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McMaster HEALTH FORUM

EVIDENCE BRIEF

ADDRESSING HEALTH-SYSTEM SUSTAINABILITY IN ONTARIO

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EVIDENCE >> INSIGHT >> ACTION

Evidence Brief:
Addressing Health-system Sustainability in Ontario

29 November 2016

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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Conflict of interest

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Merit review

The evidence brief 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

What's the problem?

- At least four broad groups of factors exist that threaten the long-term sustainability of Ontario's health system:
  - demand-side challenges to sustainability (e.g., the ways in which demographic shifts, lifestyle and behavioural risk factors for disease and disability, the burden of disease and disability, public and patient expectations, and patterns of service utilization, influence the programs, services and drugs Ontarians need and want);
  - supply-side challenges to sustainability (e.g., the ways in which medical and technological advances, availability of financial and health human resources, price effects such as inflation, and health-system delivery arrangements, influence the programs, services and drugs available to Ontarians);
  - governance arrangements and political-system factors that may constrain efforts to ensure sustainability (e.g., compressed time frames, pressure from health-system stakeholders and public opinion); and
  - the difficulties Ontario has experienced in addressing long-standing policy issues in the health system.

What do we know (from systematic reviews) about three viable elements to address the problem?

- Element 1 – Engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change
  - This element examines a range of approaches that can be adopted both within and outside the health system that aim to help Ontarians reduce unhealthy behaviours and make healthier choices, improve population health literacy, and engage patients and their families in all aspects of care.
  - Eighty-two systematic reviews were identified that focused on element 1, with the main findings indicating that there are a number of positive benefits associated with interventions that focus on promoting healthy lifestyles, behaviours and choices, ensuring healthy living and working environments, improving health literacy, and supporting self-management.
- Element 2 – Align features of the health system to achieve value for money by addressing supply-side drivers of change
  - This element includes introducing supports to increase the use of evidence by decision-makers, managers and clinicians, engaging stakeholders, implementing financial incentives and adopting integrated models of care.
  - Forty-four systematic reviews were identified that focused on element 2 and they reported barriers to supporting the use of evidence can be overcome, that there isn't one best approach for engaging stakeholders and/or the public in decision-making, financial incentives come with mixed results, and integrated and innovative models of care can help lead to improvements in patient outcomes.
- Element 3 – Harness distributive leadership approaches that enable the system to innovate and move towards sustainability
  - This element focuses on harnessing distributive leadership by empowering individuals at each of the political, system, managerial, professional and citizen levels.
  - The 20 reviews identified that related to this element support engaging in deliberative dialogues, creating a case for change, supporting providers through continued professional development, and increasing citizen engagement in care delivery and in the development of policies and guidelines.

What implementation considerations need to be kept in mind?

- While many barriers may exist to implementing these elements at the level of patient/citizens, providers, organizations and systems, perhaps the biggest barrier lies in the need to gain collective agreement and political buy-in across health-system stakeholders on a collective vision for change.
- Windows of opportunity for implementing these elements might include: 1) a well-accepted understanding that increasing budget constraints makes the status quo unsustainable, which has created a platform for change; and 2) the current negotiations between the federal government and provincial governments on the parameters of a new health accord.

REPORT

Like many jurisdictions across Canada and internationally, healthcare spending in Ontario has increased significantly in the past decade and a half, with total expenditures (i.e., from both public and private sources) having grown by approximately 60% between 2000 and 2013, from $41 billion to $66 billion (adjusted based on Statistics Canada health consumer price index).(1) In addition to this observed growth in expenditure, projections of future healthcare spending in the province have contributed to establishing a dominant and widely accepted narrative that the province is in a fiscal crisis, and that current trends are not sustainable. For instance, estimates based on 2010 data warned that if health expenditures continue to grow unchecked, healthcare would take up 80% of the provincial budget by 2030.(2)

Perhaps as a response to this and other similar warnings, the provincial government has taken steps to restrain public spending (including healthcare spending) as part of broader efforts to meet a goal of balancing the budget by 2017-18.(3) For example, health sector spending is projected to increase by an average 1.7 per cent per year until 2017/18, which sits well below the 3.0 per cent annual average pace from 2010-11 to 2014-15.(4)

However, many current cost-containment efforts in the province and across the country reflect short-term solutions. For example, 25% of all recent reductions in healthcare spending have been carved out of capital expenditure budgets, despite the fact that capital expenditures only account for 5% of all provincial healthcare costs, and future maintenance and additional investments in capital are inevitable in the medium and long term (which make these short-term reductions temporary).(3) Furthermore, the complex array of factors that need to be considered in order to position the health system for long-term sustainability mean that such narrowly-focused short-term solutions are highly likely to be inadequate.

In preparing this brief, we acknowledged early on in the process that sustainability in a health system is a concept that is much broader than ensuring adequate financial resources are available, and in keeping consistent with this, we define a sustainable health system as one that:

1) is designed to meet the health and healthcare needs of individuals and the population (from health promotion and disease prevention to restoring health and providing end-of-life care);
2) leads to optimal health and healthcare outcomes;
3) responds and adapts to cultural, social and economic conditions and demands; and

Box 1: Background to the evidence brief

This evidence brief mobilizes both global and local research evidence about a problem, three elements of a potentially viable approach for addressing the problem, and key implementation considerations. Whenever possible, the evidence brief 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 evidence brief does not contain recommendations, which would have required the authors of the brief to make judgments based on their personal values and preferences, and which could pre-empt important deliberations about whose values and preferences matter in making such judgments.

The preparation of the evidence brief involved five steps:

1) convening a Steering Committee comprised of representatives from the partner organization (the Ontario Medical Association) and the McMaster Health Forum;
2) developing and refining the terms of reference for an evidence brief, particularly the framing of the problem and three elements of an approach for addressing it, in consultation with the Steering Committee and a number of key informants, and with the aid of several conceptual frameworks that organize thinking about ways to approach the issue;
3) identifying, selecting, appraising and synthesizing relevant research evidence about the problem, elements and implementation considerations;
4) drafting the evidence brief in such a way as to present concisely and in accessible language the global and local research evidence; and
5) finalizing the evidence brief based on the input of several merit reviewers.

The three elements for addressing the problem were not designed to be mutually exclusive, but could be pursued simultaneously or in a sequenced way, and each could be given greater or lesser attention relative to the others.

The evidence brief was prepared to inform a stakeholder dialogue at which research evidence is one of many considerations. Participants' views and experiences and the tacit knowledge they bring to the issues at hand are also important inputs to the dialogue. One goal of the stakeholder dialogue is to spark insights – insights that can only come about when all of those who will be involved in or affected by future decisions about the issue can work through it together. A second goal of the stakeholder dialogue is to generate action by those who participate in the dialogue and by those who review the dialogue summary and the video interviews with dialogue participants.

4) does not compromise the outcomes and ability of future generations to meet their own health and health care needs.(5)

As a complement to this definition, we also considered sustainability as: "the long term ability of an organizational system to mobilise and allocate sufficient and appropriate resources ([human resources], technology, information and finance) for activities that meet individual or public health needs and demands."(6) We acknowledge that the act of pursuing a sustainable health system may be associated with one or more important objectives, including:

1) the maintenance of health benefits:
2) the continuation of health programs;
3) the institutionalization of programs within organizational systems; and
4) establishing and maintaining community capacity.(6)

In adopting these broad definitions, it becomes clear that while budgetary challenges may have served as a central narrative and launching point for discussions about health-system sustainability in the province, they are only the symptom of a much more complex set of underlying challenges that need to be addressed. To this point, a number of those discussing the issue in the province (including a number of key informants interviewed during the preparation of this brief) have acknowledged that considering the financial sustainability of Ontario's health system in isolation is missing the mark, since, theoretically, the upper limits of what we can spend are not defined. Rather, the financial resources available to spend on healthcare are dependent on how much citizens are willing to pay through increases in taxes rather than any true objective upper limit. Therefore, it could be argued that it is the unfavourable political implications of increased tax that puts pressure on decision-makers to find ways to ensure greater value for money within existing system resources.

Additionally, even if current financial pressures did not exist, large changes to the health system would still be needed. For example, demographic changes such as the rapidly aging population, and the increasing number of patients with multiple chronic conditions, raise questions about whether the way in which the health system has traditionally been organized in the province (e.g., focused on hospital-based care) continues to be the most appropriate given patient needs and preferences.

Another important aspect of the issue that warrants consideration is that despite the unique issues that need to be addressed in the province to ensure long-term health-system sustainability, this is not the first attempt to address the issue in Ontario (or in Canada for that matter). Specifically, throughout the 2000s, new federal funding was provided to address the gaps identified in the Romanow report, by supporting provinces in working towards sustainability, innovation and system transformation. Unfortunately, despite this injection of funds, in its review of the accord, the Standing Senate Committee on Social Affairs, Science and Technology observed that "real systematic transformation of health care systems across the country had not yet occurred, despite this decade of government commitments and increasing investments."

Internationally, the issue of sustainability is also one that features as a priority in almost all high-income countries across the Organisation for Economic Cooperation and Development (OECD) with health-system stakeholders routinely voicing their concerns about the challenges associated with sustaining their publicly financed health systems. As a starting point to addressing the full range of factors that can contribute to establishing a sustainable health system, jurisdictions including the United Kingdom have recently begun to shift their attention towards 'drivers of change' that may pose a threat to the long-term sustainability of their health system.(7; 8) Unfortunately, similar efforts to identify and address these 'drivers of change' have not been pursued in Ontario.

Therefore, a shift in thinking away from a primary focus on financial pressures towards a more comprehensive assessment of the 'drivers of change' may be needed in Ontario, if ensuring health-system sustainability is to be a top priority. To begin this discussion, this evidence brief and the stakeholder dialogue it was prepared to inform will focus on how to move towards a more sustainable health system in Ontario by focusing on the 'drivers of change' that may threaten health-system sustainability.

Such a focus requires considering a number of existing challenges that could make this difficult, including a range of factors on the 'demand side' that influence whether and how Ontarians interact with their health system (e.g., their social environments, behaviours and health needs), and a number of factors on the 'supply side' that influence how the system is organized, the types of services provided to patients, as well as the cost of providing these services. Similarly, it requires considering the ways in which governance arrangements and political-system factors may also constrain efforts to ensure long-term health-system sustainability and these will also be considered.

This evidence brief also prioritizes a number of groups in the province, given the potential equity implications that this issue has for them. Specifically, when considering the problems associated with ensuring health-system sustainability in Ontario and the elements within a potentially comprehensive approach for addressing these problems, frequent users of the health system (e.g., those with complex chronic conditions) who may be most affected by substantive health-system transformation are prioritized. Additionally, given the issues addressed by this brief are focused on long-term sustainability and will likely take time to implement, this evidence brief will also focus on youth and young adults, who will be the most frequent users of the health system in the future (see Box 2).

Box 2: Equity considerations

A problem may disproportionately affect some groups in society. The benefits, harms and costs of elements of an approach to addressing the problem may vary across groups. Implementation considerations may also vary across groups.

One way to identify groups warranting particular attention is to use "PROGRESS," which is an acronym formed by the first letters of the following eight ways that can be used to describe groups†:

- place of residence (e.g., rural and remote populations);
- race/ethnicity/culture (e.g., First Nations and Inuit populations, immigrant populations and linguistic minority populations);
- occupation or labour-market experiences more generally (e.g., those in "precarious work" arrangements);
- gender;
- religion;
- educational level (e.g., health literacy);
- socio-economic status (e.g., economically disadvantaged populations); and
- social capital/social exclusion.

The evidence brief strives to address all Ontarians, but (where possible) it also gives particular attention to two groups:

- frequent users of the health system, namely those with complex conditions and/or multiple chronic conditions; and
- youth and young adults.

Many other groups warrant serious consideration as well, and a similar approach could be adopted for any of them.

† The PROGRESS framework was developed by Tim Evans and Hilary Brown (Evans T, Brown H. Road traffic crashes: operationalizing equity in the context of health sector reform. *Injury Control and Safety Promotion* 2003;10(1-2): 11–12). It is being tested by the Cochrane Collaboration Health Equity Field as a means of evaluating the impact of interventions on health equity.

In the sections that follow, we provide a brief overview of some important characteristics of the health system in Ontario that provide the context for considering sustainability, followed by a focused discussion of

the range of challenges associated with health-system sustainability in the province. We then discuss three elements of a potentially comprehensive approach for addressing these challenges (including what is known from the best available research evidence about these elements), as well as key implementation considerations associated with each element.

Overview of contextual factors related to addressing health-system sustainability in Ontario

A number of considerations related to the health system in Ontario are important for providing an appropriate level of context when addressing issues related to sustainability, and these can be grouped into at least three sets of factors: 1) how the health system is organized in terms of its governance, financial and delivery arrangements; 2) how the various sectors within the health system interact with each other; and 3) how the health system addresses specific populations with unique needs. We provide a brief summary of these factors below as background to assist with interpreting the information presented about the problem, three elements of a potentially comprehensive approach for addressing the problem, and implementation considerations.

How the health system is governed

- The provincial government has constitutional responsibility for healthcare, but it intersects with the federal government in areas where the latter has responsibility (e.g., First Nations) or sets broad terms under which financial transfers are provided.(9)
- The provincial government has the authority to make a number of decisions about how the system works, but they've also delegated some of this authority to other organizations, such as the ones that regulate what different types of professionals (e.g., nurses or doctors) can do, and the Local Health Integration Networks that plan, integrate and fund care in 14 regions within the province.(9)
- Nursing and medicine are examples of self-regulating professions, which means that the government has established regulatory colleges (led by both members of the profession and the general public) to regulate practice in each profession (e.g., who can be considered a nurse, what a doctor is allowed to do). This self-regulation means that some of the levers available to intervene in the system are not under the control of policymakers, which often leaves them to focus on how health workers are remunerated and organizations are funded.(9)
- Ontario also has 36 local public health agencies, which are typically linked to municipal government and are not aligned with the boundaries of the LHINs (although the *Patients First Act* proposes enhanced integration of population and public health into the health system).(9; 10)

How the health system is financed

- Medically necessary care for eligible Ontario residents that is provided in hospitals and by physicians is fully paid for as part of Ontario's publicly funded health system.(1)
- Public spending on healthcare in Ontario is mostly financed through taxes, while private spending is financed primarily through out-of-pocket payments and premiums paid to private insurance plans.(1)
- Many physicians are paid fee for service, but up to one-third of income received by physicians in Ontario is now paid through alternative payment models. Other health professionals such as nurses are typically paid through salaries or contracts.(1)
- Many other healthcare and community services such as prescription drug coverage, community support services and long-term care homes may be wholly, partly or not paid for by the health system, and any remaining costs need to be paid by patients, families or their private insurance plans.(1)
- Given that 42 cents of every dollar the government spends goes to healthcare, relatively little money is available for the many other areas where the government needs to act.(11)

How the health system is organized

- Most health professionals work in one of three types of settings outside a citizen's home – 1) offices, clinics, pharmacies and laboratories in the community; 2) hospitals; and 3) long-term care homes – most of which are located in independently owned or leased space.(1)
- Healthcare in Ontario is delivered by professionals in 28 regulated health professions, as well as by unregulated health workers (e.g., physician assistants and personal support workers) who contribute to the health system.(1)
- Technology is used to support the delivery of care through a teletriage system called Telehealth Ontario (to assess a health problem and provide advice, but not diagnose or prescribe treatment), and telemedicine (videoconferencing to provide clinical care at a distance through the Ontario Telemedicine Network), as well as through an increasing number of patient portals that provide patients with access to their personal health information.(1)

How the health system addresses specific populations with unique needs

- Health Links (82 out of an approximate planned total of 100 are currently in operation) support the delivery of integrated care for those with complex needs, which is typically people living with four or more chronic diseases and who comprise roughly 5% of the population.(12)
- The 10 Aboriginal Health Access Centres and five Aboriginal Family Health Teams provide community-led, culturally grounded primary healthcare, including many services related to chronic-disease prevention and management, as well as a combination of traditional healing, primary care, cultural programs, health-promotion programs, community-development initiatives, and social-support services to First Nations, Métis and Inuit communities.(12)
- Rural-Northern Physician Group Agreements support one to seven physicians per location to serve rural and northern communities with a nurse-staffed, after-hours Telephone Health Advisory Service for enrolled patients seeking care for a range of issues, including chronic diseases.(12)
- The 101 Community Health Centres provide primary care and health promotion programs for individuals, families and communities, and were designed to address the specific needs of populations such as low-income communities, new immigrants and homeless people.(13)

THE PROBLEM

As noted earlier in this brief, much of the discussion around health-system sustainability in Ontario tends to begin with a focus on growth in expenditures and the costs associated with providing universal publicly funded healthcare. While this is certainly an important part of sustainability to consider, it is also vital to understand the many factors that contribute to these trends in order to properly understand the full extent of the problem. In this section, we describe the problem in terms of four related but distinct issues:

1) demand-side factors that drive change and create sustainability challenges for the health system;
2) supply-side factors that also drive change and pose challenges to health-system sustainability;
3) governance arrangements and political-system factors may constrain efforts to ensure health-system sustainability; and
4) difficulties addressing long-standing policy issues in the health system.

Within each of these issues, a number of factors have been identified that independently and collectively threaten the long-term sustainability of Ontario's health system. Each of these issues are discussed below in turn.

Box 3: Mobilizing research evidence about the problem

The available research evidence about the problem was sought from a range of published and "grey" research literature sources. Published literature that provided a comparative dimension to an understanding of the problem was sought using three health services research "hedges" in MedLine, namely those for appropriateness, processes and outcomes of care (which increase the chances of us identifying administrative database studies and community surveys). Published literature that provided insights into alternative ways of framing the problem was sought using a fourth hedge in MedLine, namely the one for qualitative research. Grey literature was sought by reviewing the websites of a number of Canadian and international organizations, such as Institute for Clinical Evaluative Sciences, Canadian Institute for Health Information, Statistics Canada, The King's Fund, European Observatory on Health Systems and Policies, and Organisation for Economic Co-operation and Development.

Priority was given to research evidence that was published more recently, that was locally applicable (in the sense of having been conducted in Canada), and that took equity considerations into account.

There are many demand-side factors that drive change and create sustainability challenges for the health system

Some of the most pressing challenges to sustainability relate to the ways in which the specific characteristics of citizens, patients, caregivers and communities in Ontario affect the use of the health system. These demand-side dynamics make it challenging to ensure long-term health-system sustainability in Ontario, and include:

1) demographic shifts;
2) lifestyle and behavioural risk factors for diseases;
3) burden of disease and disability;
4) public and patient expectations related to their health and the care they receive; and
5) patterns of service utilization.

Though many of these demand-side factors lie largely outside the direct control of health-system policymakers and stakeholders, each of these challenges have an impact on the long-term sustainability of Ontario's health system.

Given the body of literature that was identified that speaks to each of the demand-side factors, we present a summary of each in Table 1.

Table 1. Demand-side factors that influence the sustainability of Ontario's health system

Demand-side factors	Examples
Demographic shifts	• Two important demographic shifts are unfolding in Ontario and have implications for the sustainability of the health system. 1) Ontario's population is growing ▪ As a result of changes in birth, mortality, immigration and emigration rates, current projections estimate that Ontario's population will increase from 13.8 million in 2015 to 17.9 million in 2041. ▪ Population growth adds on average a 1.0% increase per year to public-sector healthcare spending.(14) 2) Ontario's population is aging ▪ Ontario's life expectancy rose 1.0 years between 2003-05 and 2007-09 ▪ The year 2015 marked the first time in history that there were more people living in Canada who were over the age of 65 than who were aged 14 or younger, and the number of Canadian seniors is expected to double over the next two decades. ▪ While aging alone accounts for only a 0.9% increase per year in public-sector healthcare spending, older adults are more likely to accumulate health 'deficits' such as reduced mobility, disability or chronic disease. ▪ Due to this accumulation of disease and its interaction with a number of other social and environmental factors, indirect costs have also begun to accrue as a result of limitations in the health system's ability to respond to the needs of older patients.
Lifestyle and behavioural risk factors for diseases	• The province has seen improvements in rates of physical activity and a reduction in people who smoke in the last decade, but nearly all Ontarians (92.8%) report at least one of four of the following unhealthy lifestyle behaviours: 1) smoking; 2) unhealthy alcohol consumption; 3) poor diet; and 4) physical inactivity. • Unhealthy behaviours have serious implications for both the health of Ontarians as well as for resource use in the health system – between 2001 and 2012, 32% of all hospital bed days in the province could be linked to one of smoking, unhealthy alcohol consumption, poor diet or physical inactivity.(15) • Between 2004 and 2013, more than $89.4 billion in health spending could be attributed to one or more of these four unhealthy behaviours. • Success in reducing these behaviours has been estimated to produce cost savings, with reductions in smoking having been linked to an estimated $4.9 billion saved.(15) • Factors such as income, living conditions, geography and level of education (that individuals may only have some control over), heavily influence these four unhealthy behaviours, health status, and use of health services.(16) o For example, the choice of whether to buy and eat healthy foods is not always made by consumers, but may be dependent on the availability of access to healthy choices in communities. Studies that measure food store availability and the availability of healthy foods show a large disparity in access by race and income and for low-density and rural areas due to: ▪ lack of supermarkets ▪ lack of healthy, high-quality foods in nearby food stores; ▪ large concentrations of convenience and corner stores; and ▪ lack of transportation to access stores.(17)

Burden of disease and disability	• Medical advances and shifts in behaviours have changed the burden of disease in Ontario, with many previously life-threatening conditions now appearing as chronic diseases. • While medical advances that extend life can represent a positive development in population health and healthcare services, the system must now contend with how to effectively manage chronic care and multiple chronic conditions. • Approximately 80% of Ontarians over the age of 45 (nearly 3.7 million people) are living with at least one chronic condition, and care for such conditions now represents 55% of total healthcare costs in the province. • The combination of population growth, an aging population and continued exposure to lifestyle and behavioural risk factors is projected to increase the total number of individuals with chronic disease in the province, and significantly expand the burden beyond older adults.(18) • Most of the global burden of disease and the bulk of health inequities are caused by the social determinants of health, which puts those who live in poverty in Ontario at a greater risk of developing chronic disease and results in a 2.5% increase in premature mortality, due to lower access to nutritious food, exercise and screening for diseases, or due to work-related challenges including precarious or stressful work.(18)
Public and patient expectations related to their health and the care they receive	• The expectations of younger baby boomers and the generations following them are often much higher and quite different than those of individuals who grew up during the development of Medicare (i.e., post-war populations). • Heightened expectations have been reflected in changes to other service industries such as banking and retail where technology has changed how consumers interact with service providers, but despite significant efforts (e.g., HealthConnect and Telehealth), healthcare in Ontario has been slow to adopt these changes. • Adding to this dynamic is the fact that patients are increasingly empowered to take on a greater role in managing their own care, as well as in decision-making processes including: o increased choice in setting of care; o increased variety of services available; o improved convenience; and o enhanced levels of personalization. • Meeting evolving patient expectations will require significant changes to how the system is planned and how services are delivered.
Patterns of service utilization	• The past decade has seen changes in the utilization of hospital care, with a modest increase in the average length of stay and slight increase in the resources used in inpatient care. • There has been an increase in the number of low-risk surgical procedures that are increasingly viewed as routine (e.g., between 2009-2010 and 2013-2014 there was an increase of just under 20% for hip and knee replacements). • There has been an increase in the demand for mental health and addictions services between 2006-2007 and 2011-2012, with steady increases in the rate of the emergency department visits for youth (<25 years) being seen for all types of disorders. • The overuse of select healthcare services poses a challenge to the health system and has the potential to harm the patient (e.g., through the overuse of prescription medication and low-value imaging and other types of tests). • Due to patterns in the burden of disease, it is expected that those with lower socio-economic status will use more healthcare services. However, barriers to access means that current utilization patterns do not reflect this, as individuals from lower socio-economic backgrounds are less likely to use specialist services, diagnostic-imaging services, screening programs, subsidized residential care, long-term care, home care and end-of-life care. • These patterns are particularly acute for Ontario's Indigenous peoples who, due to lower socio-economic status, social exclusion, discrimination and geography are unable to access services and, as a result, use far fewer services than other Canadians.(19)

Overall, when the full range of demand-side factors are taken together, it is clear that there are many key challenges for health-system sustainability. Some of the factors are likely not feasible to address for a variety of reasons. For instance, as this section has shown, demographic changes including population growth and aging have been linked with increased health expenditures. However, barring efforts to curb birth rates, immigration and prolonged life expectancy, which are neither practical nor realistic, these challenges are difficult (and in some instances impossible) to address.

On the other hand, there are likely many demand-side drivers of change that could be considered challenges for which solutions can be developed. For instance, the four unhealthy lifestyle choices and behaviours (smoking, alcohol misuse, poor diet and lack of exercise) that currently account for a large proportion of costly hospital stays could be addressed with targeted efforts to reduce them. Also, as the burden of disease in the province shifts and creates different types of care needs, the system could be continually adapted to ensure it aligns with these needs as efficiently as possible (as opposed to having many parts of the health system be in a perpetual game of 'catch up'). Furthermore, it is important to account for public expectations in relation to what a publicly funded health system can provide, and patterns of service utilization can be monitored to ensure resources are appropriately allocated to meet these expectations. Each of these areas are addressed as opportunities within the elements presented later in this brief.

Supply-side factors also drive change and pose challenges to health-system sustainability

Supply-side factors – those that relate to the full range of health system inputs that combine to form the actual services that are delivered to patients – also challenge health-system sustainability. The drivers of change on the supply side that may make it challenging to ensure long-term health-system sustainability in Ontario include:

1) medical and technological advances;
2) remuneration of health workers;
3) inflation and price effects; and
4) health system delivery arrangements.

Given the body of literature that was identified that speaks to each of the demand-side factors, we present a summary of each in Table 2. In contrast to the factors outlined in the previous section on the demand side, many of the drivers of change on the supply side are those that health-system policymakers and stakeholders can exert some control over through the decisions that they make. These could include decisions about whether and how to fund new technologies and drugs, or how to adjust financial and delivery arrangements in the province. Importantly, it is the confluence of these factors rather than any single one in isolation that may threaten long-term health-system sustainability, so they are best considered together.

Table 2. Supply-side factors that influence the sustainability of Ontario's health system

Supply-side factors	Examples
Medical and technological advances	• Advances in healthcare technologies have dramatically changed the way care is delivered in Ontario, including: o changes in medical devices and equipment (e.g., imaging); o surgical improvements (e.g., robotic devices); o information and communications technology (e.g., computers, electronic health records and telehealth); and o prescription drugs. • These developments have not only contributed to improvements in population health and outcomes of care, but they have also shifted the types of illnesses that can be treated successfully. • Despite the fact that technological and medical advances can be associated with significant short-term costs, many of them can also be considered opportunities to reduce long-term expenditures. o In general, technological and medical advances with the potential to prevent or cure diseases, even if they are costly investments, are often cost-saving compared to those technologies that treat symptoms.(7) • Canadians spend more on their medications than they did a decade ago, with much of this spending being driven by new drugs designed to treat less common illnesses and more serious conditions such as cancer and autoimmune disease. o For example, despite recent efforts to reduce prices of generic drugs in Canada, generic prices continue to be an average of 32% higher in Canada than in other international markets, particularly those with a substantial number of suppliers.(20) • Not adopting new technologies may also come at a cost to the system. o Despite the potential of technology to advance sustainability, the health system has been slow to embrace the adoption of technological advances and the changes in practice and financing that accompany and promote their use.
Approaches used to pay organizations and providers	• Remuneration of providers and funding of organizations have an impact on sustainability for at least three reasons: 1) The amount being paid to those who work in the health sector is relatively high compared to other social sectors. For example: ▪ earnings among those working in the health sector in Ontario have increased at a greater rate than average earnings increases across the entire economy, with health-worker compensation, particularly in hospitals, driving much of this growth between 1998 and 2008;(21) ▪ attempts to reduce wages through reduced spending on physician services began in 2011, and since then a number of changes have been made to substantially slow this annual growth;(21) and ▪ as a result, the Physician Services Budget only increased from $11.4 billion in the 2011-12 budget to $11.6 billion in the 2015-16 budget, which amounts to a 0.6% annual growth rate (this has been highlighted as being less than estimated annual contribution of population growth and aging to healthcare spending).(21) 2) The growth in earnings has coincided with an increase in the number of people working in the health system, where there have been increases in: ▪ the number of registered practical nurses (RPNs) and nurse practitioners (NPs) (increased since 2004 by 60% and 354%, respectively);(22)

	▪ the number of family physicians (13%) and specialists (11%) between 2010 and 2013;(23) and ▪ other cadres of regulated health professionals, including an 89% rise in the number of midwives between 2008 and 2015, a 32% increase in the number of pharmacists between 2008 and 2014, and a 27% increase in the number of dietitians between 2008 and 2015.(24-25) 3) There has been a rise in spending on organizations and providers, which can, in part, be attributed to the models used to remunerate health professionals. ▪ For example, while alternative models of payment were originally conceived as replacements for fee-for-service, they have increasingly been used alongside fee-for-service to remunerate providers (including those with lower than average fee-for-service incomes, those working in areas where service volumes are low or unpredictable, and those working in time-intensive fields).
Inflation and price effects	• The economy can influence health-system sustainability, particularly as it can be a factor in determining (at least in part) how much the resources used in the health system cost. o For example, general inflation between 1998 and 2016 was about 1.92%, and while this is out of the control of the health system, it has a large effect on health system spending, particularly with regard to labour negotiations.
Health system delivery arrangements	• No transparent process exists for determining what services are considered 'medically necessary' and should be publicly funded, and there is little engagement of citizens in providing advice on what should be included in the 'core bargain of medicare' (i.e., publicly funded traditional physician-led and hospital-based care). • Despite recent efforts and the introduction of new visions for the health system, the system remains fragmented and with limited coordination between providers of care and across sectors.(10) • While there are many programs that aim to promote healthier lifestyles, ensure patients can access appropriate care, and help Ontarians maintain their optimal level of health, these programs are often designed and implemented in isolation within a specific sector and with a specific population or disease focus. • Fragmentation across sectors can lead to care pathways that are not as efficient (e.g., delayed access to health services and/or repetition of diagnostic tests) or effective (e.g., in terms of poor health outcomes) as they could be.

Governance arrangements and political-system factors may constrain efforts to ensure health-system sustainability

While much is known about demand- and supply-side threats to sustainability, decisions about how best to approach each of these challenges are often made by politicians working within the limits of four-year election cycles, and in the face of significant pressures from health-system stakeholders, and the public and from competing agenda items. As such, it may not always be possible to address issues quickly or make decisions based on long-term plans, such as those required to address the array of issues affecting health-system sustainability.

To illustrate these issues, it is important to note that health-system reforms have been a consistent election issue since the mid-1990s across Canada.(26) While a number of changes have occurred in Ontario's system, many researchers acknowledge the difficulties in creating transformative change in a policy domain that is as politically and financially charged as the health system.(26) For example, many stakeholders actively involved

in the system (e.g., service delivery organizations, professional associations, research organizations or groups and public service workers) may challenge reform proposals or efforts to gain consensus across stakeholders.(26) Likewise, politicians and political parties often have interests that differ from those of key stakeholders. Therefore, finding a balance between vested interests to determine the 'right' path forward is often an extremely difficult task. Further complicating the task of building consensus for reforms to ensure sustainability, politicians face pressure from citizens to protect the 'core bargain of Medicare.' In doing so this often means that the public opposes reform proposals for fear that it may weaken the Medicare legacy or require the public to modify the way they seek care and relate to providers.(26)

Despite the challenge in building consensus across health-system stakeholders and in a way that is supported by citizens, health system decision-makers largely agree that reorganization of the system is needed to achieve better population-health outcomes. This includes a recognition that individual-level health status is determined largely outside the provision of health services and, as a result, the path will require a holistic approach to health-system reforms that addresses the intersections between health and other sectors, including sanitation, education, social services, infrastructure and the built environment. First and foremost, however, it will require improved cooperation and coordination and an aligned vision for the health system that is agreed upon by the full range of system leaders. Unfortunately, in Ontario this has not been a particular strength of the many health-system stakeholders with 'skin in the game,' as the implementation of innovative practices that can support efforts to ensure long-term system sustainability have proven challenging to adopt and scale up. This has been seen most recently with the piecemeal efforts to introduce and integrate electronic medical records, a domain in which Ontario lags behind many other jurisdictions in the world.

Ontario has had difficulties addressing long-standing policy issues in the health system

A key challenge to health-system sustainability has been the difficulty in addressing long-standing policy issues in the health sector. Health-system sustainability is not a recent addition to the agenda of policymakers in the province. For example, the issue was front and centre in the negotiations leading up to the 2004 Health Accord, signed between the federal and provincial governments. These negotiations led to a total transfer of $41 billion dollars, to be paid out over a decade, from the federal government to the provinces to sustain, transform and innovate within the Canadian health system. This money contributed, at least in part, to several reforms in Ontario, including:

- introduction of interprofessional team-based primary care;
- expansion of the role of nurses to provide some primary-care services (e.g., as part of Family Health Teams or in Nurse Practitioner-led Clinics);
- creation of Local Health Integration Networks (for planning and funding healthcare in their regions); and
- Community Care Access Centre for coordinating the delivery of home and community care.(27)

Despite these changes, this increase in money from the federal government to the provinces did not produce the long-term changes in the health system that many anticipated. Even today, discussions are underway between the federal and provincial governments with regards to new funding priorities and funds to support system-level transformations in Ontario.

Indeed, a recent analysis of reforms in Ontario points out that key areas where reforms did not happen include those that relate to the core elements of the health system. In particular, reforms have maintained the approach of providing public funding for care provided in hospitals or by physicians, but not for any other parts of the health system or sectors that provide services that promote healthy populations.(27) This includes what many would identify as sectors that provide essential care such as:

- home and community care (although increased investments have been made in this sector);
- rehabilitation care; and
- forms of treatment that many require access to as part of their care plans (most notably funding prescription drugs) or as part of primary care (e.g. dental services).

The same analysis of reforms identified other areas where reforms have not happened in Ontario, which include:

- strengthened care for mental health and addictions;
- limited roll-out of alternative ways of paying clinicians that support their ability to provide health-promoting services, as well as comprehensive care for those with complex conditions (e.g., through the introduction of value-based funding); and
- the implementation of a comprehensive approach to address the overuse of health services, where most action has taken the form of focused profession-led initiatives, such as Choosing Wisely Canada.

As noted in the analysis, the challenge in making progress towards such large reforms is that they typically only happen as a result of: 1) electoral processes (e.g., a new government or government leader, campaign commitment to reform during an election, appointment of a champion once in power, and a policy announcement in the first half of a mandate); and 2) presence of a perceived fiscal crisis.(27)

Additional equity-related observations about the problem

While the challenges outlined in this section of the brief have important implications for how demand-side drivers, supply-side drivers and the problems associated with governance arrangements and political-system factors can threaten health-system sustainability in Ontario more generally, there are a number of aspects of these challenges that may be particularly salient for the groups prioritized in this brief (frequent users of the health system and youth/young adults). First, as demographics, the burden of disease/disability and patient/public expectations continue to shift in the province and create the impetus for reforms that veer away from the traditional focus of the health system in Ontario (acute episodic care) towards a system that centres on a strong primary-care sector with the aim of preventing disease and promoting health, and on supporting patients and their families in home and community settings, it will be essential to ensure the unique needs of frequent health-system users are not overlooked – even if some of those needs are heavily weighted towards acute care. The 'heaviest' users of the system – around 5% of patients – are estimated to account for two-thirds of healthcare costs in the province, and most often these are patients with multiple complex conditions that require coordinated services across a range of sectors (e.g., home and community care, primary care, acute hospital care and long-term care).(28) While a more sustainable health system will ideally help to address some of the antecedents that lead to such complex cases and effectively shift the cost curve (e.g., by focusing on reducing the number of people with preventable chronic illnesses in the first place), it is inevitable that there will always exist a proportion of high-frequency users relative to the general population, and programs will need to be in place to support them. The recently initiated Health Links in Ontario provide a promising template for how such supports can be provided.

Second, as already noted above, there are now more adults over 65 than children aged 0-14 in Ontario, and this imbalance will continue as the baby-boomer generation continues to age. In the existing 'pay as you go' model of health-system financing (whereby the working population contributes taxes to pay for public services), this means the burden on younger generations for financing the health system is heavier now than it was for past generations. Furthermore, younger generations have the most to gain from system-wide reforms that include a shift in focus away from acute episodic care towards a stronger primary-care system that supports healthier behaviours and lifestyles. However, the changes that need to be made today to realize these future benefits would likely come at the expense of the highly expensive acute care that the current generation of older adults have come of age expecting from their health system. This dynamic creates a significant tension between the dominant needs and demands of patients in Ontario today, and those of the future.

Citizens' views about key challenges related to health-system sustainability

During a citizen panel convened on 12 November 2016, 12 ethno-culturally and socio-economically diverse citizens were provided a streamlined version of this evidence brief written in lay language. (Details about the recruitment and approach to convening the panel are available in the panel summary, which can be downloaded from the McMaster Health Forum website.(29)) During the deliberation about the problem, citizens were asked to share what they view as the key challenges related to addressing health-system sustainability in Ontario, and what they view as being needed to recognize it as an issue that warrants attention and effort to address. To prompt discussion, citizens were specifically asked to consider what underlying challenges they have experienced or observed that may pose a threat to the sustainability of the health system. Citizens were encouraged to think of challenges that relate to each the demand- and supply-side, as well as governance arrangements and political-system factors that may constrain efforts to ensure sustainability. We summarize the key challenges identified by citizens in Table 3.

Table 3: Summary of citizens' views about challenges related to health-system sustainability

Challenge	Description
Patients have inconsistent access to healthcare services	• Participants discussed having a lack of consistent access to health services particularly: o in rural communities where travel to another town was often required; o among marginalized populations living in either rural or urban areas; and o in communities with high numbers of immigrants and refugees, who may be in need of (or prefer) care that is sensitive to specific cultural or linguistic norms. • Several participants expressed frustration with a lack of timeliness of care in primary care, as well as long wait-times for urgent care and surgery. • Two participants discussed the specific challenge of limited reserve capacity to address emergent issues and to ensure patients receive the best healthcare. In particular they were concerned about: o not having replacements for professionals when they are on holiday; and o a perceived ongoing shift of resources from smaller rural communities to more urban settings where large health facilities provide care for large regions.
Lack of accountability for what and where services are being provided	• Participants felt that the system lacked professional accountability for providing care that promotes patient well-being, and several emphasized a consistent focus among providers on prescribing drugs rather than working with patients to support behavioural and health-promotion interventions. • Participants also discussed what they saw as limited accountability within the health system for the distribution of healthcare providers through health workforce planning in the province, particularly in areas that are often chronically underserved, such as rural and remote communities. • Participants also suggested there was insufficient accountability for costs and payments in the system, specifically as it relates to: o transfers from the Ministry of Health and Long-Term Care to the Local Health Integration Networks; and o ensuring transparency in how organizations are funded and providers remunerated, and the impact this may have on care provided.
Insufficient amount of attention paid to what helps keep patients healthy	• Many participants felt there was too much focus placed on reactive treatments to help patients once they are sick, and not enough attention paid to proactive interventions to prevent disease and promote wellness. • In particular, participants focused on the limited attention paid to nutrition and its impact on health, with emphasis placed on a number of shortfalls that include: o the inability of select populations to access nutritious foods (e.g., very northern populations and in less affluent areas);

	○ the amount of salt and sugar in processed food; ○ a lack of adherence to or knowledge of Canada's Food Guide among Ontarians, and no consistency in serving sizes; ○ a lack of easily accessible and understandable information on nutrition and food; and ○ challenges associated with controlling the marketing of junk food to children (e.g., associating snacks with cartoon characters and placing them on lower shelves). • Participants also felt there was a limited focus on physical activity, particularly in younger demographics, and how to remain healthy and active throughout the lifespan.
Misalignment of the political system to support and achieve long-term whole-system change	• Politicians are elected on four-year mandates, which participants noted is often not enough time to develop and implement large-scale transformation before they have to begin campaigning for the next election. • Participants also discussed how self-interest in being re-elected can lead to a focus on quick wins rather than developing long-term policy that would contribute to enhancing sustainability. • The lack of collaboration between politicians was also discussed, including difficulties associated with: ○ collaborating across different sectors (e.g. health, social services, agriculture or transportation); ○ fostering agreement between politicians and health-system stakeholders; and ○ engaging citizens to determine what values should be represented in the health system.
Information is not readily accessible or easy to understand	• Participants expressed uncertainty about where to find reliable sources of information regarding health and healthcare services. • They also discussed the lack of accountability in the media for publishing information that is based on the best available evidence (e.g., food and physical activity fads).

THREE ELEMENTS OF A POTENTIALLY COMPREHENSIVE APPROACH FOR ADDRESSING THE PROBLEM

Many approaches could be selected as a starting point for deliberations about an approach for addressing health-system sustainability in Ontario. To promote discussion about the pros and cons of potentially viable approaches, we have selected three elements of a larger, more comprehensive approach to promote health-system sustainability. The three elements were developed and refined through consultation with the Steering Committee and the key informants who we interviewed during the development of this evidence brief. The elements are:

1) engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change;
2) align features of the health system to achieve value for money by addressing supply-side drivers of change; and
3) harness distributive leadership approaches that enable the system to innovate and move towards sustainability.

While the three elements could be pursued separately or simultaneously, or components could be drawn from each element to create a new (fourth) element, addressing health-system sustainability will likely require action across each of them. We present them separately to foster deliberations about their respective components, the relative importance or priority of each, their interconnectedness and potential of or need for sequencing, and their feasibility.

The principal focus in this section is on what is known about these elements based on findings from systematic reviews. We present the findings from systematic reviews along with an appraisal of whether their methodological quality (using the AMSTAR tool) (9) is high (scores of 8 or higher out of a possible 11), medium (scores of 4-7) or low (scores less than 4) (see the appendix for more details about the quality-appraisal process). We also highlight whether they were conducted recently, which we define as the search being conducted within the last five years. Due to the extensive scope of each of the elements and the large number of systematic reviews relevant to them, we have restricted the evidence presented in the brief to only include high-quality (AMSTAR scores of 8 or high out of a possible eleven) and recent reviews (i.e., conducted since 2011). In the next section, the focus turns to the barriers to adopting and implementing these elements, and to possible implementation strategies to address the barriers.

Box 4: Mobilizing research evidence about elements of a potentially comprehensive approach for addressing the problem

The available research evidence about elements of a potentially comprehensive approach for addressing the problem was sought primarily from Health Systems Evidence (www.healthsystemsevidence.org) which is a continuously updated database containing more than 5,500 systematic reviews and more than 2,500 economic evaluations of delivery, financial and governance arrangements within health systems. The reviews and economic evaluations were identified by searching the database for reviews addressing features of each of the elements and sub-elements.

The authors' conclusions were extracted from the reviews whenever possible. Some reviews contained no studies despite an exhaustive search (i.e., they were "empty" reviews), while others concluded that there was substantial uncertainty about the elements based on the identified studies. Where relevant, caveats were introduced about these authors' conclusions based on assessments of the reviews' quality, the local applicability of the reviews' findings, equity considerations, and relevance to the issue. (See the appendices for a complete description of these assessments.)

Being aware of what is not known can be as important as being aware of what is known. When faced with an empty review, substantial uncertainty, or concerns about quality and local applicability or lack of attention to equity considerations, primary research could be commissioned, or an element could be pursued and a monitoring and evaluation plan designed as part of its implementation. When faced with a review that was published many years ago, an updating of the review could be commissioned if time allows.

No additional research evidence was sought beyond what was included in the systematic review. Those interested in pursuing a particular element may want to search for a more detailed description of the element or for additional research evidence about the element.

Citizens' values and preferences related to the three elements

To inform the citizen panel convened on 12 November 2016, we included the same three elements of a potentially comprehensive approach to address the problem in the citizen brief as are included in this evidence brief. These elements were used as a jumping-off point for the panel deliberations. During the deliberations, we identified several values and preferences from citizens in relation to these elements, which we summarize in Table 4. In addition to posing questions about each of the elements, we also asked participants to describe, based on their experiences, what has worked well for them and their families and caregivers in the health system, and they identified the following:

- first-dollar coverage for care provided in hospitals and by physicians;
- prioritizing care based on need (e.g., through triage systems that ensure that those in most urgent need get seen first);
- coordination of home and community care that is provided by Community Care Access Centres; and
- convenient access to prescription drugs through community pharmacies (although fees associated with drug costs and variability in dispensing fees were noted as frustrating).

Interestingly, while some emphasized the importance of first-dollar coverage for medical care and allocating care based on need, several participants indicated that alternative models of delivery should be considered with some advocating for (and several agreeing) that a two-tier system where citizens could pay for faster access should be considered to help make it easier to access care.

Table 4: Citizens' values and preferences related to the three elements

Element	Values expressed	Preferences for how to implement the element
Engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change	• Empower citizens with education (for consumers to improve health literacy and generate a greater understanding of health and the health system) • Integrate citizen's values and preferences (in developing health-promotion and disease-prevention interventions as well as in making any adjustments to the built environment) • Embrace innovation and technology (in the development of health-promotion and disease - prevention initiatives and in educating consumers)	• Keep people healthy by focusing on interventions with a community design that are targeted to specific geographic areas and take into consideration the values and preferences of individuals living in each community. • Support people to engage in physical activity and health enhancing behaviours by: o improving community walkability; o ensuring safe play areas for children and adolescents; o improving the accessibility and affordability of healthy food (e.g., incentives for purchasing organic produce and increasing grocery store density in rural and less affluent communities); and o supporting adults to enrol in physical activity programs (e.g., by providing tax credits or incentives). • Embrace technology for promoting healthy behaviours such as implementing pilot Fitbit programs, developing cooking classes via YouTube and using social media (e.g. Snapchat) to promote health facts (much like companies do to market unhealthy food and other products to users). • Provide education and health-literacy training that is easily accessible (e.g., in schools) and adapted for different demographics, and sufficiently interesting to engage consumers. • Develop a clear, unbiased and well-promoted source for information on health and the health system.

Align features of the health system to achieve value for money by addressing supply-side drivers of change	• Support evidence-based decision-making (in determining what programs, services and drugs should be publicly funded) • Ensure transparency (in the decision-making process when stopping or limiting funding for programs, services or drugs) • Promote accountability (in holding one organization or agency responsible for decision-making)	• Base decisions on what to fund in the system on the best available evidence and ensure decision-makers have the ability to communicate this step when announcing policy changes. • Develop a clear process for determining what is or is not (e.g., services and drugs) considered medically necessary to ensure that it: o is transparent both in process and implementation; o has clear lines of accountability (e.g., how and by whom the decision was made); and o demonstrates effects of new services or drugs.
Harness distributive leadership approaches that enable the system to innovate and move towards sustainability	• Ensure transparency (in who is involved in decision-making processes for addressing health-system sustainability) • Promote accountability (for reforms to address health-system sustainability) • Foster citizen and stakeholder involvement (in high-level decision-making in health system reforms)	• Include representatives from all levels of the health system in decision-making processes for addressing health-system sustainability. • In efforts to combat changes in the political agenda, develop an independent body with representatives from across the health system that can continue to monitor and report on reform efforts. • Increase the amount, accessibility and availability of public reporting to enable citizens to keep decision-makers accountable. • Engage in clear communication and dialogue with the public in an effort to gain buy-in and ownership over changes.

Element 1 – Engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change

This element is rooted in an understanding that a wide range of factors, including those associated with demographics, built environments, socio-cultural and socio-economic environments, as well as individual patient choices (both in the lifestyles and behaviours they engage in and in the ways that they engage with the health system) drive Ontarians' demand for healthcare. It also acknowledges that many aspects of the problem outlined earlier that align with these demand-side drivers are currently putting a strain on the health system and threaten its long-term sustainability. As such, this element focuses on a range of approaches that may be adopted to alter the long-term trajectories upon which these drivers have set many aspects of the health system. In the broadest sense, these include efforts to improve the information made available to Ontarians which can affect the choices they make (both inside and outside of the health system), as well as efforts to alter the contexts in which they live and work. Both of these are intended to keep Ontarians as healthy as possible for as long as possible.

More specifically, this element may include a number of sub-elements such as:

- enabling Ontarians to make healthier lifestyle decisions;
- promoting the establishment of healthier living and working environments;
- adopting and implementing appropriate 'nudge' policies that increase the likelihood Ontarians choose healthy lifestyles;
- enhancing the health literacy of Ontarians and enabling informed care choices through the provision of information about health systems;
- supporting patient self-management and shared decision-making; and
- strengthening and supporting the role of patients' families and carers, and increasing the role of patient peer-to-peer support.

In total, we identified 82 systematic reviews (Table 5) that related to these sub-elements. We provide a broad summary about what we can learn from the research evidence, but for those who want to know more about the systematic reviews (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 1.

With respect to the first sub-element focused on enabling healthier lifestyle decisions, we identified 10 high-quality systematic reviews which found that engaging in lifestyle interventions focused on dietary modifications and increased levels of physical activity had a range of positive benefits for individuals across the lifespan, including better clinical outcomes for Type 2 diabetics, improved levels of physical activity and improved nutritional behaviour.(30; 31) While many reviews focused on what interventions were effective, relatively few reviews addressed how to best engage individuals in these activities. We also identified three high-quality reviews that provide some insight into success factors that encouraged uptake of behavioural interventions. One review found that among university students, interventions where the duration was less than a semester and those that were embedded within a course were most effective.(32) Another review examining Type 2 diabetics' participation in physical activity found that providing at least 11 hours of contact and support was an important mediator of ongoing participation.(33) Finally, a review focused on organized cancer screening found each of the following interventions could increase participation (and while screening isn't a healthy behaviour per se, getting people to adhere to screening recommendations is a type of behaviour change that is promoted to optimize promotion/prevention initiatives):

- postal reminders;
- advanced notification letters for colorectal screening;
- telephone calls;
- signed invitations from physicians;
- advanced scheduling of an appointment; and
- mailing self-sampling devices to non-responders.(34)

Fifteen high-quality reviews were found that promote the establishment of healthier living and working environments (the second sub-element). Four high-quality reviews focused on workplace health and safety and found that occupational health and safety training, drug-free workplace campaigns and the use of proper sanitation facilities improved health behaviour, and reduced injuries and the prevalence and odds of infection.(35-38) Similarly, reviews found that the use of ergonomic equipment is beneficial in reducing the symptoms of upper limb and neck discomforts, as well as in reducing injury severity, injury costs and lost work days.(39; 40)

Other reviews related to the second sub-element also found that the built environment can influence the extent to which individuals participate in healthy behaviours. For example, one high-quality review found that increased cycling infrastructure including dedicated bike routes that are easy to access and separated from traffic, improve cycling uptake in communities.(41) Additionally, a medium-quality review identified the following characteristics from both the natural and built environment that encourage physical activity and reductions in obesity:

- mixed-land use and density;
- footpaths and cycle ways;
- facilities for physical activity;
- street connectivity and design;
- transport infrastructure; and
- linking residential, commercial and business areas.(42)

Changes that positively affect the health of Ontarians may also be pursued through the introduction of 'nudge' policies specifically targeted at individual behaviours and choices that can affect their health, which is the focus of the third sub-element. Nudge policies are any changes to choice architecture (i.e., the way in which choices are presented to consumers) that alter people's behaviour in a predictable way, without closing any options and without the use of purely economic incentives. Eleven high-quality reviews were found that addressed the effectiveness of nudge policies, the majority of which addressed the impact of choice architecture on food and beverage consumption. Four high-quality and three medium-quality reviews found:

- an association between the size and shape of containers and cutlery on eating behaviours;(43)
- health messaging and food labelling had some effect on food choice with a reduction ranging between 16.8 and 55.6 kcal for choices that had visible caloric information;(44; 45)
- food labelling was more effective for women than men;(45) and
- promotion of target foods can influence children's food preferences, knowledge and consumption behaviour.(46-48)

Despite not specifically nudge policies, two additional reviews found that demand for food and non-alcohol beverage choices was elastic, with food away from home, soft drinks, juice and meats being the most responsive to changes in price. It is therefore thought that taxes and subsidies have the potential to contribute to healthy consumption patterns at the population health level.(49; 50)

In addition to these findings, a number of reviews we identified focused on ways of enhancing individuals' health literacy levels as a strategy to both improve their uptake of healthy behaviours and to encourage them to seek out health information on their own (the focus of the fourth sub-element). Three high-quality reviews found that health literacy training improved help-seeking behaviour, self-efficacy in searching for information, and communication of information with health providers.(51-53) Importantly, one of these reviews found a strong relationship between levels of health literacy, emergency department visits and overall health status.(54)

Patient self-management, shared decision-making and strengthening support for informal caregivers were also seen as potential strategies for altering demand-side factors threatening sustainability (sub-elements five and six). One high-quality review was identified that assessed the impact of shared decision-making and found that it:

- improved knowledge acquisition;
- increased the number of informed choices patients made;
- supported patient participation in the care process;
- improved patient-relevant and disease-related outcomes; and
- reduced decision-making conflicts among marginalized individuals.(55)

Similarly, patient, family and caregiver involvement in the care process was generally found to improve knowledge, result in small improvements in health outcomes and have a small effect on patient quality of life.(56; 57) Reviews also suggested that information increases the ability of patients and their caregivers to accurately assess risks.(58) For example, one high-quality review found that when health information technology applications were brought in to support patient self-management they were found to have a positive influence on:

- clinician responsiveness to patient needs;
- self-efficacy;
- decision-making processes; and
- access to information.(59)

Evidence from reviews confirmed that many informal caregivers require additional supports to relieve feelings of burden and stress. We identified eight high-quality reviews that reported on interventions to reduce caregiver burden, including psychoeducation, computer and internet-delivered support and telehealth services. These reviews generally found positive outcomes including improved knowledge and skills for caregiving, increased ability to manage stress, improved coping and self-efficacy, and improved problem-solving and decision-making skills.(60-67) However, respite care and temporary residential admissions were found to accelerate the time to admission of dementia patients to nursing homes, reduce sleep quality of patients during admissions, and increase feelings of burden on caregivers immediately following the respite period.(68)

While much information was found for this element, retrieving information and conclusive evidence on cost and cost-effectiveness remained relatively rare. This paucity in research may be, in part, the reason health-promotion and disease-prevention activities, similar to those suggested above, have been slow to be implemented and scaled up in the health system.

A summary of the key findings from the synthesized research evidence is provided in Table 5.

Table 5: Summary of key findings from systematic reviews relevant to element 1 – Engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change

Sub-element	Key findings from systematic reviews
Enabling Ontarians to make healthier lifestyle choices	*Benefits* • Two high-quality reviews found dietary modifications reduced the risk of cardiovascular disease as well as reduced the progression to Type 2 diabetes for those with impaired fasting glucose or impaired glucose tolerance.(30; 31) • Four high-quality reviews examining the effectiveness of dietary and physical activity interventions found: o better clinical outcomes for diabetics; o reduced sedentary behaviour; o reduced BMI; o increased participation in other forms of activities girls under 12; and o a reduction in the likelihood becoming overweight.(30; 69-71) • One high-quality review found that using social media to promote healthy diet and exercise had no significant increases in physical activity or in weight, suggesting that interventions may not be sufficient to trigger behaviour change.(72) • Two high-quality reviews found behavioural interventions including both supervised exercise components and counselling sessions increased the levels of physical activity and exercise in adults with Type 2 diabetes. The reviews also found that direct contact and support enhanced the interventions level of effectiveness.(33; 73) • Three high-quality reviews examining multi-component behavioural lifestyle interventions to reduce sedentary behaviour improved weight outcomes among children, and reduced sedentary behaviour among adults participating in the intervention.(74-76) • Among university and college students, one high-quality review found that interventions targeting physical activity, nutrition and weight loss resulted in: o improved levels of physical activity with a significant number of participation days and longer duration; o improved nutritional behaviour including diet quality, vegetable intake, fruit intake, reduction in fat and fewer calories consumed; and o reported improvements in reduced waist size and BMI.(32) • The same review reported that interventions spanning a semester or less and that were embedded within a course were more effective than those with a duration longer than a semester.(32) • Two high-quality reviews examined the effects of lifestyle interventions to improve pregnancy outcomes for women at risk for or with gestational diabetes, and found increased physical activity, availability of nutritional information and visits from a dietitian reduced the likelihood of weight gain and prevalence of gestational diabetes.(77; 78) • One high-quality review found each of the following interventions increased participation in organized cancer screening: o postal screening; o postal reminders; o advance notification letters for colorectal screening; o telephone calls; o GP signing invitation; o scheduled appointments; and o mailing self-sampling device to non-responders.(34) • One high-quality review found no evidence to support changes in exercise behaviour or changes to current guidelines for individuals with or who have had cancer treatment.(79) *Harms* • None identified

	Costs • One high-quality review reported that while few community-engagement studies report any analysis of costs, there was some evidence in the included studies that community engagement in the development of interventions to address inequalities in healthcare was cost-effective.(80)
Promoting the establishment of healthier living and working environments	*Benefits* • One high-quality review found the use of the World Health Organization's Health Promoting Schools framework was an effective tool for improving public health outcomes in students, including a small but positive effect on body mass index, physical activity, physical fitness, fruit and vegetable intake, tobacco use and being bullied.(81) • Two high-quality reviews found the use of some ergonomic equipment and interventions were beneficial in reducing the symptoms of upper limb and neck discomforts, as well as in reducing injury severity, injury costs and lost work days.(39; 40) . • Four high-quality reviews focused on workplace health and safety and found: o occupational health and safety training improved health behaviour in the workspace, but had no effect on workers' overall health;. o drug-free workplace campaigns were found to have a small effect at reducing injuries; o access to health education and use of sanitation facilities is associated with a reduction in prevalence and odds of infection with soil-transmitted helminth as well as active trachoma infections.(35-38) • One-high quality review found mental health interventions have positive impacts on workplace outcomes when: o they are high intensity interventions; o seek to improve both mental and physical health; o have multiple components; o provide access to clinical treatment; and o provide support in navigating disability-management programs.(82) • Mixed evidence was found for the impact of educational and environmental interventions in preventing and or reducing lead exposure. Some evidence was found that a combined approach of both education and household interventions may be effective.(83;84) • Some evidence was found in one high-quality review supporting the use of motivation interviewing and intensive counselling to encourage smoking cessation among family members and carers of children.(85) • One high-quality review found that workplace physical activity interventions improved employees' physical activity, energy consumption and body mass index. The review also found that the most effective interventions were less than six months in duration, used a pedometer and applied internet-based approaches. Similarly, another high-quality review found one-on-one counselling, health assessment and feedback, educational material and tailored interventions provided by employers could improve BMI, percent of body fat, blood pressure and smoking cessation.(86) • One high-quality review assessing the effect of individual perceptions of the school environment found that teacher support, general connectedness, encouragement of autonomy, quality of relationship with peers, happiness with school, feeling of being safe at school, and clarity and consistency had an effect on emotional health and/or suicidal behaviour. • One high-quality review examining public health interventions to reduce the health impact of climate change found some evidence that green spaces help to reduce the impact of higher temperatures, and that heat warnings help to increase public awareness and reduce mortality. As climate change becomes an increasingly pressing issue, the review stresses that more research will be needed.(87) • One high-quality review found that increased cycling infrastructure, including dedicated cycle route combined with short travel distances, improved cycling uptake.(41) *Harms* • One high-quality review found safety campaigns at construction sites had a small but significant initial and sustained increase in fatal and non-fatal injuries.(36) *Costs* • None identified

Adopting and implementing appropriate 'nudge' policies that increase the likelihood Ontarians choose healthy lifestyles	*Benefits* • Two medium-quality and three medium-quality reviews assessed the impact of choice architecture interventions on individuals' food and beverage consumption found: o an association between the size and shape of containers and cutlery and eating behaviours;(43) o health messaging and food labelling had some effect on food choice with a reduction ranging between 16.8 and 55.6 kcal for choices that contained visible caloric information;(44; 45) o food labelling was found to be more effective for women than men;(45) o food and non-alcoholic beverage choices were found elastic with food away from home, soft drinks, juice and meats being the most responsive to changes in price;(49) o taxes and subsidies were found to have the potential to contribute to healthy consumption patterns at the population level.(50) • In assessing how to reduce smoking rates, one overview of reviews and one high-quality review found that smoking bans reduced the rates of active smoking as well as contributed to a reduction in passive smoke exposure at a variety of institutions. In examining government policy levers, the overview of reviews determined that raises on tobacco taxes and warning labels about the danger of tobacco were at least in part effective at reducing rates of active smoking and encouraging smoking cessation.(88-89) • Food promotion, particularly of target foods and among younger children (e.g., age 2-11), was found in two high-quality and two medium-quality reviews to affect children's food preferences, as well as having a modest effect on nutritional knowledge and consumption behaviour.(46-48; 90) One of the medium-quality reviews further found that food promotion and targeted campaigns are most effective when they take place over a number of years, use multiple modes of communication, and in the short-term incorporate public involvement.(90) • Two-high quality reviews confirmed that interventions aimed at influencing food consumption patterns are most effective among young children and new parents. The most effective interventions, particularly for lower socio-economic and Indigenous families, were found to have the following success factors: o high levels of parental engagement; o use of behavioural change techniques; o a focus on skill building; and o strong links to community resources.(91) • One medium-quality review that the following urban-form characteristics of both natural and built environment tend to be associated with physical activity and nutrition-related obesity behaviours: o mixed-land use and density; o footpaths and cycle ways; o facilities for physical activity; o street connectivity and design; o transport infrastructure; and o linking residential, commercial and business areas.(42) *Harms* • None identified *Costs* • None identified
Enhancing the health literacy of Ontarians and enabling informed care choices through the provision of	*Benefits* • School mental health literacy programs were found, in one high-quality review, to improve knowledge acquisition and help-seeking behaviour as well as to reduce stigmatizing attitudes.(51) • Two high-quality reviews examined the impact of health-literacy training on finding and using information. The reviews suggest that this education had positive outcomes across measures of self-efficacy for information seeking, information evaluation skills, and communication of information with health professionals.

information about the health system	In addition, the reviews suggest that there is a relationship between health-literacy levels and levels of hospitalization and health status, suggesting those who are at risk of being the most ill are those who are in the most need of health-literacy training.(52; 53) • The same reviews found that interventions with a focus on self-management decreased hospitalization and emergency department visits among individuals with low levels of health literacy.(54) • One high-quality review found the following design features were effective for improving the understanding of health messages for individuals with low levels of health literacy, including: o presenting numerical data in table format rather than text; o adding icon arrays; and o adding visual to verbal narratives.(53) *Harms* • None identified *Costs* • None identified
Supporting patient self-management and shared decision-making	• In two high-quality reviews, shared decision-making was found to: o improve knowledge acquisition; o increase the number of informed choices; o support patient participation in decision-making; o improve patient-relevant and disease-related outcomes; and o reduce decision-making conflicts among marginalized individuals.(55) • The same reviews also found an increase in shared decision-making and the number of individuals undergoing the screening procedures. • Personalized risk communication was found in one high-quality review to enhance individuals' decision-making ability and increase the number of individuals undergoing the screening procedure.(58) • One high-quality review suggested that person-centred care related health IT applications can have a positive impact on healthcare process outcomes, as well on clinical outcomes related to diabetes mellitus, cancer and heart disease. IT interventions were also found to have a positive influence on: o clinicians' responsiveness to patients' needs; o patient-clinician communication; o decision-making process; and o access to information.(59) • Interventions that focus on patient activation and self-management resulted in lowered A1C haemoglobin levels, systolic blood pressure, and low and high-density lipoprotein cholesterol in Type 2 diabetes patients. They were not found, however, to influence hypoglycaemia or short-term mortality.(92) The two high-quality reviews further found that the most common components of self-management interventions are: o lifestyle advice; o psychological strategies; and o information related to the condition.(93; 94) • An additional two high-quality reviews assessing self-management suggest that they lead to small improvements in patients' health outcomes and quality of life.(95) • One high-quality review examined professionals' attitudes and approaches towards patient self-management and found two primary approaches: 1) manage their condition(s) well, which takes a narrower approach to disease control; and 2) manage well with their condition(s), which allows the patients to focus on disease control in terms of what supports they can obtain to achieve their goals. Despite the second approach being found to be more effective, it was less evident in actual practice.(96)

	Harms • None identified *Costs* • None identified
Strengthening and supporting the role of patients' families and carers, and increasing the role of patient peer-to-peer support	*Benefits* • One high-quality review found that carer stress was not a strong predictor of subsequent institutionalization of those being cared for. • Including family caregivers in patient care through educational sessions was found in one high-quality and one medium-quality review to reduce readmission rates, improve knowledge, enhance patient care, prolong time to rehospitalisation, increase levels of perceived control among patients, and improve dietary and medication adherence.(56; 57) • In one high-quality and one medium-quality study, psychoeducation and cognitive behavioural therapy were found to improve caregivers' ability to manage stress, increase knowledge and preparedness, improve coping skills and self-efficacy. Neither intervention however was found to significantly affect their general health.(60; 61) • In assessing willingness to access care, one medium-quality review found caregivers' willingness to access services for themselves is primarily determined by previous experience with both formal and informal supports. A sub-group analysis further determined a preference among male caregivers for seeking help from formal services over informal alternatives.(62) • Technological interventions including computer-mediated interventions were found to be somewhat effective at reducing symptoms of depression and anxiety in two medium-quality studies. The reviews, however, found no impact on feelings of burden, problem-solving abilities or overall health status.(63; 64) • Two additional medium-quality reviews examined the impact of internet- and telehealth-based interventions on supporting informal caregivers. These reviews reported improved psychological health, increased knowledge and caregiving skills, higher levels of social support, and improved problem-solving and decision-making skills, and telehealth interventions improved communication with providers.(65; 66) • One high-quality review found that the provision of palliative care at home improved the likelihood of individuals dying at home. The review also found that delivering palliative care at home is more effective than usual care on relieving symptoms. • One medium-quality review found five key themes related to patients, families' and healthcare providers' perceptions of advance care planning for cancer patients: o advance care planning is relational and family should be involved in patients' decision-making, with the exception of end-of-life treatment decisions; o advance care planning can provoke fear and distress depending on the timing of the discussion, how it is initiated and what information is provided; o advance care planning is largely controlled by physicians who feel they are best placed to determine when patients are ready to engage in planning; o institutional culture is influential in determining participation and success of the advance care planning process; and o knowledge of advance care planning and previous healthcare experiences can act as a motivator or barrier to participating in advance care planning.(67) *Harms* • One medium-quality review included four studies which found that while one-on-one sessions of psychoeducation assisted caregivers, group sessions increased feelings of anxiety among caregivers of patients receiving palliative care.(60) • One medium-quality review found that while respite homes were effective in decreasing caregiver burden and behavioural problems in persons with dementia, they were also found to accelerate the time to admission of dementia patients to nursing homes, and reduced sleep quality during admission. Likewise, the review found that temporary residential admissions showed adverse effects on both caregivers and care recipients including increased feelings of burden on caregivers immediately following the respite period.(68) *Costs* • One high-quality review found that delivering palliative care at home lowered costs in the intervention groups ranging from 18% to 35% compared to conventional care.

Element 2 – Align features of the health system to achieve value for money by addressing supply-side drivers of change

While element 1 focused primarily on efforts that could target the many demand-side factors that threaten health-system sustainability in Ontario, this element focuses on a number of potentially feasible mechanisms that could be used to address some of the supply-side factors identified above that threaten health-system sustainability in the province. Specifically the focus of element 2 is on strengthening, and in some cases re-aligning, components of the health system to ensure it is positioned to achieve value for money. Efforts that fall within this element include:

- organizational changes, such as:
  - ensuring that health system and organizational decision-making processes are informed by the best available evidence, and
  - integrating routine assessments of system sustainability into all system-level decision-making processes;
- changes to financial arrangements, such as:
  - aligning funding and remuneration models with population-health outcomes and appropriate health-system performance measures that align with patient preferences and values, and
  - ensuring publicly funded programs, services and drugs take advantage of medical advances that offer 'value for money', while identifying and disinvesting in those that are no longer cost-effective; and
- changes in how programs, services and drugs are delivered, such as:
  - improving the integration of programs and services that focus on promoting health and preventing illness, providing care to those who become sick, and supporting the ongoing management of conditions,
  - identifying the most promising models of care delivery that can help to ensure long-term system sustainability, given shifts in demographics, risk factors and burden of disease in the province, and
  - ensuring services are provided by the health professional(s) who have the most appropriate scope of practice, and who best align with the needs of the patient.

Forty-four systematic reviews ranging in quality were identified (Table 6) that relate to aligning features of the health system to achieving value for money. As with element 1, we only provide a high-level overview of what the evidence tells us about element 2 in this section. For more detailed information about the specific interventions included in the reviews identified, consult Appendix 2.

Three high-quality reviews examined barriers and strategies to increase the use of existing research evidence by health-system managers, policymakers and health professionals. One review identified that barriers to the use of research evidence among public health decision-makers includes the perception of the evidence, an inability to reproduce research findings in decision-making processes, and competing time constraints.(97) Two high-quality reviews found that educational visits, short summaries of systematic reviews, targeted messaging and the development of evidence 'libraries' showed significant improvement in changing knowledge and behaviour among clinicians.(98; 99) Neither review found evidence on changes to policy-makers' decision-making.(98; 99)

A key component of implementing organizational changes could involve efforts to ensure stakeholders (including members of the public) understand and are engaged in the process. We identified one medium-quality systematic review that assessed stakeholder-engagement processes for program evaluation (100) and four reviews ranging in quality that evaluated public- and consumer-engagement processes.(101-103) The review about stakeholder engagement found limited research evidence about stakeholder involvement in program evaluation. However, the review did find that there was considerable overlap in the key features of stakeholder-engagement processes in the literature, and indicated that the methodological centrepiece of these processes is entering into collaboration with a collective willingness to participate, and placing emphasis on the need to draw on the strengths of each member while respecting their unique positions and expertise.(100)

Of the four reviews about public and consumer engagement, two indicated that it can be helpful for improving the dissemination of information and processes for developing interventions, as well as for enhancing awareness and understanding among citizens.(102; 104) However, all of the reviews indicated that the available evidence is limited and that it is difficult to draw firm conclusions about the benefits of particular public- and consumer-engagement processes. As one example of the form that such processes can take, Patients Canada engages citizens in the development of key performance targets for Ontario's health system.

In addition to organizational changes, changing the financial arrangements in Ontario's health system (the second sub-element) is also a potentially useful direction. We identified many reviews assessing the impact and effectiveness of financial incentives for citizens, health professionals and organizations. Given the large number of reviews available, we place priority on outlining the findings from several overviews of reviews that we identified. The key messages from these overviews include:

- financial incentives targeting citizens can be effective at changing behaviours, but the evidence supporting these effects is either inconsistent (e.g., for improving adherence to medicines),(105) indicates that effects are not sustained in the long term (e.g., for promoting healthy behaviours such as changes in smoking, eating, alcohol consumption, and physical activity), or require substantial cash incentives to sustain behaviour changes (e.g., smoking cessation);(48; 106; 107)
- the reviews of the evidence for the use of financial incentives for both health professionals and health organizations found that evidence is either insufficient, modest and of variable effects, or based on perceived outcomes (e.g., organizational leaders), and/or point to incentives being more effective for changing some behaviours in the short run (e.g., for simple, district and well-defined behaviours such as providing priority services to specific populations) or for specific types of conditions (e.g., for chronic rather than acute care), but not for other more complex behaviours (e.g., improving adherence to clinical guidelines) or over the long term (e.g., retention of human resources);(108-112) and
- how they are designed (e.g., using cash incentives for citizens, selecting targets based on those with the largest room for improvement, and using process and intermediary outcome indicators as target measures)(105) and complemented by other policy instruments (e.g., using cash plus other motivational interventions for citizens, combined with education interventions and audit and feedback for health professionals) can be very important.

In parallel to organizational and financial changes, the ways in which programs, services and drugs are delivered also likely needs to be changed to ensure long-term health-system sustainability and to avoid structural disincentives. For evidence about such changes, we identified one high-quality, three medium-quality and two low-quality reviews examining integrated models of care. The reviews generally found that increased integration and collaboration in care lead to improved patient outcomes and quality of life, notably among those with chronic diseases where reduced mortality and reduced hospital admissions were observed.(113-117) One review found no statistical difference between integrated models of care and current models, though the review suggested that this may reflect service-user characteristics or insufficient time for services to be implemented. One review determined that for integrated models of care to be scaled up in a way that is sustainable, changes are needed to healthcare governance that support collaborative working. The review identified the following 10 factors as being necessary for integrated primary or secondary care:

- joint planning;
- integrated information communication technology;
- change management;
- shared clinical priorities;
- incentives;
- a population health focus;
- measurement using data as a quality improvement tool;
- continuing professional development that supports the value of joint working;
- patient and community engagement and involvement with the change process; and

- innovative thinking.(118)

In addition, one low-quality review found that service integration has delivered positive outcomes without incurring additional financial costs, and in some studies resulted in a reduction in cost over the long term.

Much of the remaining literature focused on other models of care and health human resources. One medium-quality review found that for nurse practitioners in particular, transitions towards an extended scope of practice were easiest in less restrictive practice environments.(119) Three reviews ranging in quality examined approaches and effects of increasing the contribution of the nursing and midwifery workforce, finding that they led to a reduced number of pre-term births and contributed to improved outcomes for vulnerable populations.(120-122) One medium-quality review highlighted that successful initiatives were accompanied by:

- long-term investments in infrastructure;
- training and improvements of working conditions of the health workforce; and
- a mutual understanding and appreciation of the roles and responsibilities of all health professionals.(122)

New models of care including multidisciplinary teams and care coordination were assessed in three reviews and generally found to be effective, with the exception of one review which found no significant improvements in physical function, mood or quality of life with either multidisciplinary teams or care coordination in follow-up care for stroke survivors.(123) Two reviews found multidisciplinary-team models to reduce the incidence of medication errors and adverse intravenous outcomes, and for care-coordination models to reduce the number of unnecessary social admissions when implemented in emergency rooms.(124; 125) One review, however, identified multidisciplinary teams as being particularly challenging to implement due to often overlapping professional responsibilities.(126)

Finally, we identified four older low-quality systematic reviews that addressed aspects of revising or monitoring lists of publicly financed products and services. Three of the reviews addressed the outcomes of restricting some form of health treatment or service and found that:

- most managed care organizations have had limited success using formularies, therapeutic interchange, and prior approval to influence prescribing and dispensing decisions;(145)
- closed formularies have been found to be effective in reducing utilization of prescription drugs, but not their costs;(145)
- the evidence from the U.S. does not support the assumption that restriction of specific drugs results in savings in drug costs, because restricting formularies leads to dynamic changes in the Medicaid program;(146) and
- the most common concern regarding preferred drug lists was that restrictions would lead to increased healthcare service utilization, such as hospital and clinician visits.(147)

The last review focused on decision-making and priority-setting processes for including or excluding drugs from reimbursement lists.(148) The review outlined that clinical evidence about drug benefits and the quality of that evidence were the main criteria used in priority-setting, followed by the costs of the drug, while formal pharmacoeconomic analyses were accorded a small role in the process. In addition, other criteria considered in such processes included the availability of alternative treatments, decisions made in other hospitals/systems, size of population affected, and severity of disease. External factors mentioned as influencing decision-making were patient demand, pharmaceutical company activities, and clinicians' enthusiasm.

A summary of the key findings from the synthesized research evidence is provided in Table 6.

Table 6: Summary of key findings from systematic reviews relevant to element 2 – Align features of the health system to achieve value for money by addressing supply-side drivers of change

Sub-element	Types of activities that could be included	Key findings from systematic reviews
Organizational changes	• Ensuring that health system and organizational decision-making processes are informed by the best available evidence • Integrating routine assessments of system sustainability into all system-level decision-making processes	*Benefits* • Three high-quality systematic reviews examined factors that acted as barriers or facilitators to the use of evidence by health-system managers, policymakers and clinicians, and found that barriers included decision-makers' perceptions of the evidence, an inability to reproduce the research findings into a decision-making process, and competing constraints. • The reviews also found that each of educational visits, short summaries of systematic reviews and targeted messaging showed significant improvement in changing knowledge and attitudes as well as altering professional-related behaviours. No evidence was found in any of the reviews for policymakers.(98) • A medium-quality review indicated that there was considerable overlap in the key features of stakeholder-engagement processes in the literature, and found that the methodological centrepiece of stakeholder involvement is entering into collaboration with a collective willingness to participate, and that draws on the strengths of each member while respecting their unique positions and expertise.(100) • A recent low-quality review outlined that having the potential to find common ground is a requirement for using public engagement to address issues, and that common goals include activities related to developing policy direction, recommendations and tools, priority-setting, resource allocation and risk assessments.(101) • The same review indicated that public-engagement processes include three broad characteristics: 1) a sponsor seeking input from the public; 2) participants considering an ethical- or values-based dilemma; and 3) provision of accurate and balanced information to participants about the dilemma.(101) • Case studies including project administrators' views about public engagement in the planning and development of healthcare in an older medium-quality review provided support to the view that patient engagement has contributed to changes in services.(103) *Harm* • None identified *Costs* • None identified
Changes to financial arrangements	• Aligning funding and remuneration models with population-health outcomes and appropriate health-system performance measures that align with patient preferences and values • Ensuring publicly funded programs, services and drugs take advantage of medical advances that offer 'value for	*Benefits* • A recent overview of systematic reviews concluded that there is some evidence to support the use of financial incentives for improving adherence to medicines by consumers, but that the evidence is inconsistent.(105) • Two recent high-quality reviews (107; 127) and one recent medium-quality review (128) assessed financial incentives for encouraging healthy behaviours (e.g., achieving sustained changes in smoking, eating, alcohol consumption and physical activity) and found that they: o were generally more effective than providing no financial incentive for health behaviour change,

	money,' while identifying and disinvesting in those that are no longer cost-effective	and that on average have greater effects when cash-only incentives are used as compared to other formats;(127) o increased attainment and maintenance (up to 18 months from baseline) of target levels of behaviour change;(107) o sustained change in overall behaviour up to 2-3 months after the removal of incentive, but this change was not maintained thereafter;(107) o had a decreased effect over time, with increased post-intervention follow-up and increased incentive value;(107; 127; 128) and o were more accepted if they are found to be effective, safe, recipient-focused, intrusion-minimizing and viewed as benefiting both recipients and wider society, but may also be perceived as paternalistic, which can undermine an individual's autonomy.(128) • A recent, medium-quality review found that financial incentives targeting citizens were more accepted if they are found to be effective, safe, recipient-focused and intrusion- minimizing, but may also be perceived as paternalistic, which can undermine an individual's autonomy.(128) • A recent overview of systematic reviews found mixed evidence for the use of financial incentives for addressing human-resource challenges in healthcare (e.g., job satisfaction, turnover rates, recruitment and retention), and noted that while incentives improved healthcare-provider recruitment, they were less effective at supporting five-year retention.(108) • There are mixed results for financial incentives to improve healthcare professional behaviours and patient outcomes: o a recent overview of systematic reviews found that payments for service, providing care to specific populations, providing a pre-specified level of care, changing activity, as well as improving quality, processes of care, referrals, admissions and prescribing costs, were effective;(109) o the same overview noted that payments for working a specified time period, improving consultation or visit rate and promoting compliance with guidelines are ineffective;(109) and o a high-quality review that was published more recently than the overview found mixed effects for the use of pay-for-performance schemes for healthcare providers to improve quality of patient care and patient-relevant outcomes, and concluded that current evidence targeting individual practitioners is insufficient to support its adoption.(111) *Harms* • None identified *Costs* • None identified
Changes in how programs, services and drugs are delivered	• Improving the integration of programs and services that focus on promoting health and preventing illness, providing care to those who become sick and supporting the ongoing management of conditions • Identifying the most promising models of care delivery that can help to ensure	*Benefits* • One medium-quality review identified 10 elements necessary to integrated primary or secondary care, including: 1) joint planning; 2) integrated information communication technology; 3) change management; 4) shared clinical priorities; 5) incentives; 6) population focus; 7) measurement using data as a quality improvement tool; 8) continuing professional development supporting the value of joint working; 9) patient and community engagement; and 10) innovation.(118) • One high-quality, two medium-quality and two low-quality reviews focusing on models of integrated care found:

	long-term system sustainability, given shifts in demographics, risk factors and burden of disease in the province • Ensuring services are provided by the health professional(s) who have the most appropriate scope of practice, and who best align with the needs of the patient	○ systematic factors including government involvement, policy and fit with local needs, and funding and resources influence the extent of collaboration and integration;(113) ○ benefits of collaboration and integration include improved chronic disease management, improved communicable disease control, reduced mortality, reduced hospital admission and improved maternal child health outcomes;(113; 116) ○ integrated care delivered positive outcomes for patients and clinicians without incurring additional financial costs;(114) and ○ greater integration of services may have positive benefits for organizations as well as for users and carers of services.(115) • One high-quality review found no conclusive evidence to suggest that changing nursing skill-mix in old-age facilities results in improved patient or staff well-being.(129) • One high-quality review found that pregnant women in alternative care models and midwife-led continuity models were less likely to experience pre-term birth,(120) while another found midwife-led community care resulted in fewer epidurals, episiotomies and instrumental births.(121) • One high-quality review found that enhanced rehabilitation following hip-fracture surgery for adults with dementia resulted in lower complications and a reduced likelihood of being in hospital, rehabilitation centre or care homes at three months post-discharge.(130) • One high-quality review found that implementing team nursing models of care significantly decreased incidence of medication errors and adverse intravenous outcomes.(131) • One medium-quality review found primary-care follow-up using stroke support workers, care co-ordinators or case managers did not result in any significant improvements in physical function, mood or quality of life, but did improve patient knowledge of strokes.(123) • One medium-quality review examining models of care in emergency departments found multidisciplinary models of care in the emergency department reduced the number of errors, while care-coordination teams were effective in reducing unnecessary social admissions in elderly populations and reduced readmissions.(125) • One medium-quality review found multidisciplinary care for pre-dialysis chronic kidney disease patients was effective in delaying the progression of illness.(124) • One high-quality review examining the relationship between governance mechanisms and health workforce found models of shared governance, magnet accreditation and professional development were all associated with improved outcomes for the health workforce including reduced turnover, increased job satisfaction and increased feelings of professional empowerment.(126) • One medium-quality review examined the evidence regarding the optimization of professional scopes of practice and found a variety of enablers at each the macro, meso and micro level, including: ○ macro - changes to legislation to recognize principles of shared care, changes to practicums and residencies that foster interprofessional competencies, and alternative funding mechanisms such as bundled or mixed payment models; ○ meso – implementation and upkeep of electronic medical records, partnership of accrediting bodies in developing a framework for shared-care, implementation of continued monitoring and evaluation with a view towards long-term return on investments; and ○ micro – need for change-management team with a designated role for managing changes in scopes of practice and models of care, increased communication among healthcare professionals, regular meetings, and co-location of providers.(132)

		• One medium-quality review examining the impact of nurse practitioner scope of practice found that states with the greatest expanded practice authority showed the greatest growth and advancement of nurse practitioners in primary care.(119) • The same review also found that less restrictive scope of practice was linked with promoting care provision by nurse practitioners with rural and medically underserved areas.(119) • One medium-quality review focusing on strategies to improve the contribution of the nursing and midwifery workforce found a wide range of primary healthcare nursing and midwifery tasks that were described in the literature.(122) • The same review found that successful initiatives to broaden the roles of nurses and midwives were accompanied by substantial long-term investments in infrastructure, training and improvement of working conditions of the health workforce, and a shared understanding and appreciation for the roles and responsibilities of all professionals.(122) *Harms* • One medium-quality review found that overall privatization and marketization of healthcare systems does not improve quality, with most having negative results on patient care. *Costs* • One medium-quality review found the provision of integrated care for psychiatric disorders was cost-effective.(117)

Element 3 – Harness distributive leadership approaches that enable the system to innovate and move towards sustainability

It is increasingly recognized that efforts to address the underlying factors contributing to financial and service pressures will require high-quality leadership that supports collective actions from stakeholders across the health system and other sectors.(133) To this end, this element focuses on harnessing distributive leadership approaches that enable the system to innovate and move towards sustainability. In contrast to traditional leadership styles that focus on harnessing one or a small number of individuals to lead, distributive leadership focuses on allocating leadership to wherever expertise, capability and motivation reside within an organization.(133) This often means that leadership and follower roles shift depending on required tasks, instead of always from those in defined leadership roles.(133).

Therefore, this element examines ways to engage all stakeholders in the process of change – including actors from the political (both elected officials and the civil servants supporting them), managerial, professional and public levels – in efforts to gain consensus and a sense of ownership over health-system reforms. Possible sub-elements to harness distributive leadership approaches at these levels are outlined in Table 7.

Table 7: Sub-elements to harness distributive leadership approaches that enable the system to innovate and move towards sustainability

Harnessing distributive leadership at the political level	• Developing and communicating the details of a burning platform for change focused on health-system sustainability in Ontario • Creating open forums and discussions with stakeholders including managers, professionals and the public to provide input on a vision and strategic narrative • Developing inter-party committees and working groups to determine points of convergence and establish a common political agenda for healthcare • Ensure cross-party commitment to multi-year funding dedicated to specific elements of the strategic vision
Harnessing distributive leadership at the system level	• Developing a logic model or strategic plan with articulated outcomes in partnership with political actors and based on values expressed by the public, professionals and managers • Pursuing prudent investment strategies that prioritize innovation and redistribution of funding towards areas of the system that need to be built up • Recognizing and promoting the wide-spread adoption and scale up of innovative practices that show promise in early evaluations • Developing and implementing new processes for hearing patients' voices at higher levels • Supporting the development of partnerships and coalitions between organizations and key stakeholders • Investing in the development of local leaders
Harnessing distributive leadership at the managerial level	• Creating room for senior managers, freeing them from some operational pressures to reflect on the overall organization changes to align with wider strategic vision • Fostering a forum for public and professional voices and base organizational processes on their priorities and needs • Promoting and developing leadership positions for both the public and staff within an organization
Harnessing distributive leadership at the professional level	• Pursuing efforts to facilitate the establishment and ongoing development of leadership skills and competencies among the full range of health professionals working in the system • Ensuring manageable workloads such that professionals have time to engage and participate in leadership activities • Promoting increased work in team-based models and collaboration across professionals and settings of care • Provide ongoing feedback to organization and system level actors • Engaging in continuous education and learning opportunities that focus on both clinical and non-clinical skills
Harnessing distributive leadership at the public level	• Engaging citizens in identifying what changes are needed in the health system and empowering them to contribute to the development of policy and system-wide change.

Twenty reviews were found that relate to these approaches to distributive leadership, of which one review focused on the political level, five on the system level, eight on the professional level and six on the public level (no reviews were identified that were relevant to the managerial level).

At the political level, the high-quality review suggested that deliberative dialogues may be an effective strategy to engage stakeholders in the process of change. The review focused on determining what key features were necessary to ensure a successful dialogue and exchange of ideas, including:

- appropriate meeting environment (e.g., by ensuring adequate resources, commitment from participants, transparency, timeliness of the issue, appropriate group size, clear meeting rules, pre- and post-meeting tasks and effective facilitation);
- appropriate mix of participants (e.g., by ensuring fair and balanced representation of those with an interest in the issue, and that participants are motivated and provided with the resources they need to meaningfully engage in the issue); and
- appropriate use of research evidence (e.g., fostering a clear understanding of the policy issue among all participants by presenting what is currently known about it based on the best available research evidence).(134)

The same review highlighted the effects of a deliberative dialogue, which included, among others, an improved knowledge of alternative ways of thinking about the problem, a mutual understanding of opposing positions, and knowledge of viable policy options.(134)

At the system level, five high-quality reviews were identified, of which three address the sub-element of developing and implementing new processes for hearing the patients' voice at higher levels, and two addressed the sub-element of supporting the development of partnerships and coalitions between organizations and key stakeholders. For the former, two of the reviews suggest positive results from the engagement of patients and the public in the development of information, materials and health interventions.(135) Results from these two reviews suggest that patient and public engagement produce material and information that is more relevant and easier to understand for patients and citizens.(135) Likewise, community engagement in the development of health interventions was found to improve health behaviours, perceived self-efficacy and support for the intervention.(80) The third review found the following factors to be enablers of successful public and patient engagement:

- sufficient organizational support for the engagement process;
- clarity surrounding the aims of public engagement;
- appropriate methods of engagement;
- shared understanding of the case for change;
- a strong clinical case for change;
- the presence of a visible clinical leader;
- early engagement of the public in change processes; and
- adequate resourcing of evaluations.(136)

The last two reviews focused on intersectoral collaboration on addressing social determinants of health, and found mixed results, but suggested that it is an important component of efforts to support system-wide change.(137-138)

At the professional level we identified eight high-quality reviews. Related to the sub-element of ensuring manageable workloads to ensure that professionals have time to engage and participate in leadership activities, two of these reviews found mixed evidence regarding the effectiveness of cognitive behavioural therapy as a technique to reduce occupational stress and professional burnout.(139; 140) One of these also found that among interventions to reduce occupational stress of health professionals, re-arranging professionals' schedules to have shorter shifts or punctuated breaks reduced occupational stress levels.(139)

The remaining six reviews relevant to the professional level focused on the sub-element of engaging in continuous education and learning opportunities that focus on both clinical and non-clinical skills. One of

these found no consistent beneficial effects of using games as an educational strategy for health professionals,(141) while three of the reviews supported the use of e-learning, clinical simulation exercises and face-to-face education interventions in ongoing professional education.(142-144) These three reviews also suggested that continuing education improved provider knowledge and confidence in performing skills. In addition, the last two reviews that assessed the effectiveness of clinical simulations found this training was most effective when simulations included:

- clinical variation;
- feedback for professionals;
- multiple learning strategies; and
- longer durations.(145-146)

Finally, while many of the findings for the public level echo those that address the sub-element of system-level leadership for developing and implementing new processes for hearing the patients' voice at higher levels, an additional six reviews that range in quality were identified that discuss citizen engagement in the identification of areas in need of improvement, and in the development of policy. These reviews noted that:

- citizen engagement has an underlying goal of obtaining public opinion to provide insight into social values and ethical principles for consideration in public decisions;(101)
- tasks in citizen engagement can include developing policy directions, recommendations and tools, and priority-setting for resource allocation;(101; 147)
- citizen engagement can be helpful for improving the dissemination of information and processes for developing interventions as well as for enhancing awareness and understanding among citizens;(102; 104)
- training of patients and their families, as well as healthcare professionals is a critical component for successfully involving cancer patients and their families in policy and planning;(148) and
- involving patients in the planning and development of healthcare plans has several benefits for patients including improved self-esteem.(103)

A summary of the key findings from the synthesized research evidence is provided in Table 8. For those who want to know more about the systematic reviews contained in Table 8 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 3.

Table 8: Summary of key findings from systematic reviews relevant to element 3 – Harness distributive leadership approaches that enable the system to innovate and move towards sustainability

Sub-element	Types of activities that could be included	Key findings from systematic reviews
Harnessing distributive leadership at the political level	• Developing and communicating the details of a burning platform for change focused on health-system sustainability in Ontario • Creating open forums and discussions with stakeholders including managers, professionals and the public to provide input on a vision and strategic narrative • Developing inter-party committees and working groups to determine points of convergence and establish a common political agenda for healthcare • Ensure cross-party commitment to multi-year funding dedicated to specific elements of the strategic vision	*Benefits* • One low-quality review found successfully engaging in large system transformations requires: o blended top-down and distributive leadership; o measurement and reporting of progress; o consideration of historical context; o physician engagement in the process of change; and o engagement of patients and families. • One-medium quality review suggested that deliberative dialogues be used to engage policymakers, stakeholders and researchers in addressing health-system policy issues and should consider the following key features: o an appropriate environment; o an appropriate mix of participants; and o an appropriate use of research evidence. • This review outlined a model for deliberative dialogues and identified possible intended effects including, strengthened capacity of participants to address the policy issue, strengthened community or organizational capacity, and strengthened system capacity to make evidence-informed decisions. *Harms* • None identified *Costs* • None identified
Harnessing distributive leadership at the system level	• Developing a logic model or strategic plan with articulated outcomes in partnership with political actors and based on values expressed by the public, professionals and managers • Recognizing and promoting the adoption of good practices and short-term wins across the system • Developing and implementing new processes for hearing the patients' voice at higher levels • Supporting the development of partnerships and coalitions between organizations and key stakeholders • Investing in the development of local leaders	*Benefits* • Engaging patient and public voice in the development of interventions and communications material was found in two-high quality reviews to improve: o health behaviours; o participant self-efficacy; o support for the implementation of the intervention; and o readability and comprehension of material. • Reviews also suggested that the public is best engaged through telephone and face-to-face discussions rather than mailed surveys. • In engaging patients' and citizens' voices in policy decisions and health service reconfiguration, one high-quality review identified the following success factors: o sufficient organizational support for the engagement process; o clarity surrounding the aims of public engagement; o appropriate methods of engagement; o shared understanding of the case for change; o a strong clinical case for change; o the presence of a visible leader; o earlier engagement in the change process; and

		○ adequate resourcing of evaluations. • One high-quality review found that inter-sectoral partnerships have mixed results, but were most effective for the implementation of downstream prevention interventions. Authors also suggest that this type of collaboration would have larger impacts for initiatives focused on broader system-wide change over the long-term. *Harms* • None identified *Costs* • One high-quality review found public engagement strategies in the development of local interventions to have modest improvements in quality-adjusted life years gained and reduced costs in terms of healthcare services used over a six-month period following the introduction of peer/lay-delivered interventions.(80) • The same review also acknowledged a number of cost-effective health interventions that were developed and implemented with the help of the public including peer-counselling programs for minority populations, training opinion leaders to disseminate HIV risk reduction and safe sex messages, and the use of peer counsellors in schools to promote smoking cessation.(80) • The review stated that in the process of engaging community members, resource use and costs are not routinely reported in evaluations.(80)
Harnessing distributive leadership at the managerial level	• Creating room for senior managers, freeing them from some operational pressures to reflect on the overall organization changes to align with wider strategic vision • Fostering a forum for public and professional voices and base organizational processes on their priorities and needs • Promoting and developing leadership positions for both the public and staff within an organization	• No relevant systematic reviews were identified for this sub-element.
Harnessing distributive leadership at the professional level	• Pursuing efforts to facilitate the establishment and ongoing development of leadership skills and competencies among the full range of health professionals working in the system • Ensuring manageable workloads such that professionals have time to engage and participate in leadership activities • Promoting increased work in team-based models and collaboration across professionals and settings of care • Provide ongoing feedback to organization and system level actors	*Benefits* • Organizational interventions were found in one high-quality review to be effective at reducing health professionals' occupational stress. Specifically, changing health professionals' work schedules to allow for shorter shifts or frequent breaks was found to be the most effective intervention.(139) • Mixed evidence was found as to whether cognitive behavioural therapy reduced occupational stress, with one review finding it equivalent to no treatment until six months following the intervention.(139) • One high-quality review examining continuous education and learning opportunities found no consistent benefit for the use of games as an educational strategy for improving provider knowledge.(141) • Two high-quality reviews assessed the effect of simulation-based training for health professionals on patient outcomes.(145; 146) One review found simulation based training led to improved adherence to guidelines and improved ratings of competencies.(145) Both reviews concluded that

	• Engaging in continuous education and learning opportunities that focus on both clinical and non-clinical skills	simulation-based training was most effective when the simulations had: o clinical variation; o feedback; o multiple learning strategies; and o longer durations.(145; 146) • An additional high-quality review suggested that educational interventions including group sessions, simulation and role-play exercises supported health professionals' knowledge and attitudes on handovers and transitions in healthcare, but only one study included in the review could confirm the transfer of these skills to the workplace.(144) *Harms* • Following clinical simulation training, one high-quality review reported slightly higher rates of perioral trauma during endotracheal intubation.(145) *Costs* • None identified
Harnessing distributive leadership at the public level	• Engaging citizens in identifying what changes are needed in the health system and empowering them to contribute to the development of policy and system-wide change	*Benefits* • Public-engagement processes were found, in a low-quality review, to include three broad characteristics: 1) a sponsor seeking input from the public; 2) participants considering an ethical- or values-based dilemma; and 3) provision of accurate and balanced information about the dilemma to participants.(101) • The same review indicated that having the potential to find common ground is a requirement for using public engagement to address issues, and that common goals include activities related to developing policy direction, recommendations and tools, priority-setting, resource allocation and risk assessments.(101) • One high-quality review suggests that public engagement improves the dissemination of information and processes for developing interventions,(104) while another review which included the experiences of the project administrator supported the view that patient engagement has contributed to change in service.(103) *Harms* • None identified *Costs* • While not directly related to costs, one older-medium quality review noted that effective patient involvement requires both personnel and financial commitments.(148)

Additional equity-related observations about the three elements

A number of findings with implications for younger people (the first prioritized group in this brief) and frequent users of the health system such as older adults (the second prioritized group) were identified and covered in element 1. However, there are some important high-level messages that can be distilled about the elements. Specifically, the evidence suggests that there are a number of interventions aimed at influencing individuals' behaviour to prevent illness and promote greater health that have been found to be effective. These include a range of mechanisms from those targeted at individuals (e.g., educating about healthy eating behaviours) to those targeted at populations (e.g., tax policies that influence demand for unhealthy foods). This is important because it suggests there are a number of ways to effectively intervene and change some of the most challenging demand-side factors that threaten health-system sustainability (unhealthy behaviours and lifestyle), and that currently account for huge proportions of health expenditures in the province. It should be noted however, that investments in these types of approaches are often long-term strategies that take years to realize. This timeline, however, supports the focus on younger people who can begin to make a shift in their behaviours such that they live longer without becoming sick. To some extent, it could also help alleviate some of the challenges associated with frequent users by reducing the burden of illness they face attributable to preventable chronic diseases. Overall, this suggests that there are real opportunities to 'bend the cost curve' in the near future and in the long term.

IMPLEMENTATION CONSIDERATIONS

A number of barriers might hinder implementation of the three elements of a potentially comprehensive approach to addressing health-system sustainability, and therefore need to be factored into any decision about whether and how to pursue any given element (Table 9). While potential barriers exist at the levels of providers, organizations and systems (if not patients/citizens, who are unlikely to be aware of or particularly interested in the specifics of these approach elements), perhaps the biggest barrier lies in the need to gain collective agreement and political buy-in across health-system stakeholders on a collective vision for change. While many actors agree that change is necessary and converge on the need for increased coordination and integration across the system, many different perspectives exist on the right path to change and what policy levers should be pulled to get there.

Table 9: Potential barriers to implementing the elements

Levels	Element 1 – Engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change	Element 2 – Align features of the health system to achieve value for money by addressing supply-side drivers for change	Element 3 – Harness distributive leadership approaches that enable the system to innovate and move towards sustainability
Patient/Individual	Individuals could have negative reactions to policies perceived as government paternalism (e.g., nudges or tax policies) that are meant to influence their behavior Individuals may not have the desire to alter their existing behaviours and lifestyle choices Patients may resist expectations that they ought to play a more active role in the health system (e.g., by engaging in self-management)	Individuals may resist changes if they feel that resources and services they value are threatened by proposed reforms (e.g., shifting money away from spending on hospital beds to health promotion/disease prevention programs) Patients are likely to continue to expect access to the most advanced and most expensive treatments and technologies, regardless of their cost-effectiveness relative to other investments	The public may not feel as though they are adequately engaged in the change process to support drastic system transformation The public may be skeptical about the motives behind health-system policymakers' and planners' attempts to engage them in decision-making about system transformation
Care provider	Providers may not embrace shifting the dynamics of the patient-provider relationship (e.g., supporting greater health literacy, shared decision-making and self-management)	Providers may resist any adjustments to how they are paid if they feel the adjustments may negatively impact their incomes Providers may resist changes in how care is organized and delivered if they perceive it as a threat to their professional autonomy and/or 'ownership' over a particular scope of practice	Providers may be unavailable to engage in leadership training or open forums due to competing demands and heavy workloads
Organization	A shift towards a more sustainable system will require different investments (e.g., primary care rather than acute care) which may result in some resistance from organizations that will be disinvested from	Organizations may resist operational and financial changes if they do not believe they are feasible from a budgetary standpoint Decision-makers within organizations may not possess the knowledge, attitudes and skills that can support them in accessing, acquiring, assessing and applying the best available evidence in decision-making	Organizations functioning independently in the health system may resist efforts to build consensus and may reject necessary concessions to support change Organizations with established influence in the system may resist an approach that emphasizes a distribution of leadership and shared governance

System	There is a lack of accountability in the system with respect to who ought to support health-promotion and disease-prevention initiatives, with fragmentation across primary care and public health	Technology needed to support integration across programs and services may not be widely available across the health system Labour negotiations and legislative mandates (e.g., the Public Sector Labour Relations Transitions Act) create limits in the extent to which system transformation through human resource reforms (e.g., re-allocation of workers out of hospital-based delivery settings) can be pursued successfully in the short- to medium-term	There may not be the necessary political will to collectively pursue change in the system No clear vision of, or practical suggestions for, the details of a distributive leadership model may decrease stakeholder support Legal challenges (e.g., Dr. Brian Day in British Columbia) could be viewed as disruptive to the political landscape, particularly as it pertains to planning for long-term health-system goals Select legislation such as the Commitment to the Future of Medicare Act, 2004 may be seen as a barrier to innovation

Despite the many barriers highlighted above, a number of potential windows of opportunity exist for implementing the elements presented in this evidence brief (Table 10). While all are important on their own, the fact that they are all present at a single point in time creates a unique constellation of factors that can provide the impetus for reforms framed within the goal of health-system sustainability. Specifically, existing financial constraints alongside an increasingly widespread understanding of the need for health-system reform, in combination with national policy discussions (i.e., renewal of the Health Accord) and provincial reform initiatives (e.g., Patients First Act), have established an opportune time for strategically addressing complex challenges that require short-, medium- and long-term solutions.

Table 10: Potential windows of opportunity for implementing the elements

Type	Element 1 – Engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change	Element 2 – Align features of the health system to achieve value for money by addressing supply side-drivers for change	Element 3 – Harness distributive leadership approaches that enable the system to innovate and move towards sustainability
General	• There is a generally well-accepted understanding at all levels of the system (e.g., patients, providers, organizations and system) that given increasing budget constraints the status quo is not sustainable, and significant changes are needed to ensure the publicly funded health system is able to mobilize and allocate sufficient and appropriate resources that meet individual or public health needs and demands over the short, medium and long term • The federal and provincial governments are in the process of renegotiating the parameters of a new health accord which, alongside providing clearer guidance as to the role the federal government will play in provincial health systems, will also provide an opportunity to consider how to ensure the sustainability of these systems within the context of the Canada Health Act		
Element-specific	• There is a strong evidence base to inform efforts intended to support individuals in making healthier choices • Aspects of the system are already evolving, albeit slowly, to optimize support for and the roles of patients and their family/informal caregivers, while new proposed legislation (e.g., the Patients First Act) will help to buttress these efforts	• The Government of Ontario has initiated, or has plans to initiate, a number of system reforms that affect health system governance financial and delivery arrangements (e.g., the Excellent Care for All Act, the proposed Patients First Act) that can be leveraged to support the changes on the supply side needed to ensure sustainability	• Inter-sectoral collaboration and multi-stakeholder decision-making processes are increasingly viewed as an imperative, particularly as 'health in all policies' becomes a more widely accepted goal

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APPENDICES

The following tables provide detailed information about the systematic reviews identified for each option. Each row in a table corresponds to a particular systematic review and the reviews are organized by element (first column). The focus of the review is described in the second column. Key findings from the review that relate to the option are listed in the third column, while the fourth column records the last year the literature was searched as part of the review.

The fifth column presents a rating of the overall quality of the 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.

The last three columns convey information about the utility of the review in terms of local applicability, applicability concerning prioritized groups, and issue applicability. The third-from-last column notes the proportion of studies that were conducted in Canada, while the second-from-last column shows the proportion of studies included in the review that deal explicitly with one of the prioritized groups. The last column indicates the review's issue applicability in terms of the proportion of studies focused on achieving health-system sustainability, Similarly, for each economic evaluation and costing study, the last three columns note whether the country focus is Canada, if it deals explicitly with one of the prioritized groups and if it focuses on achieving health-system sustainability.

All of the information provided in the appendix tables was taken into account by the evidence brief's authors in compiling Tables 1-3 in the main text of the brief.

Appendix 1: Systematic reviews relevant to Element 1 – Engage patients and citizens to keep the health system sustainable by addressing demand-side drivers of change

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
Enabling Ontarians to make healthier lifestyle choices	Examine the effect of exercise, diet and lifestyle interventions on clinical markers of cardiovascular disease in patients with type 2 diabetes(30)	The review included 235 studies, 17 of which were included in a meta-analysis. The review examined the effects of lifestyle interventions including diet modification, physical activity and patient education for Type 2 diabetes patients. The review suggests that nutritional interventions reduced the risk of cardiovascular disease compared to the physical activity and lifestyle interventions. Physical activity interventions were found to have a significant impact on select clinical markers including HbA1c levels and DBP, but not others (i.e., BMI, SBP, LDL-c, and HDL-c). On the other hand, lifestyle interventions, such as education and counselling did not show any differences in risk factors assessed in the study.	2014	8/11 (AMSTAR rating from McMaster Health Forum)	Not reported	0/17	0/17
	Examine the efficacy of behavioural lifestyle interventions for pediatric obesity (75)	The review included 20 studies examining the efficacy of behavioural lifestyle interventions for pediatric obesity. The review found multi-component behavioural lifestyle interventions improved weight outcomes in children who are obese or overweight. In addition, greater intervention duration and intensity are associated with better weight outcomes; however, more research is needed for a definitive conclusion. The interventions appear to have no significant effects on change in caloric intake, physical activity and metabolic parameters.	2013	9/11 (AMSTAR rating from McMaster Health Forum)	0/20	20/20	0/20
	Examine a combination of interventions used to reduce sedentary behaviour and body fat in children (76)	The review reported results from 25 studies on interventions to reduce sedentary behaviour. The review suggests interventions attempting to reduce sedentary behaviour among children significantly reduced their BMI. There were also no differences identified between using multi-component (combination of BMI reduction, sedentary behaviour and diet) or single component interventions. This suggests that adding additional improvement components to an intervention program may not have an additive effect.	2012	6/11 (AMSTAR rating from McMaster Health Forum)	Not enough detail	25/25	0/25

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Identify characteristics and effectiveness of physical activity and/or sedentary behaviour interventions for youth with Type 1 diabetes (149)	The review included 11 studies examining physical activity and sedentary behaviour interventions. Findings from the included studies suggest that the majority of interventions (8) successfully improved physical activity and/or an area of fitness, and most studies found at least one positive effect on health. Even if there is not an improvement in physical activity or health, there may be the possibility to prevent or postpone deteriorations in these outcomes. In addition, physical activity can positively affect HbA1c, but this result should be interpreted with caution.	2012	10/11 (AMSTAR rating from McMaster Health Forum)	0/12	12/12	0/12
	Examine the effect of physical exercise interventions on changing the behaviour of adolescent girls (69)	The review included 45 studies examining the effectiveness of interventions to improve physical activity among adolescent girls. All interventions included some physical activity. The review suggests that physical activity interventions have a small but significant effect on changing the behaviour of adolescent girls to participate more in physical activities. The interventions that had these effect were multi-component, theory-based, school-based, with girls only or with younger adolescent girls, and target both physical activity and sedentary behaviour.	2013	8/11 (AMSTAR rating from McMaster Health Forum)	0/45	45/45	0/45
	Review the impact of health behaviour interventions on improving physical activity, diet and/or weight changes in students (32)	The review included 41 studies targeting improvements in student health outcomes. The review focused on outcomes for levels of physical activity, diet quality and weight loss. The review found mostly positive results, with the majority of the included studies demonstrating significantly improved outcomes for physical activity and diet. For physical activity, 18 studies reported significant improvements after intervention. Five studies reported significant increase in number of days and duration of physical activity. For nutrition, 12 studies found improvements in nutrition behaviour. These included improvement in diet quality, vegetable intake increases, fruit intake increases, reductions in fat intake, fewer calories consumed, increased frequency of wholegrain product consumption, and increases in healthy fat consumption. For weight outcomes, four studies reported improvements in reduced waist size, decreased BMI, and number of participants trying to lose weight.	2014	6/11 (AMSTAR rating from McMaster Health Forum)	0/41	41/41	0/41

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		Interventions spanning a semester or less resulted in greater significant outcomes in comparison to those with a duration longer than a semester. In addition, course-embedded interventions were more effective when involving contact with facilitators.					
	Assess the effectiveness of diet and physical activity interventions to prevent or treat obesity in South Asian populations (70)	The review found of the 29 included studies, only five evaluated South Asian children, and there was no clear effect of interventions on BMI for this group. However, for adults, there was a significant effect for adjusted weight, but not for BMI or waist circumference. There is also evidence that effective interventions in adults may be transferred and used to develop effective interventions in children. The authors warn that the results should be interpreted with caution due to low quality of evidence available.	2014	7/10 (AMSTAR rating from McMaster Health Forum)	0/29	5/29	0/29
	Evaluate the effectiveness of lifestyle behaviour change interventions in preventing weight gain among healthy young adults (150)	The review found slight improvement in reducing weight gain through the different lifestyle interventions. However, only a small number of studies were identified and the authors faced methodological constraints that made it difficult to draw any conclusions.	2011	7/11 (AMSTAR rating from McMaster Health Forum)	1/8	8/8	0/8
	Examine use of social media to promote healthy diet and exercise (72)	The review included 22 studies focusing on social media interventions to improve diet and exercise. A variety of interventions were used, including discussion boards, social support through social networking sites, facebook groups, weight and caloric feedback via email, and weekly group chats. The review suggests that utilizing social media to promote healthy diet and exercise had no significant increases in physical activity or changes in weight. However, five studies reported a possible decrease in dietary fat consumption, which should be viewed cautiously due to heterogeneous results. The lack of effect in weight change and physical activity may be the result of difficulty in behaviour change, where initial positive change may occur, but long-term change is not sustained.	2013	9/11 (AMSTAR rating from McMaster Health Forum)	0/22	6/22	0/22

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Examine the effectiveness of interventions in school- and general-population settings to prevent excessive sedentary behaviour in children and adolescents (151)	The review included 33 studies examining the effects of interventions aiming to decrease sedentary behaviour. Interventions were focused on children younger than age 12, were school-based and used multiple health behaviour interventions. The review found that interventions that aimed to reduce sedentary behaviour may contribute to the prevention of being overweight, with significant decreases in sedentary behaviour and BMI. There were no differences between single health behaviour and multiple health behaviour interventions.	2011	5/11 (AMSTAR rating from McMaster Health Forum)	0/34	34/34	0/34
	Provide a review of the effect of internet-based interventions on waist circumference changes among adults (152)	The review found that internet-based lifestyle interventions significantly deceased waist circumference compared to other interventions (e.g., workplace physical activity, dietary behavioural interventions). There were few differences between internet-based and paper-, phone-, or person-based lifestyle interventions; however, using the internet can be more beneficial in terms of covering a larger number of individuals and providing immediate, easy-access support at a low cost.	2014	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	0/31
	Evaluate the effect of interventions that aim to improve sedentary behaviour in adults (74)	The review included 51 studies evaluating the effects of interventions targeting sedentary behaviours. Types of interventions and control conditions varied substantially in the study, including dietary interventions and multi-component lifestyle interventions. The review found that incorporating 22 minutes per day of a lifestyle intervention for reducing sedentary behaviour may be a promising approach. There was no evidence that physical activity and a combination of physical activity and sedentary-behaviour interventions reduced sedentary behaviour.	2014	10/11 (AMSTAR rating from McMaster Health Forum)	0/51	Not reported in detail	0/36
	Examining effectiveness of a combination of diet, aerobic exercise and resistance training in reducing risk factors for Type 2 diabetes in pre-diabetic populations (153)	The review included 23 articles reporting on eight studies of exercise interventions. The review found that interventions that included diet and both aerobic and resistance exercise training were modestly effective in inducing weight loss and improving impaired fasting glucose, glucose tolerance, dietary and exercise outcomes in pre-diabetic adults.	2013	5/10 (AMSTAR rating from McMaster Health Forum)	0/23	0/23	0/23

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Assess the effectiveness of behavioural interventions in improving physical activity and exercise in adults with Type 2 diabetes (73)	The review included 17 studies examining the effects of behavioural interventions on physical-activity behaviour among individuals with Type 2 diabetes. Behavioural interventions included supervised exercise sessions and structured counselling sessions. Reviews found that behavioural interventions increased the levels of physical activity and exercise in adults with Type 2 diabetes. These increases also coincided with clinically significant improvements in HbA1c levels.	2012	9/11 (AMSTAR rating from McMaster Health Forum)	3/19	0/19	0/19
	Examine lifestyle interventions for women previously diagnosed with gestational diabetes mellitus to explore changes in behaviour, weight and diabetes risk (77)	The review found a lack of evidence from methodologically robust trials for effects of lifestyle interventions on women with prior gestational diabetes mellitus. In six of 11 studies evaluating behaviour change, there was a favourable change in terms of physical activity. Due to the low quality of the studies, this should be interpreted with caution. However, a few high-quality studies examined dietary changes and demonstrated a possible positive impact under lifestyle interventions.	2014	6/10 (AMSTAR rating from McMaster Health Forum)	0/13	0/13	0/13
	Determine the efficacy of antenatal dietary, activity, behaviour or lifestyle interventions in overweight and obese pregnant woman in improving maternal and perinatal outcomes(78)	The review included 19 studies examining the effects of lifestyle interventions for overweight and obese pregnant women. Interventions included a combination of exercise and nutrition information, visits from a dietitian, personalized weight measurements and attendance at study-specific antenatal clinics. The review found that antenatal lifestyle, dietary and activity interventions restricted gestational weight gain and reduced prevalence of gestational diabetes in obese and overweight pregnant women. However, the quality of evidence is poor and should be interpreted with caution.	2012	7/11 (AMSTAR rating from McMaster Health Forum)	3/19	0/19	0/19
	Examine the effectiveness of lifestyle, pharmacological and surgical interventions in reducing the progression to Type 2 diabetes mellitus in people with pre-diabetes (31)	The review included 30 studies evaluating the effectiveness of lifestyle, pharmacological and surgical interventions in reducing the progression to Type 2 diabetes in people with impaired fasting glucose or impaired glucose tolerance. The review supports previous findings that diet and exercise interventions can be effective if behaviour change is achieved. As well, pharmacological therapies alone and in combination with diet and exercise, are effective and possibly beneficial in preventing progression to Type 2 diabetes.	2013	7/11 (AMSTAR rating from McMaster Health Forum)	1/30	0/30	0/30

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Identify factors that moderate the effectiveness of behavioural programs for adults with Type 2 diabetes (33)	The review included 132 randomized control trials described in 161 articles examining the impact of behavioural programs including lifestyle interventions, disease-management programs and education on individuals with Type 2 diabetes. The review found that most lifestyle and self-management education programs are moderated greatly by frequent and direct contact of support (≥ 11 contact hours). They are moderated to a lesser extent by the delivery personnel or format of the program. However, including peers to support delivery and implementation may enhance effectiveness by making the program more culturally and linguistically acceptable. Furthermore, tailoring programs to ethnic minority groups appears to be beneficial. The programs that were effective included in-person delivery rather than utilization of technology.	2015	8/11 (AMSTAR rating from McMaster Health Forum)	6/161	0/161	0/161
	Examine effectiveness of physical activity interventions at promoting long-term changes in levels of activity in older adults (71)	The review included 32 studies examining the effects of multimodal interventions, including physical activity and lifestyle counselling, on levels of physical activity. The review found that lifestyle interventions to promote physical activity significantly increased step counts and physical activity after 12 months. However, when following up after 18-24 months, these effects were not maintained.	2010	8/11 (AMSTAR rating from McMaster Health Forum)	1/32	0/32	0/32
	Assess the efficacy of interventions to increase participation in organized population-based screening programs (34)	The review included 69 studies with quantitative information on interventions in organized screening for cervical, breast, colorectal cancer, and cervical and breast cancer. The review found each of the following increased participation in organized screening: postal reminders, advance notification letter for colorectal cancer screening, telephone calls, GP signing invitation, scheduled appointments, and mailing self-sampling device to non-responders.	2012	8/11 (AMSTAR rating from McMaster Health Forum)	0/69	0/69	0/69

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Identify community engagement approaches that improve the health of disadvantaged populations or reduce inequalities in health (80)	The review found 361 reports of 319 studies examining the impact of community engagement to reduce inequalities. The review included three theoretical models for engaging patients including patient/consumer involvement, peer/lay delivered interventions, and empowerment of the community. The review found that community-engagement interventions were effective in improving health behaviours, health consequences, participant self-efficacy, and perceived social support for disadvantaged populations. The review reports that while few community-engagement studies report any analysis of costs, there was some evidence that community engagement in the development of interventions to address inequalities in health are cost-effective. The review, however, discusses that the costs most frequently reported concentrate on costs of training staff with little attention paid to the contribution of volunteers.	2011	8/11 (AMSTAR rating from McMaster Health Forum)	8/361	226/361	0/361
	Examine the effectiveness of exercise interventions on exercise behaviour in sedentary people living with or beyond cancer (79)	The review included 14 trials examining the effects of aerobic or resistance training on sedentary people living with or having survived a cancer diagnosis. Current exercise guidelines for cancer survivors recommend 150 minutes per week of aerobic exercise and twice weekly resistance (strength) training. The review found that exercise-intervention studies did not provide convincing evidence for changes in exercise behaviour and adherence to current exercise guidelines. No studies included reported an adherence of 75% or more for current exercise guidelines. Only three studies reported 75% adherence for lower aerobic exercise goals. Adherence may be improved when interventions combine supervision of exercise training in tandem with requirement of independent exercise. The results should be viewed cautiously due to reporting issues in each study.	2012	7/10 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	0/14
	Examine the effectiveness of digital games on healthy lifestyle promotion outcomes (154)	The review evaluated 54 papers including 61 different game evaluations. The review found that serious games increased healthy lifestyle adoption. These results showed no difference between age or gender, confirming earlier findings that serious games can work in various populations. This finding was also in line with previous findings on computer-delivered interventions, demonstrating digital gaming's effectiveness as an alternative. In addition, the long-term benefits were maintained for knowledge, but not for behaviour.	2013	5/11 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	0/52

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Assess the effectiveness of mobile technology-based interventions delivered to health care consumers for health behaviour change and disease management (155)	The review included 75 trials, 59 of which investigated the use of mobile technologies to improve disease management, and 26 investigated their use to change health behaviours. The interventions that aimed to change health behaviour were delivered by mobile phones, personal device assistant (PDA) mobile telephone, and hand-held computers. The most commonly used behaviour-change techniques were providing feedback on performance, goal setting, providing information on the consequences of their behaviours, and tailoring. It was found that SMS-based smoking cessation interventions can improve smoking cessation, and targeting physical activity can benefit in diabetes control (HBA1C). However, simple medication reminders delivered by SMS message showed no benefit. The disease-management interventions were delivered by mobile phone, PDA mobile phones, hand-held computers or a video console. It was found that using text messages to maintain contact, monitor, and respond to medical issues in patients on anti-retrovirals increased adherence to medication and significantly reduced HIV viral load. Furthermore, it was found that disease management interventions can reduce HBA1C, reduce blood pressure in those with hypertension, and improve lung function in individuals with asthma.	2010	10/11 (AMSTAR rating from McMaster Health Forum)	0/75	Not reported in detail	0/75
	Assess effectiveness of personalized risk communication on informed decision-making by individuals taking screening tests(58)	The review found that personalized risk communication interventions increased knowledge and may increase accuracy of risk perception. However, it did not significantly affect anxiety. The results also indicated that there were small increases in the number of people who undertook the screening procedure. The screening results were specific to breast cancer and colorectal cancer. Caution is required if applying these to other types of screening.	2012	10/11 (AMSTAR rating from McMaster Health Forum)	1/41	0/41	0/41
Promoting the establishment of healthier living and working environments	Effectiveness of urban vegetation as a psychological buffer for the negative impact of noise pollution on human health (156)	This review included five studies, two of which were cross-sectional surveys and reported that green areas could buffer the effects of chronic noise exposure on annoyance response. Three experimental studies that were included presented conflicting evidence. Authors note that more research is required to determine definite conclusions due to limitations in the number and quality of studies included.	2013	6/9 (AMSTAR rating from McMaster Health Forum)	Not reported	2/5	0/5

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Effectiveness of the Health Promoting Schools framework in improving the health and well-being of children and young people and their academic achievement (81)	The review included 67 trials, finding that the use of the Health Promoting Schools framework can be an effective tool for improving public-health outcomes in students. Though no meta-analysis was possible, small but positive results were found for body mass index (BMI), physical activity, physical fitness, fruit and vegetable intake, tobacco use, and being bullied. Mixed evidence was found regarding its benefits on standardized body mass index, and no effect was found on levels of alcohol intake, mental health, violence and prevention of bullying others. Overall, the review suggests that the use of the Health Promoting Schools framework produced small but important improvements in school environments.	2013	10/11 (AMSTAR rating from McMaster Health Forum)	2/67	67/67	0/67
	Effect of workplace ergonomic design or training intervention, or both, for preventing work-related upper limb and neck musculoskeletal disorders (MSDs) in adults (40)	The review included 13 trials. Eleven studies were conducted in an office environment and two in a healthcare setting. Four studies evaluated the effectiveness of interventions involving ergonomic equipment among computer users, and two were included in meta-analysis. It was found that the use of some ergonomic equipment decreased the incidence of neck/shoulder disorders and discomfort scores for neck/shoulder and right upper limb. Studies that evaluated the effectiveness of supplementary breaks or reduced work hours, effects of ergonomic training, and effectiveness of lifting interventions versus no intervention found no significant difference in any of the primary outcomes assessed. Overall, moderate- to low- quality evidence found that the use of some ergonomic equipment might reduce the symptoms of upper limb and neck discomfort as well as the incidence of neck or shoulder disorders. However, given that multiple comparisons were made involving a number of interventions and outcomes, high-quality evidence is needed to clearly determine the effectiveness of these interventions.	2010	11/11 (AMSTAR rating from McMaster Health Forum)	3/13	0/13	0/13

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	Whether occupational health and safety (OHS) training has a beneficial effect on workers, and whether higher engagement in OHS training has a greater beneficial effect on workers than lower engagement training (35)	The review included 22 studies. Though only two of five studies that assessed the effects of training on knowledge were considered to be good/fair methodological quality, they both showed positive, statistically significant results. Mixed evidence was found regarding the effects of training on attitudes, beliefs and health. Ten studies contributed data on the effects of training on behaviour, and the effects seen in most studies were positive. There was insufficient evidence to show that higher-engagement training was more effective than lower-engagement training because there were too few studies. Overall, there is strong evidence for the effectiveness of training on behaviour in the workplace. For health, there was insufficient evidence to conclude that training was effective because effects did not meet size criterion and were inconsistent in direction. However, definite conclusions cannot be made due to the general lack of high-quality trials that meet relevant criteria, and the heterogeneity that was present in the moderate- or good-quality trials.	2007	7/10 (AMSTAR rating from McMaster Health Forum)	2/22	1/22	0/22
	Effectiveness of workplace mental health interventions on improving workplace outcomes, including absenteeism, productivity and financial outcomes (82)	Of the 14 reviews included, four reviews provided moderate/positive evidence, six reviews provided limited evidence, and the remaining four reviews provided either no conclusions or inconclusive results. Greatest support for improved workplace outcomes were found for interventions that included aspects intended to improve both mental and physical health collectively, multi-component health and/or psychosocial interventions, and exposure to in vivo that contains interventions for particular anxiety disorders. Positive workplace outcomes were also found when workplaces provide high-intensity mental health interventions, access to clinical treatment, and support in navigating disability management programs. The review concluded that there is moderate evidence that mental health interventions have positive impacts on workplace outcomes.	2012	7/10 (AMSTAR rating from McMaster Health Forum)	Not reported	0/14	0/14

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Effectiveness of preventive occupational health interventions in the meat processing industry on work- and health- related outcomes (39)	A total of 13 articles were included and were categorized into three topics of ergonomic programs, skin protection, and Q fever vaccination. Six articles addressed various ergonomic programs. Four of these studies focused on the improvement of workplace and safety, and provided low-level evidence for the effectiveness of ergonomic programs in reducing injury severity, injury costs, and lost work days. Two experimental studies investigated the effect of added rest breaks, and provided very-low quality evidence that rest breaks were effective in improving productivity and reducing the perceived discomfort in various body regions at the end of the workday. Three articles on one randomized control study addressed skin protection. The study found that skin protection, which included educational activities and evidence-based recommendations, was effective in reducing eczema prevalence. Four studies provided high quality evidence for the effectiveness of Q fever vaccination by means of Q-Vax administration.	2013	7/9 (AMSTAR rating from McMaster Health Forum)	0/13	0/13	0/13
	Determine the effectiveness of educational and/or environmental household interventions in preventing and/or reducing domestic lead exposure in children (84)	A total of 14 studies were categorized based on the type of intervention used: educational, environmental or a combination. Five studies that utilized educational interventions found that it was ineffective in reducing blood lead levels. Five studies used environmental interventions, of which three utilized dust control interventions and two utilized soil abatement interventions. Dust control interventions were found to be ineffective. One study reported significant reductions of blood lead levels in the soil abatement treatment group; however, the effectiveness of soil abatement was not able to be meta-analyzed. Four studies assessed the effectiveness of combining educational and environmental interventions. One study found a significant decrease in blood lead levels in the treatment group. However, these results could not be meta-analyzed, and there is insufficient evidence to draw conclusions about the effectiveness of combination interventions.	2012	9/10 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	14/14	0/14

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Evaluate the effectiveness of programs for both prevention and cessation of smoking by those who interact with children (85)	Among 57 studies, 14 reported interventions that successfully reduced children's exposure to tobacco smoke. Seven of these studies employed an intensive counselling-based approach or motivational interviewing. While the remaining studies reported evidence of success for a variety of other intervention types, further research is required to confirm their findings. A total of 42 studies that used a variety of different interventions, including 14 that used more intensive counselling approaches, did not find an intervention effect that reduced children's environmental tobacco exposure. There is insufficient information to recommend one intervention over another to reduce parental smoking or child exposure. The effectiveness of several interventions that have been used to reduce children's tobacco exposure has not been clearly demonstrated. However, seven studies reported motivational interviewing or intensive counselling provided in a clinical setting to be effective.	2013	9/10 (AMSTAR rating from McMaster Health Forum)	3/57	57/57	0/57
	Effectiveness of workplace interventions in promoting and increasing physical activity (157)	Out of the 20 selected interventions, five interventions reported significant effectiveness on employees' physical activity, energy consumption, and body mass index (BMI). Seven interventions showed effectiveness on at least one of these primary outcomes, and eight interventions did not find any significant improvements in any outcome. Many of the studies that reported the intervention as effective were less than six months in duration, used pedometers, applied internet-based approaches, and included activities targeting social and environmental levels. In addition, interventions that utilized a more rigorous research design (i.e., RCT) were less likely to report being effective.	2010	4/9 (AMSTAR rating from McMaster Health Forum)	2/20	0/20	0/20

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Effect of regulations, safety campaigns and drug programs in preventing injuries among workers at construction sites (36)	Three studies evaluated the effectiveness of regulatory interventions, which are characterized by construction companies executing safety measures. In the meta-analysis, the regulatory intervention showed a small but significant initial and sustained increase in fatal and non-fatal injuries. One study evaluated the effectiveness of safety campaign and one study evaluated the effectiveness of a drug-free workplace program on reducing non-fatal injuries. It was found these interventions might be effective in reducing injuries. Overall, there is no evidence for the effectiveness of introducing regulations in reducing fatal and non-fatal injuries, and there is limited evidence for the effectiveness of safety campaigns and drug-free workplace programs in preventing non-fatal injuries.	2006	10/10 (AMSTAR rating from McMaster Health Forum)	0/5	0/5	0/5
	Effect of interventions targeting the school environment in cohort studies, on adolescent emotional health (158)	Nine papers describing five interventions were retrieved. Seven of these papers were randomized controlled trials (RCT). Six RCTs focused on a wide range of school-related factors, including climate, curriculum content, and partnerships with external agencies. None of these studies found significant differences in emotional health between intervention and control groups. One RCT that focused on supportive relationships with teachers found a non-significant trend toward intervention students having better emotional health after the intervention. Two nonrandomized trials provided some evidence that a supportive school environment may improve student emotional health. Thirty cohort papers were retrieved. Six cohort studies included an analysis of the impact of school-level factors, and none found a positive effect on emotional health or suicidal behaviour. In addition, 26 studies examined the effect of individual perceptions of the school environment, and found that teacher support, general connectedness, encouragement of autonomy, quality of relationships with peers, school stress, happiness with school, feeling safe at school, feeling close to people in school, pedagogic style, and clarity and consistency, had an effect on emotional health and/or suicidal behaviour. However, the author notes that more and higher quality studies are required to determine whether these factors within the school	2011	9/10 (AMSTAR rating from McMaster Health Forum)	0/39	0/39	0/39

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		environment have a positive effect.					
	Assess the evidence for the effectiveness of environmental sanitary interventions on the prevalence of active trachoma in endemic communities (37)	Two trials evaluated the effects of health education, where one assessed health education versus no intervention, while the other assessed health education with modest water supply. The former trial found that health education significantly decreased trachoma, where the latter trial found no significant difference between the intervention and control villages in terms of active trachoma rates. Two trials that assessed fly control interventions found that insecticide spray significantly reduced the magnitude of active trachoma. However, another trial didn't find any significant effect of insecticide spray in the reduction of active trachoma. Furthermore, two trials assessed the effect of latrine provision as a fly control measure, and found no significant trachoma reduction.	2011	8/10 (AMSTAR rating from McMaster Health Forum)	0/6	0/6	0/6
	Assess the effectiveness of regulatory, environmental, and educational interventions in reducing blood lead levels in children, pregnant women, and the general population (83)	Three uncontrolled before-after studies that evaluated environmental inventions found them effective in decreasing the lead content in drinking water. However, the author notes that these results should be generalized with caution because limited causal inferences can be drawn from uncontrolled before-after studies, and because the women included in the study were characterized with high blood lead levels at baseline. Three randomized controlled trials that evaluated the effectiveness of educational interventions showed no significant change in blood lead levels in the intervention compared to the control. One uncontrolled before-after study reported a statistically significant decrease in mean blood lead levels. However, confidence in this finding is limited due to the study design and because the study recruited children with elevated blood lead levels at baseline. There were no studies found that assessed the effectiveness of regulatory interventions.	2015	7/10 (AMSTAR rating from McMaster Health Forum)	0/7	4/7	0/7

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Effects of health promotion interventions in reducing chronic diseases and associated risk factors in truck drivers (86)	No studies found that measured chronic disease as an outcome. Nine studies describing eight interventions were retrieved, which all reported risk factors for chronic diseases in the form of immediate health outcomes or health behaviour outcomes. It was found that health-promotion interventions, including one-on-one counselling, health assessment and feedback, educational materials, and tailored interventions, could improve BMI and body weight, percent body fat, blood pressure, smoking cessation, and levels of physical activity.	Not reported in detail	6/9 (AMSTAR rating from McMaster Health Forum)	0/9	0/9	0/9
	Compare effectiveness of different permissible exposure limits in preserving the hearing threshold level (159)	Four of the studies in this review were experimental in design, and four of the studies were cross-sectional in design. Most of the studies indicated that there were much lower temporary threshold shifts when subjects were exposed to 85 dBA or lower. Four studies compared subjects exposed to noise levels of 85 dBA versus 90 dBA. Three of these studies showed that there was more temporary threshold shifts with 90 dBA compared to 85 dBA. Another study found no significant difference in threshold shifts. However, the author notes that the results of this study may not be applicable as data collection was done within a day after baseline audiometry.	2013	6/10 (AMSTAR rating from McMaster Health Forum)	0/8	0/8	0/8
	Effectiveness of public-health interventions in reducing the burden of high priority climate-sensitive diseases that are likely to be exacerbated in a warmer world (87)	There are 24 systematic reviews that investigated the prevention of vector-borne diseases. There was evidence that chemoprophylaxis, immunization, and insecticide-impregnated bed nets can prevent vector-borne diseases. There was weak and mixed evidence in favour of water interventions, including chlorination, solar disinfection, and filtration in preventing water-borne diseases. There were two reviews found related to heat stress. There was very low-quality evidence that green spaces within cities have a slight cooling effect. Another study found that heat health warning systems increased awareness and reduced mortality. However, associated quality of evidence was very low because they did not include groups vulnerable to heat stress. Overall, there is mostly weak evidence for environmental interventions that could have a positive impact in a warmer world.	2010	6/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	0/33	0/33

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Effect of promoting a healthy diet solely and in combination with increasing physical activity at the workplace in European countries (160)	Seventeen studies focused on the promotion of healthy diets. Eight were educational, one used worksite environmental change strategies, and eight used a combination of both. There was moderate evidence of the effect of educational and multi-component dietary interventions on dietary behaviours and potential dietary determinants of such behaviours. Mixed evidence was found in the 13 studies that focused on the combination of nutrition and physical activity interventions.	2010	6/10 (AMSTAR rating from McMaster Health Forum)	0/30	0/30	0/30
	Effect of sanitation in reducing soil-transmitted helminth infection (161)	In the meta-analysis conducted, it was found that the access to and use of sanitation facilities were associated with a reduction in the prevalence and odds of infection with soil-transmitted helminths.	2010	9/11 (AMSTAR rating from McMaster Health Forum)	0/36	16/36	0/36
	Effect of various interventions or physical factors on cycling (41)	Eleven of 21 studies showed a statistically significant positive association between objectively measured environmental factors and the rates or frequency of cycling. These environmental factors were dedicated cycle routes (on and off road), 'Safe Routes to School' initiatives, short distance of trip, separation from traffic, short distance to a cycle path, and presence of green space or recreational land. Factors that showed a negative association with cycling included traffic danger, sloping terrain and long trip distance. Ten studies did not find an objectively measurable environmental factor that was positively associated with cycling.	2009	7/10 (AMSTAR rating from McMaster Health Forum)	1/21	4/21	0/21

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Effectiveness of home-based, multi-trigger, multi-component interventions with an environmental focus in improving asthma outcomes (162)	Of the 23 studies, 21 conducted an environmental assessment, and 17 of these studies also included environmental remediation activities. Another 21 studies also included a form of education, ranging from primarily environmental education to primarily asthma self-management education. Sixteen studies that measured changes in quality of life among children or adolescents with asthma showed an overall improvement in the number of asthma-symptom days, the proportion of individuals with asthma symptoms, and in scores from symptoms of Quality of Life surveys. Ten studies measured productivity outcomes in children or adolescents and found a decrease in the number of school days missed. Eighteen studies measured changes in one or more healthcare utilization outcomes and found small overall improvements. Seven studies measured physiological responses using pulmonary function tests. Two of these studies showed significant improvements, and five showed no overall improvement. Only three studies reported outcomes among adults with asthma. The effectiveness of these interventions in adults was inconclusive due to the small number of studies and inconsistent results.	Not reported in detail	6/10 (AMSTAR rating from McMaster Health Forum)	1/23	20/23	0/23
Adopting and implementing appropriate policies that 'nudge' or persuade people to choose healthier lifestyles	Assess the evidence of the effectiveness of choice architecture as a means to alter food choices and food consumption in self-service settings (43)	The review included 12 studies with a focus on out-of-home eating and the effects of choice architecture interventions on food choice and volume of food and beverage consumption. Studies included used a variety of interventions including container and cutlery size, health message and labelling at point of purchase, and assortment and payment methods. All but one of the container and cutlery size interventions found evidence of an association between the size and shape of containers or cutlery and behavioural indicators. Studies examining health message and labelling found some evidence of an effect of point-of-purchase information on food purchase, but the outcomes were not consistent. No studies assessed total calorie purchase so it was not possible to establish whether the increase in fruit and vegetable sales was due to an increase in complementary side orders.	2012	4/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	5/12	0/12

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		Overall, mixed results were found, and manipulating cutlery and container size showed inconsistent evidence of reducing consumption volume. Interventions with health or nutrient information showed some evidence of effect on food choice, but inconsistently on what type of food.					
	Assess the impact of institutional smoking bans on reducing passive smoke exposure and active smoking, and its impact on other health-related outcomes (88)	The review included 17 studies examining the impact of institutional smoking bans on reducing harms and levels of second-hand smoke exposure. Studies took place in a variety of settings including prisons, hospitals and universities. A meta-analysis was conducted and found evidence that smoking bans reduce active smoking rates in both staff and patients in hospitals. A reduction in passive smoke exposure was reported in all three settings after the introduction of smoking policies or bans. The review reported a reduction in smoking-related illness in prisons when compared to prisons with no smoking policies, as well as significant reductions in smoking-related mortality in all prisoners. Within the hospital, one study identified a significant reduction in the onset of acute myocardial infarction after the introduction of a phased smoking policy over 12 years. There was also an increase in quit attempts and increased prescribing of nicotine replacement products in some studies. A positive effect from smoking bans was also seen on university and college campuses, and included reductions in the smoking rates, increased quit attempts, evidence of reduced passive smoke exposure, and positively influencing social norms and peer perceptions of smoking attitudes and behaviours. Staff attitudes at each of these institutions were seen as critical in enacting and enforcing these policies.	2015	10/10 (AMSTAR rating from McMaster Health Forum)	1/17	2/17	0/17
	Examine the effectiveness of interventions to prevent obesity or improve obesity related behaviours in children aged 0-5 from socio-	The review included 32 studies examining the effectiveness of interventions to prevent obesity or improve obesity-related behaviours in children 0-5 years from socio-economically disadvantaged or Indigenous families. Interventions included in the review were delivered in a number of different settings including the home, primary-care facilities, preschool and community settings. Studies in the home setting were for the most part delivered	2013	5/9 (AMSTAR rating from McMaster Health Forum)	0/32	32/32	0/32

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	economically disadvantaged or Indigenous families(91)	antenatally from birth or early infancy, and used trained field workers. Only studies commencing antenatally or at birth had a positive impact on breastfeeding outcomes, though all had a positive impact on introducing solids. All studies had a positive impact on child diet at 24 months where children had an improved BMI and a reduced likelihood of being overweight or obese. Findings among preschoolers were mixed with the more successful interventions requiring high levels of parental engagement, use of behaviour change techniques, a focus on skill building, and links to community resources. The majority of studies reported positive impacts on some measure of obesity. The few studies that reported no impact focused largely on knowledge acquisition, or had minimal parental components or low levels of parental engagement.					
	Determine whether the provision of menu-based nutrition information affects selection and consumption of calories in foodservice establishments(44)	The review included 17 studies examining the effects of menu labelling on food and calorie consumption, particularly among those with low health-literacy skills. All interventions took place at either fast-food restaurants or worksite cafeterias and consisted of calorie content only. Of five studies focused on fast-food restaurants, only one reported statistically significant association between the introduction of menu labelling and the selection of fewer calories. Among the workplace cafeteria studies, there was a more frequent selection of targeted items in cafeterias where menu labels were provided. A meta-analysis of the 10 experimental studies concluded that participants in the menu label groups selected 43 fewer calories and consumed 41 fewer calories than control groups.	2013	7/11 (AMSTAR rating from McMaster Health Forum)	0/17	Not reported in detail	0/17
	Assess the impact of calorie labelling on calories purchased, and determine young adults' views on calorie labelling and on calories	The review included seven studies that assessed the impact of recent legislation requiring calorie labels on food purchases by young adults at catering outlets. Three studies examined the effect of recent New York City legislation and found no effects on calories purchased.	2014	4/11 (AMSTAR rating from McMaster Health Forum)	0/7	Not reported in detail	0/7

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	purchased (45)	Two studies examined the effect of the Washington legislation, which required calorie labelling for chain restaurants. No effect was found at either eight or 13 months in one study, while another found no effect at six months but a decrease of 22.1 kcal at coffee chains at 18 months post labelling. Two studies examined the impact at catering outlets and found reductions ranging from 16.8 to 55.6 kcal in four participating restaurants and two university cafeterias. Four studies examined gender differences, two of which reported larger reductions in calorie consumption among women than men, and the remaining two reported no differences. A meta-analysis was conducted for six of the studies and found that the overall effect of calorie-labelling was a small reduction in calories. In a survey to young adults, 46% of respondents reported wanting calorie information.					
	Effects of government tobacco control policies on health outcomes (89)	The overview included 59 reviews examining the effects of government tobacco control policies on health outcomes. Twelve reviews summarize the health-related effects of smoking bans and found that overall reviews reported reductions in smoking prevalence and cigarette consumption, as well as reductions in smoking prevalence and cigarette consumption. Twelve reviews present research evidence on the effect of financial assistance or incentives for smokers to quit smoking, and for healthcare professionals to provide smoking interventions. Financial interventions appear to have different effects depending on whether they are incentives to quit smoking or assistance to lower the cost of cessation therapies. The effect of incentives and competitions for smokers is less clear with four reviews reporting increased cessation and four reporting unclear or no effects. Three reviews examined warning labels about the danger of tobacco, two of which were found to be effective at decreasing smoking behaviour, reporting reductions in tobacco use and increases in motivation to quit.	2014	Not reported in detail	Not reported in detail	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		Four reviews examined the health-related effects of tobacco advertising bans and restrictions, and none of the reviews found links to clear reductions in smoking behaviour. All but one of six reviews examining increased taxes on tobacco found that increasing the price of tobacco reduces smoking behaviour, with decreases in cigarette consumption and smoking prevalence, and increases in smoking cessation.					
	The effect of food and beverage marketing on the diets and health of children and youth (46)	There is strong evidence that television advertising influences the food and beverage preferences of children aged 2–11 years. There is insufficient evidence about its influence on the preferences of teens aged 12–18 years. There is strong evidence that television advertising influences the food and beverage purchase requests of children aged 2–11 years The review concluded that television advertising influences children preferences for and requests of high-calorie and low-nutrient foods and beverages. There is moderate evidence that television advertising influences the usual dietary intake of younger children aged 2 –5 years, and weak evidence that it influences the usual dietary intake of older children aged 6 –11 years. There is also weak evidence that it does not influence the usual dietary intake of teens aged 12 –18 years. Statistically, there is strong evidence that exposure to television advertising is associated with adiposity in children aged 2 –11 years and teens aged 12 –18 years. The association between adiposity and exposure to television advertising remains after taking alternative explanations into account, but the research does not convincingly rule out other possible explanations for the association.	2005	8/10 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	65/65	65/65

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Influence of food promotion on children (47)	There is strong evidence that food promotion influences children's food purchase-related behaviour. There is reasonably strong evidence that food promotion has an effect on children's food preferences. There is modest evidence that food promotion has an effect on children's nutritional knowledge. There is modest evidence that food promotion has an effect on consumption behaviour. There is some evidence that food promotion significantly influences children's food behaviour and diet independently of other factors known to influence children's food behaviour and diet.	2003	8/10 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	101/101	0/101
	Links between physical environments and physical activity nutrition and obesity (42)	There are several urban-form characteristics (natural and built environment) that tend to be associated with physical activity, and possibly nutrition-related obesity behaviours. These include: mixed land use and density; footpaths and cycle ways and facilities for physical activity; street connectivity and design; transport infrastructure; and systems, linking residential, commercial and business areas. A key limitation in interpreting the available research is that even where there are reasonably consistent associations between environmental variables and health behaviours, the evidence cannot be interpreted as definitively 'causal'. There is a lack of research on the types of interventions or built environmental change which will produce the most improvements in health-enhancing physical activity.	2005	4/10	Not reported in detail	Not reported in detail	15/15
	The effectiveness of monetary incentives in modifying dietary behaviours (48)	There is strong evidence that exposure to food promotion can influence children's food preferences, food purchasing and purchased-related behaviour. There is modest evidence that exposure to food promotion can influence nutritional knowledge and food consumption behaviour.	2005	9/11 (AMSTAR rating from McMaster Health Forum)	0/4	2/4	0/4
	The impact of prices on the demand for food and beverages (49)	Prices were significantly associated with lower demand for food and beverages. Price elasticity for foods and non-alcoholic beverages ranged from -0.3 to -0.8, with food away from home, soft drinks, juice and meats being most responsive to price changes.	2007	4/10 (AMSTAR rating from McMaster Health Forum)	0/160	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		The studies reviewed did not assess the effects of price changes on substitutions from unhealthy to healthy food choices for many of the key categories (e.g., whole grains).					
	To assess the effect of food taxes and subsidies on diet, body weight and health through a systematic review of the literature (50)	Taxes and subsidies influenced consumption in the desired direction, with larger taxes being associated with more significant changes in consumption, body weight and disease incidence. Studies that focused on a single target food or nutrient may have overestimated the impact of taxes by failing to take into account shifts in consumption to other foods. Food taxes and subsidies have the potential to contribute to healthy consumption patterns at the population level.	Not reported	6/10 (AMSTAR rating from the McMaster Health Forum)	Not reported in detail	Not reported in detail	24/24
	The effectiveness of population approaches to improve dietary habits, increase physical activity, and reduce tobacco use (90)	Focused national, community, and school-based media and educational campaigns are all effective in increasing knowledge and consumption of healthy foods, with some evidence of reductions in adiposity and other cardiovascular risk factors as well as increasing levels of physical activity. Some studies suggest that campaigns are most effective when they are focused on specific foods, implemented for many years, use multiple modes for communication and education, and, if shorter-term, incorporate other means of more direct communication to or involvement by the public.	2011	7/10 (AMSTAR rating from McMaster Health Forum)	21/497	69/497	14/497
Enhancing the health literacy of Ontarians and enabling informed care choices through the provision of information about the health system	Assess the effectiveness of school mental health literacy programs to enhance knowledge, reduce stigmatizing attitudes, and improve help-seeking behaviours among youth (51)	The review aims to assess the effectiveness of school mental health literacy programs to enhance knowledge and help-seeking behaviour, and reduce stigmatizing attitudes among youth. A total of 27 studies were included in the review, of which five were RCTs, nine were controlled before-and-after studies, and 13 were quasi-experimental studies. All studies had moderate to high risk of bias as a result of confounding factors, attrition bias and lack of randomization. Two studies demonstrated a statistically significant increase in knowledge acquisition, and four studies reported statistically significant positive results on reducing stigmatizing attitudes. Other studies addressing knowledge, attitude and help-seeking behaviours reported mixed findings. Overall findings suggested that there is inadequate evidence to support the positive effects of school-based mental health literacy programs. Studies with more rigorous methodological approaches	2009	9/10 (AMSTAR rating from McMaster Health Forum)	2/27	27/27	0/27

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		are needed to determine the effectiveness of such programs for addressing mental health promotion and intervention among adolescents.					
	Assess the effects for improving consumers' online health literacy(52)	Access to health information allows consumers to engage in healthcare decisions. Such information has been increasingly distributed online, which poses several barriers for consumer access, including insufficient skills to search, evaluate and use the information. This study aims to determine whether educating people on how to find and use the online information can improve their skills and their health. This review included two studies, with a total of 470 participants, examining the effect of adult education classes on online health literacy. One RCT demonstrated statistically significant positive outcomes in the intervention group regarding self-efficacy for information seeking, information-evaluation skills, and communication of information with health professionals. One controlled before-and-after study showed positive outcome in adopting the internet as an information access tool in the intervention group. Due to limited studies and moderate to high risk of bias, more well-designed RCTs are required to assess the interventions for enhancing consumers' online health literacy.	2008	10/11 (AMSTAR rating from McMaster Health Forum)	0/2	0/2	2/2
	Review whether differences in health-literacy skills are related to health outcomes and the use of healthcare services, as well as investigate interventions designed to improve these outcomes for individuals with low health literacy (54)	This review aims to answer two key questions pertaining to health literacy. One is to determine the outcomes, specifically whether health literacy skills are related to the use of healthcare services, health outcomes, costs of healthcare, and outcome or service use disparities. The other investigates the effective interventions for individuals with low health-literacy skills. The review included 95 articles measuring health outcomes and 45 articles addressing interventions. A relationship was found between differences in health literacy level and increased hospitalizations and emergency care use, poorer ability to understand health messages, lower receipt of vaccines, and poorer health status. The strengths of studies examining health outcomes were mostly low or insufficient. Moderate level of evidence was found for the effects of mixed interventions on healthcare service use, the effect of self-management interventions on behaviour, and the effect of disease-	2010	8/10 (AMSTAR rating from McMaster Health Forum)	3/140	0/140	0/140

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		management interventions on disease severity or prevalence. The report suggested advancement in the field of health literacy since the last version of the report in 2004. More studies are needed to develop tools to measure oral health literacy, and to examine the mediators and moderators of the impact of health literacy.					
	Examine the effectiveness of interventions designed to reduce the effects of low health literacy (53)	This review aims to assess the effectiveness of interventions for improving low health literacy through either single or multiple literacy-directed strategies. It examined the interventions used to enhance the use of healthcare services, health outcomes, lower costs of care, and reduced disparities in service use and outcomes among different ethnic, racial, or age groups. The review was commissioned by the Agency for Healthcare Research and Quality (AHRQ). The review included 38 studies, of which 22 were RCTs, one was a cluster-randomized trial, five were non-randomized controlled trials, and 10 were quasi-experimental studies. It was found that interventions with certain design features, such as presenting essential information first, presenting numerical data in table format rather than text, adding icon arrays, and adding visual to verbal narratives can improve participant comprehension level. Mixed-strategy interventions with a focus on self-management decreased hospitalizations and emergency department visits. Interventions focused on disease management also reduced disease severity. Significant advancement in research had taken place in the field of health literacy within the last decade. Not all interventions with intuitive appeal turned out to be effective. In addition, interventions could have different impacts on individuals with low and high health literacy.	2011	7/10 (AMSTAR rating from McMaster Health Forum)	0/38	0/38	0/38

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
Supporting patient self-management and shared decision-making	Evaluate the effect of shared decision-making interventions on disadvantaged groups and health inequalities (55)	Shared decision-making (SMD) is one of the models used to advocate patient engagement in healthcare. This model allows the healthcare system to manage the growing and changing demand of patients, and to mediate the decision-making process between patients and healthcare providers. However, SDM leads to the risk of increasing health inequalities, as those who use the model tend to be natural information-seekers. Thus, this review aims to examine the effect of SDM interventions on disadvantaged groups and health inequalities. The review included 19 studies, 10 of which were included in the meta-analysis. At least 50% of individuals from all studies came from disadvantaged groups, unless a separate analysis was conducted for these groups. Overall findings from the meta-analyses suggested that SDM interventions have positive effects on knowledge acquisition, making informed choices, and participation in decision-making, reducing decision-making conflicts among disadvantaged individuals. It was also discovered that SDM interventions tend to benefit those with lower health literacy more compared to those with higher health literacy and socio-economic status. Evidence from research suggests that SDM interventions can significantly benefit the disadvantaged groups. More studies with higher quality should be conducted to support these findings.	2012	10/11 (AMSTAR rating from McMaster Health Forum)	0/19	0/19	0/19
	Review the evidence on the impact of health information technology that supports patient-centred care (59)	This review aims to investigate current evidence on the effect of health information technology (IT) on patient-centred care (PCC). The areas of focus of PCC includes healthcare processes, clinical outcomes, intermediate outcomes such as patient or provider satisfaction, responsiveness to patient needs, decision-making communication processes, and access to medical information. The review included 327 articles, of which 184 papers examined the impact of health IT applications on supporting PCC, 206 papers assessed the facilitators and barriers for implementing these applications, and 63 papers mentioned both. The results suggested that PCC-related health IT applications can have a positive impact on healthcare process outcomes, intermediate outcomes, and clinical outcomes related to diabetes mellitus, cancer, and heart disease, among other conditions. IT interventions also have a positive	2010	9/10 (AMSTAR rating from McMaster Health Forum)	0/327	0/327	0/327

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		influence on clinicians' responsivenes to patient needs, patient-clinician communication, decision-making process, and access to information. For using health IT applications for PCC, there are several facilitators and barriers to implementations that need to be considered. The facilitators include ease and efficiency of use, availability of support, perceived usefulness, and site location. The barriers include low computer literacy, inadequate training in applications, increased workload, lack of standardization, patient information confidentiality, and limited access to applications due to age, income, education, and other factors.					
	Explore the influence and impact of shared-decision on medical malpractice litigation and patients' intention to initiate litigation (163)	Medical practice has been shifting toward a shared decision-making process that emphasizes patient-centred care, as poor communication and inadequate sharing of information often lead to patient dissatisfaction. Communication issues have been shown to be strongly associated with medical malpractice litigation. This review aims to study the impact of shared decision-making and related interventions on medical malpractice litigation, and patients' intentions to initiate litigation. This review included five studies, of which four were qualitative and one was quasi-experimental. It was found that involving patients in decision-making and respecting patients' preferences are important in decreasing the risk of litigation. By documenting shared decision-making processes in a patient's record, clinicians may prevent litigation, as evidence of informed consent is available. Two studies also found that healthcare professions think the use of technological interventions can offer the best defense against litigation. It was hypothesized that shared decision-making can reduce medical practice litigation. However, due to insufficient empirical data, quality and heterogeneity of included studies, conclusions could not be drawn on whether or not shared decision-making and related support interventions are able to decrease medical malpractice litigation.	2014	9/10 (AMSTAR rating from Program in Policy Decision-making)	0/5	0/5	0/5

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Effect of shared decision-making on patient-related and disease-related outcomes(164)	Shared decision-making (SDM) has been shown to improve patients' satisfaction and their confidence in the medical decisions made. This review examines controlled studies that explicitly assessed the effect of shared decision-making on patient-relevant and disease-related outcomes. The review included 22 studies of high heterogeneity regarding sample population, intervention types, and implementation methods of SDM. Twelve studies showed significant difference between patients who had undergone SDM intervention and the control group. Ten studies demonstrated greater improvement in patient-relevant and disease-related outcomes for patients who had received SDM interventions. The benefit appeared greater when the intervention was directly targeted at the patient. The study quality ranged from low to moderate in most studies. As a result, it was concluded that current evidence is insufficient in determining conclusive benefits of SMD interventions.	2014	7/10 (AMSTAR rating from McMaster Health Forum)	2/22	0/22	0/22
	Explore models of self-management support interventions that are associated with reductions in healthcare utilization without compromising outcomes in patients with long-term conditions (165)	Self-management interventions include patient education, self-monitoring, support for decision-making, and psychological and social support. While self-management could potentially enhance the efficiency of health services, it could also lead to negative outcomes such as feelings of anxiety and decreased quality of life. This review examines the ability of self-management support interventions to reduce healthcare utilization without compromising outcomes of patients with long-term conditions. This review included 184 studies. Results suggested that self-management interventions led to small but significant improvements in patients' health outcomes, especially those with diabetes, or respiratory, cardiovascular, and mental health conditions. Only a few self-management interventions were associated with small reductions in health services utilization. It was also found that the interventions that demonstrated greater benefits were associated with a higher risk of bias. Overall findings support the use of self-management interventions in reducing healthcare utilization without compromising health outcomes of patients. Future work is needed to evaluate the specific components of self-management support that are most effective in	2012	8/11 (AMSTAR rating from McMaster Health Forum)	0/184	0/184	0/184

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		achieving positive outcomes.					
	Identify, summarize, and synthesize evidence regarding interactive digital interventions to support patient self-management of asthma, and determine their impact (166)	This review aims to identify and evaluate the evidence for the effectiveness of interactive digital interventions to promote patient self-management of asthma. The review included eight articles with a total of 593 participants. Three studies were eligible for the meta-analysis, of which two studies were targeted at improving asthma control and another study aimed to decrease the dosage of oral prednisone without compromising health outcome. The meta-analysis showed high heterogeneity between studies and no significant differences in the outcomes between the intervention and the control groups. However, upon removing the third study from the meta-analysis, the heterogeneity decreased and improvements were found in the Asthma Quality of Life for both the intervention and the control group. Interactive digital interventions were shown to support self-management of asthma among adults. However, due to the extremely low number of trials, the evidence is weak and more robust studies need to be conducted.	2013	8/11 (AMSTAR rating from McMaster Health Forum)	0/5	0/5	0/5
	Effectiveness and safety of patient activation interventions for adults with Type 2 diabetes, and which of the interventions have the largest impact on glycemic control (92)	Patient activation interventions (PAIs) are a subset of behavioural interventions that promote patient motivation, knowledge and disease self-management skills. Although PAIs were deemed as promising clinical tools, little research had been done to evaluate the effectiveness. Thus, this review aims to assess the effectiveness and safety of PAIs for adults with Type 2 diabetes, and which of the interventions influence glycemic control the most. This review included 138 randomized trials that compare PAIs to usual care or control groups for adults with Type 2 diabetes. The results suggested that PAIs were able to reduce some intermediate outcomes, including A1c hemoglobin levels, systolic blood pressure, and low- and high-density lipoprotein cholesterol. Low to moderate quality of evidence suggests that PAIs did not influence hypoglycemia or short-term mortality. Specifically, PAIs were able to improve A1c hemoglobin levels in adults with Type 2 diabetes without increasing their chance of mortality.	2011	8/11 (AMSTAR rating from McMaster Health Forum)	3/138	0/138	0/138

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Explore which models of self-management support are associated with reductions in health services utilization without compromising outcomes in patients with long-term conditions (95)	Patient self-management interventions have the potential to increase healthcare efficiency and provide benefits to patient health and quality of care. This review aims to assess the models of self-management support, and which ones are able to reduce health services utilizations without compromising outcomes of patients with long-term conditions. A total of 184 studies were included in the review. Long-term health conditions of patients included those of cardiovascular, respiratory, and mental health origins. The self-management interventions were categorized as "pure self-management" (5%), "supported self-management" (20%), "intensive self-management" (47%), and "case management" (28%). Findings suggest that self-management interventions were associated with small but significant advancement in quality of life. Some studies also found reductions in healthcare utilization that were associated with decrements in health. It was also found that the interventions that demonstrated greater benefits were associated with a higher risk of bias. The findings for self-management support were limited by the small number of available literature. There were also some poor reporting of outcomes pertaining to healthcare utilization and costs. Future studies should better report the outcomes, and investigate the factors affecting the implementation of self-management support.	2012	7/11 (AMSTAR rating from McMaster Health Forum)	7/184	0/184	0/184
	Identify and evaluate effective types of self-management interventions that could be packaged with resources or with guidelines (93)	Self-management is regarded as an important aspect of care for individuals with chronic conditions. Experts advocated for the establishment of guideline-based, self-management interventions that could be used by patients and enhance healthcare quality and outcomes. This review aims to identify and evaluate effective self-management interventions that could be incorporated into appendices or guidelines. The review included a total of 77 studies, of which 14 were considered as having low risk of bias, 44 with moderate risk of bias, and 18 with high risk of bias. A total of 54 studies focused on single interventions that are educational or self-directed, and 21 studies focused on multifaceted interventions. Results showed the involvement of multiple types of self-management components for most health conditions. The most common self-management components include lifestyle advice (72%), psychological strategies	2014	6/10 (AMSTAR rating from McMaster Health Forum)	5/77	0/77	0/77

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		(69%), and information related to the condition (49%). 76% of the interventions were able to inform and activate the patients. Among the effective interventions, activation strategy was used alone in 83% of the cases, used in conjunction with information in 94% of the cases, and used in conjunction with both information and collaboration in 95% of the cases. Patient-oriented tools, such as single resources that provide information and encourage activation, were shown to be effective for enhancing guidelines and providing patient support. More research on the optimization of the beneficial characteristics of self-management resources included in guidelines is needed.					
	Synthesize and summarize research into professional practitioners' perspectives, practices, and experiences to help in the reconceptualization of support for self-management (96)	This review took a critical interpretive synthesis approach as it aims to summarize the existing literature about social or healthcare workers' perspectives, practices and experiences, and to develop a reconceptualization of support for self-management. The review included 164 papers and identified significant diversity among professionals' approaches to support for self-management and interpretations of related concepts. Two main approaches of self-management were identified. The narrower approach supports patients to "manage their condition(s) well" in regards to disease control. This was associated to more limited views of patient empowerment and a more hierarchical clinician-patient communication, which often led to patient frustration and intervention failure. The broader approach allows patients to "manage well with their condition(s)." This approach allows the patients to focus on disease control in terms of what matters to them and how they can obtain support in order to achieve their goals. The broader approach was deemed necessary for fulfilling the self-management support, particularly for patient empowerment. The broader approach, despite being the relatively more effective self-management support intervention compared to the narrow approach, was found to be less evident in actual practice.	2014	3/9 (AMSTAR rating from McMaster Health Forum)	0/164	0/164	0/164

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Study the planning, implementation, and effectiveness of Web 2.0 chronic disease self-management interventions for older adults living with chronic diseases (94)	Web 2.0 interventions are used to promote collaboration and to support self-management of chronic diseases. This e-patient communication tool allows older adults to not only find and share disease management information, but also obtain interactive healthcare advice. The platform demonstrated potential for accomplishing better chronic-disease outcomes. This review aims to study the construction, implementation, and effectiveness of Web 2.0 self-management interventions for older adults with at least one chronic condition. This review included 15 articles. Findings suggested that Web 2.0 participants reported better self-efficacy for disease management, and received greater benefits from communicating and receiving feedbacks from healthcare professionals. Patients also reported that certain communication and tracking tools, such as email, discussion boards, and graphical representations of personal data, aided in the self-management process. While Web 2.0 was expected to be associated with better health behaviours and health status, little evidence showed statistically significant improvements in healthcare utilization, medication adherence, and biological outcomes. There are also many limitations to the study, such as the recruitment of small samples of white females with diabetes. More research is required to gain a better understanding of the costs and benefits of patient-centered Web 2.0 interventions for self-management of multiple chronic health conditions.	Not reported	5/11 (AMSTAR rating from McMaster Health Forum)	1/25	0/25	0/25
Strengthening and supporting the role of patients' families and carers, and increasing the role of patient peer-to-peer support	Explore the effect of carer stress on subsequent institutional placement of community-dwelling older people (167)	Across 54 studies, a meta-analysis found that while carer stress is a significant factor in subsequent institutionalization, the effect size was very small. A sensitivity analysis indicated that the experience of stress among caregivers is a better predictor of subsequent institutionalization than either burden or feelings of depression, though all were reported to have relatively small effect sizes. Overall, the review determined that carer stress was a relatively small indicator of subsequent institutionalization of those being cared for, especially considering high levels of heterogeneity and bias reported in the results favouring measurements of stress.	2014	9/11 (AMSTAR rating from McMaster Health Forum)	6/54	2/54	0/54

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Identifying the effect of family-centred self-care interventions for improving outcomes of individuals with chronic conditions (57)	Ten studies were included in this review, and all interventions involved face-to-face educational sessions with patients and caregivers. Educational components included psychosocial interventions, communication training, medical adherence, coping skills training and hands on skills-based training. The interventions varied in their frequency and length of time. Significant reductions in readmission rates were seen at 30, 90 and 180 days across each of the interventions. Further positive outcomes include prolongation in time to rehospitalization and increased medication adherence. Quality of life was shown to improve but had varied results at each of the three-, six- and 12-month follow-up. Overall, evidence found significant benefits from the inclusion of family caregivers in self-care of individuals with chronic conditions.	2015	4/9 (AMSTAR rating from the McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail
	Evaluating the effects on elderly oral health following oral-health education for caregivers (168)	Five studies were included in this review. The review found that the percentage of residents with normal oral mucosa, no visible plaque and no detectable stomatis significantly increased following caregivers' receipt of oral-hygiene education. Overall, evidence found that providing education in oral hygiene to caregivers improves the oral hygiene of those being cared for.	2014	9/11 (AMSTAR rating from Program in Policy Decision Making)	Not reported in detail	0/5	0/5
	Assess interventions that aim to improve the experience of caring and reduce caregiver burden for people with severe mental illnesses (61)	The review included 21 studies which found evidence that psycho-education improves the carers' experience of care. Studies confirmed that while psycho-education does not reduce carers' psychological distress immediately following the intervention, it produced significant reductions in reported levels of distress at the six-month follow-up. Low-quality studies indicated that both support interventions and problem-solving bibliotherapy reduces carers' levels of stress immediately following the intervention and at follow-up. Overall, the review indicates that psycho-education is a beneficial intervention to reduce carers' distress.	2013	8/10 (AMSTAR rating from Program in Policy Decision Making)	1/24	0/24	0/24
	Assess current behavioral and educational interventions that support family	The review included 14 studies, which examine the effects of education, cognitive behavioural therapy and psycho-education on supporting caregivers in end-of-life care. Four studies found educational interventions increased caregivers'	2014	4/9 (AMSTAR rating from McMaster Health	1/14	0/14	0/14

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	caregivers in end-of-life care (60)	knowledge, preparedness, satisfaction and confidence in delivering care, but did not improve their general health or coping skills. Six studies found cognitive behavioural therapy improved caregivers' psychological health, coping and self-efficacy. All but one study found cognitive behavioural therapy improved caregivers' quality of life. Four studies examined psycho-education and found that one-on-one interventions generally improved caregivers' anxiety and competence in delivering support, whereas group sessions increased feelings of social support and feelings of anxiety for family caregivers of patients receiving palliative care.		Forum)			
	Synthesize research involving the barriers and facilitators for adult male carers in accessing formal and informal support (62)	The review included seven studies and found that male carers were committed to their caregiving role, though reported feeling ambivalent or guilty when asking for help. Participants in the studies highlighted insufficient information about available services as a key challenge in caregiving. The review found access to services was primarily determined by previous positive experiences with both formal and informal supports. Two studies undertook a gender sub-analysis and found a greater preference for formal services among men.	2015	6/10 (AMSTAR rating from McMaster Health Forum)	2/7	3/7	0/7
	Impact of technology-based intervention on care providers for those who survived a stroke (64)	The review included five studies examining the impact of technology-based interventions on informal caregivers of stroke survivors. The review assessed levels of depression as well as problem-solving ability, burden, health status, social support, preparedness, and healthcare utilization by care recipients as secondary outcomes. Two of the included studies suggest that technological interventions can significantly decrease caregivers' depressive symptoms, though the remaining two studies found no significant differences in any of caregivers burden, problem-solving ability, health status or levels of social support. One study assessed caregivers' preparedness following the intervention, and found some significant improvements as well as a reduction in healthcare use following the intervention, notably a reduction in emergency department visits and hospital readmissions.	2015	6/10 (AMSTAR rating from McMaster Health Forum)	1/5	0/5	0/5

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		Overall, data suggest that interventions that incorporate a technological element to assist informal caregivers are beneficial and a promising strategy.					
	Efficacy of family-based education for heart failure patients and carers (56)	The review included nine articles reporting on six trials on the effects of family-based education on heart failure. The review measured knowledge of heart failure as well as self-care behaviour, dietary and treatment adherence, quality of life, depression, perceived control, hospital readmissions and carer burden. Two of the studies included found a significant improvement among patients and carers in knowledge of heart failure. The remaining studies found enhanced patient self-care, increased dietary and treatment adherence for patients, improved quality of life, and increased levels of perceived control among patients but not carers.	2015	7/10 (AMSTAR rating from McMaster Health Forum)	0/9	0/9	0/9
	Effectiveness of respite care in supporting informal caregivers of individuals with dementia. 68)	The review included 17 studies examining the effectiveness of respite care for caregivers of dementia patients. The review found that day-care services were effective in decreasing caregiver burden and behavioural problems in persons with dementia, but were also found to accelerate the time for dementia patients being admitted to nursing homes. The review also found that temporary residential admissions had mixed results and showed adverse effects on both caregivers and care recipients.	2015	5/9 (AMSTAR rating from McMaster Health Forum)	2/17	0/17	0/17
	Effectiveness of computer-mediated interventions in supporting informal caregivers of individuals with dementia (63)	The review included 14 studies, which examined computer-mediated interventions for informal carers of people with dementia. Interventions were varied with many having multiple components, but included the use of automated interactive voice response, computer-telephone integration systems and DVD programs. No internet-based education interventions were included. Included studies found mixed effects with higher quality studies finding limited to no effect from the interventions. Two of these studies, however, reported reduced levels of anxiety following the intervention as well as carer self-efficacy. Mixed results were reported on levels of social support. Overall, findings support the provision of computer-mediated	2012	4/9 (AMSTAR rating from McMaster Health Forum)	3/14	0/14	0/14

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		interventions for carers of people with dementia, though more research is needed to confirm findings.					
	Examine types of burdens reported in informal caregivers of adult ICU survivors, as well as make recommendations on which burdens should be assessed in this population and with which instrument (169)	The review included 28 articles examining the impact of ICU discharges on informal caregivers. Within the studies, the most commonly reported outcome was psycho-social burden. Nineteen of the studies assessed caregiver depression and reported a prevalence between 16-90% during ICU or hospital stay. While the levels of reported depression lowered upon discharge, they continued to increase in the 12 months following. Other reported outcomes included anxiety, post-traumatic stress, loss of employment, financial burden, lifestyle interference and low health-related quality of life.	2014	6/9 (AMSTAR rating from the McMaster Health Forum)	1/29	Not reported in detail	Not reported in detail
	Effectiveness of internet interventions for informal caregivers of people with dementia (65)	The review included 12 studies examining the use of internet-based supports for caregivers of patients with dementia. Six studies included in the review reported significant improvements in carers' well-being with internet-based intervention for depression, sense of competence, decision-making confidence, self-efficacy and burden. Additional studies reported increases in carer self-efficacy and self-control. Included studies found no significant differences between or within treatment groups for carer quality of life, use of stress management, social isolation and health status. While internet interventions were found to improve carer well-being, outcomes should be interpreted with some degree of caution, as only two of the reviews included were considered to be of good quality.	2013	6/10 (AMSTAR rating from McMaster Health Forum)	2/11	0/11	0/11

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Explore the views and experiences of stakeholders regarding advance care planning in cancer care (67)	The review included 40 studies that examined the effect of advance care planning on cancer patients as reported by patients, families and healthcare providers. The review found five key themes regarding advance care planning: 1) advance care planning is relational, with cancer patients wanting to involve their family in decision making, with the exception of making end-of-life treatment directives; 2) advance care planning can provoke fear and distress depending on the timing of discussion, how the discussion is initiated and what information is provided about end of life care; 3) advance care planning is controlled by physicians who feel they are best placed to determine when patients are ready for advance care planning; 4) institutional culture is influential in participation in advance care planning; and 5) knowledge of advance care planning and previous healthcare experiences can act as a motivator or barrier to advance care planning.	2014	6/10 (AMSTAR rating from McMaster Health Forum)	2/40	0/40	0/40
	Review evidence of the effect of telehealth tools on informal caregivers (66)	The review included 65 studies examining the effects of telehealth tools and interventions to support informal caregivers. Participants included both parental and family caregivers assessing telehealth technologies such as video-conferencing, telephone-based interventions (phone call or text message), and web-based information. Interventions delivered via technologies included education, consultation, psycho-social/cognitive behavioural therapy, social support, data collection and monitoring and clinical care delivery. Sixty-two of 65 articles reported improved outcomes, including enhanced psychological health (less anxiety, depression, stress, burden, irritation and isolation), higher satisfaction and confidence with the use of telehealth, improved caregiving knowledge and skills, higher quality of life, improved social support, improved problem solving skills, better communication with providers, more cost savings, and enhanced physical health and productivity. Three articles reported that the caregivers did not have significant improvement nor differences in satisfaction post-telehealth intervention compared to the control group.	2014	4/9 (AMSTAR rating from Program in Policy Decision-making)	8/65	0/65	0/65

Appendix 2: Systematic reviews relevant to Element 2 – Align features of the health system to achieve value for money by addressing supply-side drivers of change

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
Organizational changes	Identify and appraise different forms of information products used by health system managers, policymakers and clinicians to summarize the evidence drawn from systematic review (98)	This paper included both studies that supported the use of information products based on systematic review findings or organizational supports that enable the uptake of systematic review evidence, and ones that supported a reduction in the use of these means of disseminating information. Only one clustered randomized control trial found a significant improvement in clinical practice when clinicians had access to the WHO Reproductive Health Library along with meetings with hospital directors and heads in the field. All three of the included time series studies showed a significant improvement in clinician behaviour when access to these information products was given. Two interrupted time series studies found significant reduction in the rate of surgery performed in children when Effective Health Care bulletins - publications from the Centre for Reviews and Dissemination based on systematic review evidence - were mass mailed to clinicians. Similar beneficial effects were seen when general practitioners were distributed a bulletin on the treatment of depression. There was a significantly lower prescribing rate each quarter when comparing the rates after and before the distribution of the bulletin.	2012	9/10 (AMSTAR rating from McMaster Health Forum)	1/8	0/8	0/8
	Examine strategies used by public health decision-makers in settings with universal healthcare coverage to synthesize empirical research evidence (99)	Due to the methodological quality of the included studies, it is difficult to draw definitive conclusions from this systematic review. Though two studies examined the extent to which research evidence is used by public health decision-makers, the lack of clarity in how the data was analysed makes it difficult to compare them. This is reflected in the different findings; one study found that 63% of participating Ontario public health staff reported using at least one systematic review in the past two years to inform a decision, and an Australian study found that only 28% of public health policymakers reported using academic research. Two qualitative studies explored the types of research evidence used by public health decision-makers, however, there was no overlap between the results. A recurring theme in all of the	2010	9/10 (AMSTAR rating from McMaster Health Forum)	8/18	0/18	1/18

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		included studies was the influence of key personnel in the decision-making process, which included acting as a filter for evidence to be transferred and making judgments based on perceived "common sense" and "expert opinions." There was a degree of consensus on important factors limiting the use of evidence in practice. Barriers included the decision-makers' perceptions of the evidence, inability to reproduce the research findings into a decision-making process, and competing constraints. Research on methods to overcome these barriers was less extensive; many advocated for direct communication and connection between the researchers and the policy makers.					
	Examine the barriers, gaps and approaches used in existing research evidence uptake mechanisms (97)	Educational visits, short summaries of systematic reviews and targeted messaging showed significant improvement in changing knowledge and attitudes as well as altering profession-related behaviours. It is worth noting that no study demonstrated a significant improvement in patient care. It was difficult to synthesize findings on barriers to information uptake from evidence because they varied across all included studies. The authors highlight that the lack of evidence on building on known facilitators impedes them from making recommendations on the enhancing evidence uptake.	2010	9/10 (AMSTAR rating from Program in Policy Decision-making)	1/10	0/10	1/10
	Knowledge translation services' effect on the uptake of evidence from systematic reviews in policymaking context (170)	The review identified 20 knowledge translation resources, 11 being summaries of systematic reviews, six being overviews of systematic reviews, and three being policy briefs. The extent to which these resources are used and are useful to policymakers is unclear, with mixed evidence found regarding their influence on decision-making.	2009	6/9 (AMSTAR rating from McMaster Health Forum)	3/20	0/20	0/20
	Examining the impact of financial incentives on healthcare professional behaviour and patient outcomes (171)	Overall, researchers concluded that payment for service, payment for providing care for a patient or specific population, and payment for providing a pre-specified level of care or providing change in activity or quality of care, were effective. Mixed results were obtained for mixed or other system interventions, and payment for working for a specified time period was generally ineffective. Financial incentives were found to be effective in improving processes of care, referrals and	2010	Not applicable for this type of document	10/10 (AMSTAR rating from the McMaster Health Forum)	0/4	4/4

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		admissions, and prescribing costs. They showed mixed effects for consultation or visit rates, and they were found to be generally ineffective in promoting compliance with guidelines. However, these results should be treated with caution due to the low to moderate quality of evidence of the studies included in each review.					
	Effectiveness of existing mechanisms to integrate medical care quality and safety into healthcare pricing and funding arrangements (172)	The literature review identified four healthcare pricing models: best practice pricing, normative pricing, quality structures pricing models, and pay-for-performance schemes. For best practice pricing, there are some reported benefits to the approach, however, the studies contained inconsistent methodologies. A study about best practice tariffs found improvements in quality of care (i.e., improved diagnostic assessments and proper medication, decreased lengths of stays). However, the approach has yet to be fully evaluated. For the normative pricing approach, which influences delivery of care, there is limited evidence on its impact on quality and safety of healthcare. Some studies reported improvements in performance among radiologists (i.e., reduced reporting turnaround times) after a financial incentive was added for target performance. For the quality structures pricing approach, which links pricing to structural approaches (i.e., accreditation, clinical quality registries linked to clinical benchmarking, and other safety improvement activities), most of the evidence indicates funding has an impact when clinical services are involved, with clinical quality registries linked to clinical benchmarking. The studies reported significant improvements in providers' adherence to evidence-based practices and reductions in post-surgical complications and mortality. However, there is no evidence to directly link performance and the level of funding. There is limited evidence to support other structural approaches in the improvement of quality and safety of healthcare. For pay-for-performance programs, the literature review reported that there is little evidence on the effect of these	2013	6/10 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		programs on patient outcomes, which in most cases was the mortality rate. Hospitals participating in a pay-for-performance program found that mortality remained the same as baseline reports. One study identified adverse effects to pay-for-performance programs, such as increased hospital admissions, cost shifting, cherry-picking or misreporting. One study surveyed 66 hospitals and determined that 75% reported making structural and organizational changes (i.e., more involvement and leadership) as a result of an incentive scheme. There is insufficient evidence to conclude which model is the most beneficial. Overall, some conclusions can be made: incentives need to be substantial to generate change in behaviour and practice; incentives need to be provided at a clinical department-level in order to improve quality and safety of clinical care; and further research is needed to expand the literature scope to include outpatients and other departments.					
	Examining the effectiveness of organizational and financial reforms on quality of health services (173)	The study found no reviews examining the effects of funding allocation reforms or direct purchasing arrangements on quality of care. There were eight reviews focused on payment of providers. Most were high quality, however the quality of the primary studies were low to moderate. The results were generally inconclusive, with half concluding that financial incentives had little impact. There were five low-quality reviews that examined changes to organization of service provision, with three on commissioning, general practice fund-holding, and internal markets, one on privatization, and one on competition. The reviews concluded that the evidence on efficiency is mixed and inconclusive. There were six reviews examining the effect of changes to service integration on quality in healthcare, One studied financial integration of health and social care bodies, two studied organization of services, and three studied integration of care. The evidence has identified benefits for patients, although it depends on the approach being taken.	2013	7/9 (AMSTAR rating from Program in Policy Decision-making)	1/19	0/19	19/19
	Examining whether various	Most MCOs have had limited success using formularies, therapeutic interchange, and prior approval to influence	2001	3/11 (AMSTAR	0/25	9/25	5/25

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	methods used by managed care organizations (MCOs) influence prescribing and dispensing of drugs (174)	prescribing and dispensing decisions. Closed formularies were effective in reducing utilization, but not cost, of prescription drugs. Prior approval programs reduce use and costs of drugs, but only in a small number of drug classes. Voluntary therapeutic interchange programs have been shown to be successful in staff-model health maintenance organizations, but not in independent-practice models. Currently, MCOs exert little control over prescribing and dispensing decisions. MCOs might better control pharmaceutical costs through other methods such as tiered co-payments.		rating from McMaster Health Forum)			
	Assessing impact of restricted Medicaid formularies and whether other formulary drugs were substituted for restricted drugs and their costs, therapeutic appropriateness, and current practices (175)	Eleven articles from 1972-1985 were analyzed for impact of restricted Medicaid formularies on use of unrestricted substitute drugs, administrative costs, drug costs and quality of care. The evidence does not support the assumption that restriction of specific drugs results in savings in drug costs. The impact of restricted formularies on administrative costs and therapeutic appropriateness of substituted drugs is unclear. In Michigan, 23.7% of patients received alternate drugs and 30.7% of patients still received prescriptions for the restricted drugs. In Louisiana, there was a 34% increase in the number of hospitalized patients and the state saved $4.1 million in its drug program, but spent $15.1 million in non-prescription services. Overall, restricting formularies leads to dynamic changes in the Medicaid program and should be carefully considered before implementing.	1987	2/10 (AMSTAR rating from McMaster Health Forum)	0/11	11/11	4/11
	Analyzing the implementation of Medicaid preferred drug lists (PDLs) in several states, and its impact on quality of care and cost relative to other segments of healthcare (176)	The most common and well-studied concern regarding preferred drug lists was identified to be medical restrictions increasing healthcare service utilization, such as hospital and physician visits. While state Medicaid departments have assured beneficiaries that drug coverage is provided for the best medications in every class, accounting for both safety and efficacy, beneficiaries have emphasized concerns about whether their medications will continue to be covered.	Not reported in detail	0/10 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail
	Macro- and meso-level decision-making and priority-	The clinical evidence on benefit and the quality of that evidence were the main criteria used in priority setting concerning medicines. The costs of the drug emerged as the second major criteria while	2007	1/10 (AMSTAR rating from McMaster	3/6	0/6	0/6

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	setting processes for including drugs in and/or excluding drugs from reimbursement lists and drug formularies in industrialized countries (177)	formal pharmaco-economic analyses were given a small role. Other criteria used were: alternative treatments available, decisions in other hospitals/systems, size of population affected, severity of disease and past decisions. External factors mentioned as influencing decision-making were patient demand, pharmaceutical company activities and clinicians' excitement. Clinical benefit as shown in clinical trials was the most important criterion for determining whether a drug is listed for reimbursement.		Health Forum)			
	Examining the effects of value-based insurance design on drug costs for individuals with multiple chronic diseases (178)	Value based insurance design has an underlying premise that drug co-payment is based on the clinical benefit or value of that drug rather than its acquisition cost. Ten studies were included in the review, two of which selectively lowered co-payments for CV medications only, three of which waived co-payments for diabetic medications only, and five of which waived co-payments for brand name drugs only. Eight studies reduced cost sharing for both generic and brand name drugs. Value based insurance design was associated with an increase in medication adherence. Medication adherence was further improved by a combined value based insurance design and disease-management programs. Only one randomized controlled trial examined the impact of essential drug coverage on clinical outcomes. The trial showed similar results as those with full drug coverage for essential CV medications, but showed that rates of total major vascularization and first major vascular event were significantly lower in the full drug coverage group compared with the usual coverage group. Mixed results were found on reductions in healthcare utilization. Three of the four studies that examined the impact of value based insurance design on healthcare expenditure found an increase in prescription drug expenditure overall. However, patient-born prescription drug costs decreased with value based implementation.	2012	8/10 (AMSTAR rating from McMaster Health Forum)	2/10	0/10	0/10
Changes to financial arrangements	Interventions to improve safe and effective	Seventy-five reviews were included, and focused on interventions with diverse aims, including behaviour change support, risk minimization and skills acquisition. While no single strategy was	2012	No rating tool available for this type	Not reported in detail	Not reported in detail	75/75 (includes reviews, not single studies)

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	medicines use by consumers (105)	found to improve all medicine-use outcomes across all diseases, populations or settings, medicines self-monitoring and self-management programs, simplified dosing regimens and directly involving pharmacists in medicine reviews appeared to be effective strategies. Delayed antibiotic prescriptions, practical management tools such as reminders and packaging, education or information combined with self-management skills training, counselling or other such strategies, and financial incentives were also associated with some positive effects, although effects were less consistent. Some strategies (e.g., directly observed therapy), providing information or education alone, were found to be relatively ineffective or to have variable effects (e.g., ineffective on medicine adherence but improving knowledge for informed medicines choices). Based on several studies, the authors concluded that there was some evidence supporting the effectiveness of financial incentives in terms of adherence, although with mixed results. Two studies suggested financial incentives targeting physicians were found to increase immunization rates. Three reviews investigated financial incentives targeting patients for immunization uptake, and found mixed results: one reported improved immunization uptake, although a smaller effect than with organizational change interventions; another showed non-significant changes with both financial incentives and with complex health systems interventions including patient financial incentives; and a third showed significant increases compared to no intervention or telephone calls or prompts, but not other interventions. One review also suggested increased medicines adherence or uptake with financial incentives.		of document			
	Effectiveness of financial incentives and contingency management programs on long-term smoking cessation rates (106)	Incentives included lottery tickets, prize draws, cash payments, item vouchers, grocery vouchers, and money deposits. The odds ration of smoking cessation at longest follow-up was 1.42 (95% CI 1.19-1.69) relative to the control group, and only three studies demonstrated significantly higher quit rates in the incentive group compared to the control. In eight of nine trials with data in pregnant smokers, an adjusted OR at longest follow-up (up to 24 weeks post-partum) of 3.60 (2.39-5.43) was reported based on moderate quality studies,	2014	10/11 (AMSTAR rating from the McMaster Health Forum)	0/21	9/21	21/21

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		favouring incentives. Three trials indicated a clear benefit for contingent rewards; the largest included trial provided intervention quitters up to GBP400 worth of vouchers, and found rates of 15.4% versus 4% for the two groups at longest follow-up. Four trials showed that successful quit attempt rewards compared to fixed payments for antenatal appointment attendance resulted in higher quit rates. The results of the review indicated that incentives may boost cessation rates while in place, with sustained success rates seen only where resources were concentrated into substantial cash payments for abstinence. Incentives for pregnant smokers may improve cessation rates, both at end-of-pregnancy and post-partum assessment stages.					
	Effectiveness of financial incentives to achieve sustained changes in smoking, eating, alcohol consumption and physical activity (107)	Overall, the findings of this review suggested that financial incentives were found to increase attainment of target levels of behaviour change, sustained up to 18 months from baseline (OR 1.53, 95% CI 1.05-2.23). Sustained change in overall behaviour with financial incentives was noted up to two to three months after incentive removal, but was not maintained thereafter. Behavioural effects were observed to weaken over time. Financial incentives were found to be effective with smoking cessation rates (effects seen for 12-18 months, sustained for two to three months after incentive removal) and healthier eating targets (for six to 12 months, not sustained after incentive removal), but not for physical activity (at six, 12-18 months, and three months after incentive removal). High deprivation increased the effect of financial incentives (OR 2.17, 95% CI 1.22-3.85), but only six to 12 months from baseline; other variables did not independently have a significant modifying effect at any follow-up time-point. This study indicates personal financial incentives may have an effect on individual health-related behaviours, but may not have a sustained effect on disease burden reduction.	2012	8/11 (AMSTAR rating from Program in Policy Decision-Making)	0/34	0/34	34/34
	Interventions for supporting nurse retention in rural and remote areas	Five relevant reviews were identified. With regards to financial incentives, one review synthesizing 43 empirical studies targeting nurses and physicians identified five types of programs addressing return of service: service requiring scholarships;	2012	6/9 (AMSTAR rating from McMaster	Not reported in detail	Not reported in detail	5/5 (includes reviews, not single studies)

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	(108)	educational loans with service requirements; service-option educational loans; loan repayment programs; and direct financial incentives. While the review identified substantial evidence on incentives for return of service as a health policy intervention to attract human health resources to underserved areas, there was limited evidence on rural area retention. Financial incentive programs were found to place substantial numbers of health workers in underserved areas, and participants were more likely to work in underserved areas for long durations relative to non-participants, although they were less likely to remain at their site of original placement. A second systematic review addressing effectiveness of different retention strategies found 14 relevant papers (one on nurse retention, six on medical practitioners, five on health care professionals with an emphasis on medical doctors, and one on psychiatrists). While financial incentives were the most commonly reported strategy, the review offered limited support for their efficacy, with results indicating they were more effective in improving recruitment and short-term retention than fostering long-term underserved area service retention. Some evidence suggested strategies involving some form of obligation (e.g., visa conditions restricting area of practice or loan repayment) might be effective in longer retention durations. Other evidence indicated non-financial incentives (e.g., providing quality working and housing conditions) might have a greater impact on retention-related decisions. Overall, while financial incentives were the only strategies that had been evaluated properly, evidence supporting their effectiveness on long-term nurse retention was still found to be very limited, with some evidence suggesting they lacked effectiveness. Evidence on "direct and indirect financial incentives (direct payments, service-requiring scholarships, educational loans with service requirements, loan repayment programs)" was classified as being moderate-strength and indirect. In comparison, effectiveness of education and continuous professional-development interventions (e.g., recruitment from and training in rural areas, targeted admission of students from rural backgrounds) was rated as being based on moderate-strength, indirect evidence. Regulatory interventions		Health Forum)			

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		(e.g., increased opportunities for recruitment to civil service) were rated as having low-strength indirect evidence, and personal and professional support interventions (e.g., general rural infrastructure improvement, supportive supervision, and measures to reduce healthcare workers' feelings of isolation) were rated as having a combination of moderate-strength indirect evidence and strong direct evidence.					
	Effectiveness of financial incentives in changing healthcare professional behaviours and patient outcomes (109)	The overview of systematic reviews included four reviews which reported on a total of 32 studies. Two of the reviews scored 7 (i.e., moderate quality) on AMSTAR criteria, and two scored 9 (i.e., high quality), and the quality of included studies was reported to be low to moderate. Payment for working for a specified time period was generally ineffective, improving 3/11 outcomes from one study reported in one review. Payments for each service, episode or visit, providing care for a patient or specific population, and providing a pre-specified level or providing a change in activity or quality of care, were all generally effective. Mixed and other systems were of mixed effectiveness. The effect of financial incentives overall across categories of outcomes were: of mixed effectiveness on consultation or visit rates; generally effective in improving processes of care; generally effective in improving referrals and admissions; generally ineffective in improving compliance with guidelines outcomes; and generally effective in improving prescribing costs outcomes. The authors concluded that financial incentives may be effective in changing healthcare professionals' practices, but did not find evidence that they improve patient outcomes. Financial incentives are utilized as extrinsic sources of motivation, and work to provide monetary transfers to individuals conditional upon them acting in a certain manner. The authors grouped financial incentives into five different categories: 1) payment for working for a specified time period; 2)	2010	11/11 (AMSTAR rating from the McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		payment for each service, episode or visit; 3) payment for providing care for a patient or specific population; 4) payment for providing a pre-specified level of care or providing a change in activity or quality of care; and 5) mixed or other systems.					
	Effectiveness of pay-for-performance schemes targeting individual healthcare providers for improving quality of patient care and patient-relevant outcomes (110)	Uncontrolled studies included in this review indicated that the pay-for-performance scheme improved quality of care, although higher-quality studies did not report similar findings. Interrupted time series studies suggested mixed effects of the scheme, with two not detecting any process of care or clinical outcome improvements, one reporting statistically significant improvements initially in guideline adherence which became minimal over time, and two others reporting statistically significant blood pressure control improvements and hemoglobin A1C control declines. Specific to preventive care, two randomized controlled trials ranked highly by the authors found significant but small effects on vaccination rates, while two other studies found no effect on mammographies, and Pap spears and mammographies combined. Other studies found mixed results bewith significant effects on one outcome and no effect on another. Specific to long-term care and chronic conditions, one highly-ranked RCT found no differences between treatment and control arms in assessing proportion of patients smoke-free. Additionally, an interrupted time series study reported no findings suggestive of a faster rate of increase in quality scores for incentivized indicators (asthma, diabetes, hypertension, coronary disease) compared to before pay-for-performance implementation, and no improvements in non-incentivized indicators. While pay-for-performance schemes may be useful in identifying elements of care valued within a given healthcare organization, current evidence targeting individual practitioners is insufficient to support its adoption, and its efficacy on quality of care and patient-relevant outcomes remains uncertain.	2012	9/10 (AMSTAR rating from McMaster Health Forum)	1/30	0/30	30/30
	Effects of financial incentives on the	This review focused on studies involving monetary transfer (change in amount, level of method of payment) targeting primary-care physicians, primary-care teams and addressing	2009	10/10 (AMSTAR rating from	0/7	0/7	7/7

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	quality of healthcare provided by primary-care physicians (111)	quality of care related to patients' health and well-being. Modest and variable effects on quality of healthcare provided by primary-care physicians were reported; while six studies reported statistically significant positive effects with financial incentives, the majority were across only one of many quality measures used in the study, and involved significant selection bias and poor study designs. One study found no effect of financial incentives on quality of care. The review's findings suggested that the following characteristics influenced financial incentive effectiveness: amount and method of payment (salary, fee-for-service, performance bonus, payment target (individual or team), timing); the importance of the income relative to other motivators (intrinsic motivation or other extrinsic motivators such as autonomy); opportunity costs of changing behaviour (other priorities for physicians); heterogeneity across physicians; and heterogeneity in marginal costs of changing behaviour (e.g., administration costs). The authors reported evidence was insufficient to either support or oppose financial incentive use to improve primary-care physician service provision quality, and implementation of such incentive schemes and their assessment require careful and rigorous designs.		McMaster Health Forum)			
	Leaders' experiences and perceptions implementing activity-based funding and pay-for-performance hospital funding models (112)	All of the included studies focused on leaders' experiences with implementing organizational incentives, but none clearly described 'how' funding models were implemented. Five themes were identified based on leaders' experiences: 1) pre-requisites for success; 2) perceived benefits; 3) barriers/challenges; 4) unintended consequences; and 5) leader recommendations. Pre-requisites for success include: full organizational commitment to and support for the chosen funding model; required infrastructure to support the individuals and activities required to accurately measure quality in pay-for-performance models; information technology and decision support systems for producing, tracking and aggregating high quality, timely,	2013	8/9 (AMSTAR rating from McMaster Health Forum)	0/14	1/14	14/14

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		accessible, clinically relevant data; committed leaders who are supportive of the funding model and recognize the benefits that can be achieved; and involving physician leaders to support accurate data collection and to act as 'champions'. Perceived benefits for activity-based funding included improved productivity and efficiency, ability to reallocate funds, supporting greater emphasis on evaluation, accountability and discharge planning, improved data accuracy, and improved collaboration and communication. Improved quality and enhanced organizational transparency were associated with pay-for-performance models. Barriers/challenges to implementation included lack of resources (e.g., constrained human resources given additional workload for providers), data collection (e.g., difficulty gathering accurate data and lack of experienced staff for data collection), and commitment factors (e.g., leaders' skepticism or suspicion about the funding model). Unintended consequences included opportunistic behaviour, 'cherry picking' patients with less complex conditions and who are less expensive to treat (possibly leading to the exclusion of more vulnerable patients), and inaccurate reporting and evaluation of quality outcomes. Leader recommendations included the need to have support for the funding model change from different leaders within the organization (including administrators, health professionals and staff) from the beginning of the transition, to ensure full engagement during the entire implementation process. Recommendations to support quality improvement at the program/unit level included providing educational resources for hospitals and training programs, increasing collaboration and cooperation with other units and project groups/committees, increasing interprofessional communication and interaction, and sharing data collection personnel, protocols and tools.					
	Effectiveness of financial incentives for	Five themes were identified: fair exchange, design and delivery, effectiveness and cost-effectiveness, recipients, and impact on individuals and wider society. Fair exchange is when financial	2014	6/10 (AMSTAR rating from	0/81	0/81	81/81

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	encouraging healthy behaviours (127)	incentives that promote health involve a beneficial exchange between the recipient and incentive provider. There is lack of consensus on whether health promoting financial incentives (HPFI) are beneficial or fair for the parties involved. There is evidence that the design and delivery of HPFI contributes to perceptions of whether they are acceptable or not. If HPFIs are found to be effective, safe, recipient-focused, and intrusion minimizing, they tend to be more accepted. Concerns raised in reference to appropriate providers of HPFI include that many socio-economically disadvantaged individuals are unwilling to accept federal-funded HPFI, and that there is a potentially negative impact of HPFI on doctor-patient relationships. Moreover, there is strong consensus that if HPFI is effective and cost-effective, it is more likely to be acceptable. A common criticism of HPFI is that it offers only short-term motivation. There is no consensus on the reason for this. There is some evidence to suggest there are concerns with cash incentives as they may be used to fund behaviours they were designed to prevent. The impact of HPFI on individuals and wider society is that there is evidence to suggest that HPFI can encourage individuals to take responsibility for themselves, however, there is also evidence that HPFI may be perceived as paternalistic and undermines an individual's autonomy. Financial incentive programs that benefit recipients and wider society are likely to be considered more acceptable.		McMaster's Health Forum Impact Lab)			
	Effectiveness of cash or voucher financial incentives for simple and complex health behaviour change in high-income countries (128)	The findings of this review generally suggested that a financial incentive was more effective than no financial incentive for health behaviour change. The average effect of the financial incentives relative to no intervention or usual care was greater for short-term (<= 6 months) smoking cessation (RR 2.48, 95% CI 1.77-3.46), long-term (>6 months) smoking cessation (1.50, 1.05-2.14), vaccination or screening attendance (1.92, 1.46-2.53), and all three complex health behaviors combined (1.62, 1.38-1.91). There was no convincing evidence to suggest differential effects between groups based on follow-up time or total incentive value for smoking cessation, although analyses suggested some effect of cash-only financial incentives compared to other formats, and	2012	9/11 (AMSTAR rating from McMaster Health Forum)	0/16	0/16	16/16

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		increased incentive values. For vaccination or screening attendance, cash plus other motivational components were found to be more effective than cash or vouchers alone; no effects were found for different incentive values. For physical activity, a difference of 16 additional minutes of daily physical activity was observed between financial incentive and control groups. For all behaviours combined, some evidence suggested a decreased effect with increasing post-intervention follow-up and increasing incentive value. Average effect of cash-only financial incentives was greater than for other formats					
Changes in how programs, services and drugs are delivered	Examine the effects of organizational and financial health-system interventions on quality of healthcare (173)	The review found that overall, privatization and marketization of healthcare systems does not improve quality, with most reforms having inconclusive or negative results. For interventions targeting payment of providers, the results were generally inconclusive. The evidence suggests that individuals respond to financial incentives in ways that are intended, but the goal must be straightforward and clearly defined. For interventions targeting purchasing and provision of services, the results were also generally inconclusive. For integration of services, evidence suggests there are benefits for patients, although it depends upon the approach taken. Although claims that increasing the private provision of healthcare might increase efficiency, this is not supported by the evidence. It appears that any cost savings are at the expense of reduced staff numbers.	2013	7/9 (AMSTAR rating from McMaster Health Forum)	1/28	0/28	28/28
	Synthesize evidence on elements of current integrated primary/secondar	The review identified 10 elements necessary for integrated primary/secondary healthcare governance across a regional setting. These include joint planning, integrated information	2012	5/9 (AMSTAR rating from McMaster Health	4/21	0/21	21/21

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	y healthcare and how they support integrated healthcare governance (118)	communication technology, change management, shared clinical priorities, incentives, population focus, measurement using data as quality improvement tool, continuing professional development supporting the value of joint working, patient/community engagement, and innovation.		Forum)			
	Examine the structures and processes required to build successful collaboration between primary care and public health (113)	Systemic-level factors influencing collaboration included government involvement, policy and fit with local needs, funding and resources factors, power and control issues, and education and training. At the organizational level, the influential factors included lack of a common agenda, knowledge and resource limitations, leadership, management and accountability issues, geographic proximity of partners, and shared protocols, tools and information sharing. The benefits of collaboration included improved chronic disease management, communicable disease control and maternal child health.	2008	4/10 (AMSTAR rating from McMaster Health Forum)	20/113	-Not reported in detail	Not reported in detail
	Synthesize evidence on elements of current integrated primary/secondary healthcare and how they support integrated healthcare governance (118)	The review identified 10 elements necessary for integrated primary/secondary healthcare governance across a regional setting. They are: joint planning, integrated information communication technology, change management, shared clinical priorities, incentives, population focus, measurement using data as quality-improvement tool, continuing professional development supporting the value of joint working, patient/community engagement, and innovation.	2012	5/9 (AMSTAR rating from Program in Policy Decision-making)	4/21	0/21	21/21
	Examine the effectiveness of joint working for users and carers of services or the organizations providing services (115)	The review found that there is some indication that recent developments, in particular the drive to greater integration of services, may have positive benefits for organizations as well as for users and carers of services. In addition, there were improvements in quality of life, health, well-being and coping with everyday life across four studies. However, when evaluations assessed different types of integrated and non-integrated care in five studies, no significant differences were reported. The authors suggest this may reflect service user characteristics, insufficient time for services to be fully	2011	0/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		implemented or may be due to study design. Due to methodological constraints, it was difficult to draw conclusions about cost-effectiveness of different types of provisions. Importantly, studies exploring establishment of integrated services consistently report a lack of understanding of the aims of integration, and concern that the contribution of community health and social care services might be marginalized by the interests of the acute sector.					
	Examine effectiveness of integrated care programs for adults with chronic conditions (116)	The review found beneficial effects of integration of care on several outcomes, including reduced mortality, reduced hospital admissions and re-admissions, improved adherence to treatment guidelines, and quality of life. A few included reviews found that costs were reduced and no review found any evidence of harm of integrated care programs.	2012	8/10 (AMSTAR rating from McMaster Health Forum)	1/26	Not reported in detail	Not reported in detail
	Examine effectiveness of staffing models in improving patient and staff outcomes (129)	The review identified no conclusive evidence to suggest that any nursing model or skill-mix model would be effective at improving patient or staff well-being in a residential aged-care facility. The evidence presented for a primary-care model is not sufficient to suggest its use in an aged-care facility.	2007	11/11 (AMSTAR rating from McMaster Health Forum)	1/2	0/2	0/2
	Assess effectiveness of antenatal care designed to prevent and reduce preterm birth in pregnant women (120)	The review found that pregnant women in alternative care models and midwife-led continuity models were less likely to experience preterm birth. The review was unable to determine maternal satisfaction and economic costs due to poor study methodology.	2014	11/11 (AMSTAR rating from McMaster Health Forum)	0/15	0/15	0/15
	Assessing rehabilitation and care models for adults with dementia following surgery for hip fractures (130)	The review found low-quality evidence that reported enhanced care and rehabilitation led to lower rates of some complications. It was also shown that enhanced care provided across hospitals and home settings reduced the chance of being in care (e.g., hospital, rehabilitation centre, care home) at three months post-discharge. However, the effect of these on functional outcomes was uncertain.	2014	11/11 (AMSTAR rating from McMaster Health Forum)	0/5	0/5	0/5

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	Compare midwife-led continuity models of care with other models of care for childbearing women and their infants (121)	The review found high quality evidence that women who received midwife-led continuity of care were less likely to have an epidural, episiotomies, instrumental births, preterm birth or loss of child. There were no differences in number of caesaren births. There were no adverse effects identified compared with other models.	2015	10/11 (AMSTAR rating from McMaster Health Forum)	1/15	1/15	0/15
	Examine the effectiveness of various models of nursing care delivery using the diverse levels of nurses on patient and nursing outcomes(131)	The review found that implementing team nursing models of care significantly decreased incidence of medication errors and adverse intravenous outcomes, as well as pain scores among patients. However, there was no effect on the incidence of falls. The wards that incorporated a hybrid model demonstrated significant improvement in quality of patient care, but no differences on incidence of pressure areas or infection rates. No significant differences were reported for nursing outcomes related to role clarity, job satisfaction and nurse absenteeism rates between any models of care. However, a hybrid model of care demonstrated better communication with physicians. Two studies examined cost effectiveness with one study supporting team nursing versus other models as being the most cost-effective; however, the other study found no financial advantage between the models.	2011	8/10 (AMSTAR rating from McMaster Health Forum)	2/14	Not reported in detail	2/14
	Explore the strategies that establish the health assistant role as a recognized clinical role (179)	The review found high quality evidence that health assistants and professionals might have good or difficult interprofessional relationships depending on staffing models, how the role was implemented and how the staff interacted/worked with each other. In addition, people perceived both the assistant role and the need for change in practice in different ways. This could be influenced by factors such as the local setting and environment, patient dependency and staffing level. Certain characteristics of training programs would improve training outcomes and program effectiveness.	2011	7/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	0/10

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		There is a need for appropriate supervision and mentoring of assistants due to concerns about responsibility.					
	Review the different models of integrated models of care for medical inpatients with psychiatric disorders to examine effects on mental health, medical and health service outcomes (117)	The review found that integrated medical care may improve psychiatric symptoms compared with usual care; however, the effects on medical symptoms was less conclusive. Evidence shows improvements in behavioural and psychological symptoms for patients with dementia. Using integrated models of care in primary care have been shown to be cost-effective and to improve medical symptoms in two studies. One study reported that costs associated with psychiatric illness were higher on using integrated models of care, however medical costs were lower.	2012	6/10 (AMSTAR rating from McMaster Health Forum)	0/4	0/4	4/4
	Effectiveness of models of follow-up for stroke survivors and their caregivers (123)	The review included nine studies evaluating the effectiveness of primary-care models for stroke follow-up. Interventions included the use of stroke support workers, care co-ordinators, case managers or a care management model linked to primary care. Interventions ranges from three to 12 months. Patients and caregivers participating in follow-up interventions did not show significant improvements in either physical function, mood, quality of life or patient behaviour. Mixed evidence was found on whether models increased patient satisfaction with care, levels of caregiver burden and health-service utilization. Patients and caregivers did report a greater knowledge of stroke. While this review does not support the use of support workers, care co-ordinators or case managers for stroke follow-up, outcomes should be accepted with caution due to available data.	2008	6/10 (AMSTAR rating from McMaster Health Forum)	1/9	Not reported in detail	0/9
	Compare different models of follow-up care for childhood cancer survivors (180)	Eight studies were included in this review examining the effect of models of care for follow-up of childhood cancer survivors. Models of follow-up care included problem-oriented and informal follow-up, shared-care model, multi-disciplinary clinics, late effects hospital-based clinic, and a comparison of adult versus pediatric hospital clinic. A high level heterogeneity restricted the ability to draw overall	2010	6/10 (AMSTAR rating from McMaster Health Forum)	1/8	Not reported in detail	0/8

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		conclusions, and so outcomes were reported almost entirely on perceived patient or parent/carer satisfaction. Follow-up patients valued clinical care. Supportive care was perceived as more important by patients who required more clinical interventions or who were experiencing late-effect symptoms. Mixed findings for perceived satisfaction between the intervention and control group indicate that there may be a group of patients for whom follow-up care is not necessary. The multidisciplinary model of care was described in detail by patients as providing a comprehensive integrated service which was valued by parents and carers and resulted in greater uptake of services. Overall, there is a need for continued research in follow-up programs for survivors of childhood cancer.					
	Impact of current emergency department models of care on care quality, care effectiveness, and cost (125)	The review examined models of emergency medicine and their impact on improving quality and cost-effectiveness of care. The review analysed trends in input, throughput and output. Input trends found that the increase in insured patients has reduced some of the demand in emergency rooms and changed the type of patient accessing emergency departments. Additional efforts to change these patterns include increased students in primary-care specialities, upgrading infrastructure, and introducing after-hours clinics. There has been some success in treat and discharge via ambulance. Other demand management strategies has included the establishment of minor injury units as conduits for emergency departments, telephone triage systems and walk-in centres. In managing throughput, appropriate levels of staffing were found to be the most important factor in providing prompt, timely and clinically effective patient care within an emergency care setting. The most prevalent model evaluated in the literature is the Emergency Nurse Practitioner role which consistently reported reduced waiting times and length of stay for lower acuity patients, and increased patient satisfaction. Evidence also suggests emergency nurse practitioners improved quality of care through reduced errors causing adverse events, lower unplanned	2013	4/9 (AMSTAR rating from Program in Policy Decision-making)	Not reported in detail	Not reported in detail	0/66

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
		re-presentation rates, improved continuity of care, and less staff turnover. Operational models of care were examined and found that Fast-Track systems were useful models of care for dealing with a large number of lower acuity patients presenting with minor injuries. In terms of managing output, one study suggested that the inability to efficiently move patients out of the emergency department was typically due to a lack of physical beds, poor accessibility to available inpatient beds, cleaning delays or over reliance on ICU beds.					
	Effectiveness of multidisciplinary care for adult pre-dialysis patients (124)	The review included four studies examining the effects of multidisciplinary models of care for adult pre-dialysis patients with chronic kidney disease. The review found that multidisciplinary models were effective in delaying the progression of chronic kidney disease in adults in the pre-dialysis phase of this condition. Teams were most effective when professionals drew on their individual expertise to educate patients about chronic kidney disease.	2009	4/9 (AMSTAR rating from McMaster Health Forum)	2/4	0/4	0/4
	Effectiveness of models of care for secondary prevention of osteoporotic fractures (181)	The review included 44 studies evaluating models of care for the secondary prevention of osteoporotic fractures. The review included a wide spectrum of interventions such as: the provision of osteoporosis protocols; health education of patients concerning osteoporosis as a disease and its management through a letter or direct communication; alerts to primary care physician of the need to evaluate and treat their patient; assessment of clinical risk factors; bone marrow density testing; treatment initiative; and monitoring with regular follow-up. A meta-analysis was conducted and Type A models of care were found to be most effective in reducing the risk of re-fracture. Cost effectiveness results found that these services were found to be highly cost-effective .	2011	4/11 (AMSTAR rating from McMaster Health Forum)	10/44	0/44	0/44
	Explore the relationship between health system governance and	The review examined the relationship between governance mechanisms in healthcare and the health workforce. The review included five types of governance mechanisms: 1) shared governance; 2) magnet accreditation; 3) professional development and education; 4) quality focused initiatives; and 5)	2012	7/9 (AMSTAR rating from McMaster Health	9/113	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	workforce outcomes (126)	re-organization of healthcare delivery. Shared governance, magnet accreditation and professional development initiatives were all associated with improved outcomes for the health workforce. Implementation of quality-focused initiatives was associated with apprehension among providers, but opportunities for proficient training increased quality and improved work attitudes. Research suggests that reorganization of healthcare delivery towards team-based care is accompanied by stress and concerns surrounding role clarity for providers.		Forum)			
	Examining changes to optimize professionals' scopes of practice (132)	The review examined changes at each the micro, meso and macro level that should be made in efforts to optimize scopes of practice. At the macro level it was found that educating professionals on changes to legislation, establishing practicums and residencies that foster interprofessional competencies, post-licensure credentialing, expanding the adoption of more flexibile legislative frameworks, and implementing alternative models of funding were all found to be enablers for optimizing professional scopes of practice. At the meso level the following factors were found to be enablers of optimal scopes of practice within collaborative care arrangements: implement electronic medical records; develop interprofessional scopes of practices; create an overall quality assurance framework with the involvement of accrediting bodies; and engage in systematic monitoring and evaluation to ensure long-term return on investments. Finally, at the micro level, the following factors were found to be enablers of optimizing scope of practice in collaborative care models: develop a designated role for managing changes; engage in continual professional development; create a team vision; instill group mentality and shared responsibility; schedule regular meetings for health are team members; integrate information communication technology; and co-locate healthcare professionals and services.	Not reported in detail	4/9 (AMSTAR rating from Program in Policy Decision-making)	Not reported in detail	Not reported in detail	Not reported in detail
	Impact of state	The review examined the impact of state legislation and	2015	6/10	Not	0/15	1/15

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	scope-of-practice regulations on the nurse practitioner workforce, access to care and healthcare utilization, and healthcare costs (119)	regulation on care provision by nurse practitioners. Five studies found that expanded practice authority showed the greatest growth and advancement of nurse practitioner primary-care provision. The studies further found that in states with less restrictive standards of practice, nurse practitioners had more authority in prescribing selected medication. In states with more flexible standards of practice, the nurse practitioners providing primary care increased from 0.2% to 3.0%. Studies also suggest that less restrictive standards of practice was linked with promoting care provision by nurse practitioners in rural and medically underserved areas. Only one study assessed the impact of state nurse practitioner standard of practice regulations on primary-care access and utilization. The study found a significant impact of nurse practitioner standards of practice regulations on healthcare utilization, but no conclusive evidence of an impact on access to care. Four of the studies provided information on the impact of state nurse practitioner standards of practice (NP SOP) regulation on healthcare costs, including health care providers' income, office-based visit expenditures, and retail clinic costs. One study found that the expansion of NP SOP did not affect office-based visit price, which was measured as the total charges per visit. This finding may be due to a non-competitive primary-care market. One study's weighted average of 14-day cost was highest for a restricted scope of practice, lowest for a reduced scope of practice, and mid-price for states with a full scope of practice.		(AMSTAR rating from McMaster Health Forum)	reported in detail		
	Examine approaches in the nursing and midwifery workforce that have improved the quantity, quality, and relevance of the	The review included 36 studies examining different approaches to improve the contribution of nurses and midwives. Eleven of these studies took place in low-and-middle income contexts while the remaining took place in high-income countries. Studies show that nurses and midwives have and continue to contribute to providing universal access to care. Studies show that national and state policies to increase the supply, scope of practice and coverage of nurses and midwives improves access to	2015	5/9 (AMSTAR rating from McMaster Health Forum)	4/36	1/36	0/36

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	workforce leading to health improvements for vulnerable populations (122)	primary care in both low- and high-income countries. Studies also found that all successful initiatives were accompanied by substantial long-term investments in infrastructure, training and improvement of working conditions. A positive impact was found in circumstances where staff took on expanded roles in their work. Successful expansion however requires additional training and supportive mechanisms. Studies relating to collaboration and team-based working found that they were key to improving care delivery. Teams were found to work best when there was an understanding and appreciation of the roles and responsibilities of all members of the team.					

Appendix 3: Systematic reviews relevant to Element 3 – Harness distributive leadership approaches that enable the system to innovate and move towards sustainability

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
Harnessing distributive leadership approaches at the system level	Examining the effects of involving consumers in the development of policy, practice guidelines and patient information material (135)	The review included six randomized controlled trials assessing the effects of consumer involvement in the development of healthcare policy and research, clinical practice guidelines and patient information material. The review found evidence that involving consumers in the development of patient information material results in material that is more relevant, readable and understandable to patients, without affecting their anxiety. Material developed by patients can also improve patient knowledge. Some evidence was found that telephone discussions and face-to-face group meetings engage consumers better than mailed surveys in order to set priorities for community health goals.	2005	9/11 (AMSTAR rating from www.rxforchange.ca)	2/6	0/6	0/6
	Assess current information and research about effective patient and public engagement in reconfiguration processes, and identify implications for further research (136)	The review included a total of eight systematic reviews to assess what is known about effective patient and public engagement in reconfiguration processes. Evidence was gathered from eight systematic reviews of methods of/approaches to patient/public engagement, seven empirical studies evaluating methods of/approaches to patient/public engagement, and 24 case studies where public/patient engagement have and have not worked well. All eight reviews were related to service configuration. Most of the reviews commented on the paucity of evidence of impact in relation to service-user engagement and reconfiguration, and recommended more robust evaluative research. Despite the limited evidence, there were positive indications for engagement methods that were characterized as more deliberative in nature and involving face-to-face interactions, and methods utilizing multiple methods. Tentative success factors in service-user engagement included organizational support in the process, a willingness of individuals to engage, clarity of the aims of engagement, and sufficient resourcing of evaluations. There was little discussion regarding potential sustainability of the methods. The empirical studies in the review were diverse in methodology and were comprised of discussion papers and debates. The research highlighted key steps in the reconfiguration process that	2014	7/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

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		could result in referral to the Independent Reconfiguration Panel if not followed correctly. Some of the precursors to referral reported were inadequate community and stakeholder engagement in early stages of planning and change, inadequate promotion of clinical case for change, benefits of change being underplayed, and limited content and methods of conveying information. The research also indicated where service-user engagement could be construed negatively, including phrases such as "value for money" and "competitive tendering", and highlighted the importance of effective use of language in communicating with multiple audiences. Six of the 24 identified case studies were chosen as being exemplars of good practice.					
	Evaluating the effects of inter-agency collaboration between local health and local government agencies on health outcomes (182)	The review included 16 studies, including 11 studies in a meta-analysis evaluating the effects of inter-agency collaboration on health outcomes. Studies that examined mental health initiatives found modest improvements, but found no overall health gain. Limited or no effect was found in the meta-analysis examining collaboration, nor were conclusive effects found for health gains from collaboration on lifestyle-improvement programs or chronic disease-management programs. While collaboration between governments is often considered best practice, the review did not conclude that this led to health improvements.	2012	11/11 (AMSTAR from McMaster Health Forum)	1/16	5/16	16/16
	Assess the effectiveness of different mechanisms and models of coordination between organizations, agencies and bodies providing or financing health services in	The review included four studies assessing how, in humanitarian crises, various models and mechanisms of coordination between organizations, agencies and governmental bodies providing or financing health services affect access to health services and health outcomes. Coordination was classified using the guidelines proposed by the Joint Evaluation of Emergency Assistance to Rwanda, which consists of four categories: information coordination, coordination through common representation, framework coordination, and management/directive coordination. The included studies examined two types of coordination, information coordination and management/directive	2014	8/9	0/4	0/4	0/4

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	humanitarian crises (183)	coordination, between organizations and agencies providing humanitarian assistance. The primary outcome assessed in the two studies that explored information coordination was access to health services. One study assessed the effect of information coordination in the form of the use of information and communication technologies on disaster response performance, and found an increase in the number of support functions and transactions for health and medical care. Another study used the organization's centrality to evaluate its ability for aid coordination, and studied how centrality affects the number of non-governmental organization beneficiaries. This study found statistically significant associations between high centrality and the number of beneficiaries in areas of food, water and sanitation. The two studies that explored management and directive coordination examined its impact on health system inputs. One study evaluated the humanitarian cluster approach in relation to sexual and reproductive health in Uganda following 20 years of civil war. This study found that this cluster approach improved the coordination among organizations working in sexual and reproductive health, and reported that mapping within the cluster helped improve the understanding of the availability of sexual and reproductive health services. Another study described coordination efforts in Bangladesh following a cyclone in 1991. It was found that the health response may be effective in terms of increased drug availability, medical manpower and health services. Overall, there was very low-quality evidence suggesting that information coordination in humanitarian crises may be effective in improving health systems input, and that management and directive coordination may improve health systems inputs and access to health services.					
	Examining the impact and effectiveness of inter-sectoral action on social determinants and	The review identified 17 articles (one systematic review and 16 primary studies) on the impact and effectiveness of inter-sectoral action on the social determinants of health and health equity. The systematic review assessed the impact of organizational partnerships on public health outcomes and health inequities. All	2012	8/11 (AMSTAR rating from McMaster Health Forum)	0/17	0/17	0/17

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on achieving health system sustainability
	health equity (137)	interventions were multi-sectoral, including: health action zones; health improvement programs; the New Deal for Communities program; health education authority integrated purchasing programs; healthy living centres; and national health school standards. The majority of the studies did not assess the impact of partnerships on public health outcomes such as health equity. There is some evidence that partnerships increased the profile of health inequities on local policy agendas. However, the impact of inter-sectoral action on health equity are mixed and limited. The primary studies evaluated universal and/or targeted programs and policies, categorizing them as upstream (e.g., housing conditions and employment), midstream (e.g., working conditions and employment, early childhood development, housing, physical and social environments, and food security) and downstream interventions (e.g., access to healthcare or services). Upstream interventions had mixed effects, ranging from moderate to none on the social determinants of health. Provision of housing for disadvantaged populations had a moderate impact in terms of improved housing infrastructure. Midstream interventions generally had mixed results of the impact of inter-sectoral action on social determinants. Support employment that integrated mental health and employment services, incorporated formal communication between sectors and had shared principles, had a positive impact on employment and working conditions. Early childhood interventions had a positive impact in promoting early literacy. There were improved health outcomes when health and social service support was embedded with housing. Supportive environments that promoted access to food had a positive health outcome such as improved oral health. Downstream interventions that focused on access to services are moderately effective in increasing the availability and use of services. Targeted interventions increased access to care, reduced the number of emergency department visits, improved management of existing conditions, and improved immunization rates and mental health. The authors identified difficulties in attributing the effectiveness of initiatives to inter-sectoral action due to the lack of clarity					

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		among the 17 studies.					
Harnessing distributive leadership approaches at the professional level	Assessing interventions to prevent occupational stress in healthcare workers (139)	The review included 14 studies examining the effects of interventions in preventing stress at work among healthcare workers. Interventions focused on those that could be classified as person-centred, included cognitive-behavioural therapy, relaxation, music-making, therapeutic massage and multi-component interventions, and those that are work-directed including attitude change and communication, support from colleagues, problem-solving and decision-making support, and changes in work organization. A meta-analysis found little evidence that person-directed interventions were able to reduce stress among healthcare workers. They were also found to have little effect on burnout, emotional exhaustion, levels of personal accomplishment or anxiety. Cognitive-behavioral therapy. However, was found to have a greater effect than no intervention. Similarly, limited evidence was found that work-directed interventions reduced stress symptoms among healthcare workers. However, some evidence was found that changing work schedules (from continuous to having weekend breaks in shifts) reduced symptoms of stress and feelings of burden among healthcare workers.	2013	10/11 (AMSTAR rating from the McMaster Health Forum)	Not reported in detail	0/14	0/14
	Evaluates the effects of coping strategies in reducing feelings of burnout in nurse practitioners (140)	Seven studies were included in the systematic review and included a number of different coping strategies such as cognitive behaviour-oriented meetings, stress-management coping and training, mindfulness-based stress reduction program, and team-based support groups. The meta-analysis found that overall coping strategies can decrease nurses' work-related burnout, with emotional exhaustion, depersonalization, and personal accomplishment each having been reduced in the intervention. Emotional exhaustion and depersonalization were found to be able to be maintained for up to one year, though personal accomplishment levels were only maintained for six months. Emotion-focused strategies were found to result in greater improvement in the emotional exhaustion and depersonalization dimensions, whereas problem-focused strategies were found to improve the personal	2014	9/11 (AMSTAR rating from McMaster Health Forum)	1/7	0/7	0/7

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		accomplishment dimension.					
	Examine the use of games as an educational strategy to improve the performance of health professionals(141)	Two studies were included in this review which examined two different games for health professionals, one based on Family Feud and the other on Snakes and Ladders. There was no significant effect found on professional knowledge in either immediate or three-month measures. However, professionals did report higher levels of enjoyment of learning in games-based groups when compared to traditional education models.	2012	9/9 (AMSTAR rating from the McMaster Health Forum)	1/9	0/9	0/9
	Evaluate the effectiveness of instructional design features for simulation training among health professionals (146)	The review included 289 studies examining technology-enhanced simulations to teach topics such as invasive surgery, dentistry, intubation, physical examination and teamwork. The review identified a number of research themes based on the findings, and found 10 features of effective simulation: range of difficulty; repetitive practice, distributive practice, interactivity, multiple learning strategies, individualized learning, mastery of learning, longer time durations and clinical variation. Pooled effect sizes from the meta-analysis were not significant, but consistently leaned towards the benefit of the intervention.	2011	9/11 (AMSTAR rating from McMaster Health Forum)	35/289	0/289	0/289
	Assessing the impact of simulation-based medical education on patient outcomes (145)	The review included 50 studies which evaluated the type, task and average effective size of simulation-based education. Thirty-four studies made comparisons with no intervention, and 33 of these were included in a meta-analysis. The pooled results found a small to moderate effect in favour of the simulation. Nine studies made comparison with non-simulation training such as lecture or standardized patient. The pooled effect of these nine studies found a small but not significant effect in favour of the intervention.	2011	9/11 (AMSTAR rating from McMaster Health Forum)	4/50	0/50	0/50
	Assessing the effectiveness of educational models of patient handover on health professionals	The review included 10 studies examining theoretical models of patient handover. The review found a paucity of research to support the use of educational interventions to improve the handover of patients. Most of the studies were found to be of poor methodological quality, and therefore limits the ability to gain insights from the review.	2010	8/11 (AMSTAR rating from McMaster Health Forum)	0/10	0/10	0/10

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	practice (144)	Some evidence from two of the included studies suggested that skills can be transferred from education on patient handover to the workplace, but no study was found to demonstrate improvements in patient safety.					

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