patient communication; and a strain on financial resources.</p> <p>The key theme that emerged was the importance of finding common ground between patients and providers related to the sharing of power over and responsibility for multiple chronic-disease management. Patients expressed the need to have their small questions answered in a timely manner, and to have mutually agreed upon integrated care plans that respect their priorities and are explained to clarify and address potentially conflicting strategies, and simple written information.</p> <p>The authors conclude that policy and programming in self-management support should be better aligned with the common functional challenges identified by patients with multiple chronic diseases (for example with the group generic Chronic Disease Self-Management Program) rather than targeted toward disease groups and optimizing care for target control of a specific condition.</p>			

Appendix 2: Summary of findings from primary studies about general chronic-disease programs and disease-specific programs

Question addressed	Focus of study	Study characteristics	Sample description	Key features of the intervention(s)	Key findings
How effective are general chronic-disease programs compared to disease-specific programs, particularly diabetes-specific programs, at improving health outcomes and the patient experience?	Cost-effectiveness of interventions used in chronic-disease management (13)	<p><i>Publication date:</i> 2013</p> <p><i>Jurisdiction studied:</i> Ontario</p> <p><i>Methods used:</i> Cost-effectiveness analysis</p>		Cost-effectiveness analyses of chronic-disease management interventions compared with usual care for: discharge planning plus post-discharge support for congestive heart failure; in-home care for heart failure patients; specialized nursing alone for chronic-disease management; specialized nursing plus physicians for chronic-disease management; and electronic tools for health information exchange in diabetes patients.	<p>Cost-effectiveness analyses demonstrated a statistically significant improvement in quality-adjusted life-years (QALYs) and cost savings compared with usual care for the following interventions: discharge planning plus post-discharge support for congestive heart failure; in-home care for heart failure patients; specialized nursing alone for chronic-disease management; specialized nursing plus physicians for chronic-disease management; and electronic tools for health information exchange in diabetes patients.</p> <p>The incremental cost savings per patient receiving an intervention ranged from \$15 per patient (i.e., diabetic patient with specialized nursing) to \$10,665 per patient (i.e., patient with congestive heart failure receiving in-home care). The authors note that the savings are principally attributable to reductions in emergency department visits and hospitalizations because of the intervention.</p>
	Cost effectiveness and budget impact of selected Type 2 diabetes interventions (16)	<p><i>Publication date:</i> 2009</p> <p><i>Jurisdiction studied:</i> Ontario</p> <p><i>Methods used:</i> Cost-effectiveness analysis, modelling program</p>		An analysis of an Ontario-specific model of diabetes care (ODEM) was undertaken using data on clinical efficacy obtained from the Medical Advisory Secretariat systematic reviews of CSII insulin pumps, multidisciplinary programs, and bariatric surgeries.	<p>Based on the analysis, multidisciplinary diabetes programs, behavioural interventions, and bariatric surgery were considered cost-effective for the treatment and management of adults with Type 2 diabetes.</p> <p>Insulin pumps were not found to be cost-effective for adults with Type 2 diabetes (either for age 65+ sub-group or for all patients in general). Data was not available to determine relative cost-effectiveness</p> <p>The authors note that caution should be exercised when comparing costs across interventions, and that results for the multidisciplinary analyses was based in one city and may not be generalizable to the province as a whole.</p>



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