

# Evidence Brief

## Improving Access to Care and Outcomes for Heart Failure in Ontario

30 January 2019



HEALTH FORUM

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**Evidence Brief:**  
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McMaster Health Forum

The McMaster Health Forum's goal is to generate action on the pressing health-system issues of our time, based on the best available research evidence and systematically elicited citizen values and stakeholder insights. We aim to strengthen health systems – locally, nationally, and internationally – and get the right programs, services and drugs to the people who need them.

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## KEY MESSAGES

### What's the problem?

- There are several inter-related factors that underpin the challenge associated with improving access to care and outcomes for patients within 30 days of experiencing heart failure, which include:
  - the number of Ontarians with heart failure is increasing, and many will visit the emergency department and be hospitalized;
  - Ontario's health system is not optimized to reduce emergency-department visits and hospitalizations among heart-failure patients; and
  - there is growing pressure to rapidly identify and scale up models of heart-failure care that will achieve the 'triple aim' of improving the patient experience and population health while keeping the amount spent per person manageable.

### What do we know (from systematic reviews) about the two elements (and their two sub-elements) of a potentially comprehensive approach to addressing the problem?

- Element 1 – Prepare the health system for rapid learning about the promising innovations included in the COACH trial while they are being tested
  - This element could include: reviewing and learning from previous instances of testing new approaches in Ontario to identify factors that may influence next steps, identifying opportunities to reduce costs during pilot phases, collecting the necessary data to answer questions about reducing costs, establishing a fund to smooth transitions at the end of the trial, establishing accountability for care, or bridging gaps between experimental/pilot phase and having the definitive result.
  - Evidence for this element focused primarily on describing facilitators of and barriers to preparing for implementation of an innovation, including developing an implementation plan, clarifying goals, planning for monitoring and evaluation, and engaging stakeholders in the change process.
- Element 2 – Adopt an approach to move forward on improving access and outcomes for patients with heart failure based on the results from the COACH trial
  - Element 2a – Develop a plan for scaling up rapid follow-up clinics if they are shown to be effective in the COACH trial
    - This sub-element could include: using the ARTIC model to plan for the scale up and widespread adoption of rapid follow-up clinics in Ontario, and aligning health-system arrangements to support the adoption of rapid follow-up clinics across Ontario.
    - While the results of COACH are still unknown, we found reviews supporting models of care that are similar to some of its components (e.g., rapid follow-up, post-discharge care), and reviews showing mixed results with telemonitoring for follow-up care in heart-failure patients, which could be important when adapting components of the COACH trial for rural and remote communities. Evidence identified for this element also considered facilitators of and barriers to the sustainability and scale up of innovative interventions.
  - Element 2b – Establish an approach for moving forward if promising innovations included in the COACH trial are inconclusive, ineffective or harmful
    - This sub-element could include: establishing criteria for guiding decisions about whether to extend or repeat evaluations as well as developing an alternative approach to improving the status quo.
    - Three systematic reviews (including two that described decision-making frameworks) were identified to help guide decision-making about how to approach moving forward with abandoning or scaling up specific components of the COACH trial.

### What implementation considerations need to be kept in mind?

- Key barriers to implementing the elements include the complexity in achieving coordination among many different groups that need to be involved, from the ministry level down to the individual health professional, as well as integrating this new model of care with other transitional programs and health-system supports.

## REPORT

Ontario has both a health system and research system that are increasingly emphasizing the importance of rapid learning and improvement at all levels, from self-management, clinical encounters, programs and organizations, to regional bodies and government. Part of these efforts include considering how innovative solutions for addressing pressing health-system challenges can be implemented, evaluated and (if successful) scaled up across the province. One such example of considering innovative solutions is the ongoing Comparison of Outcomes and Access to Care for Heart Failure (COACH) trial, which is a randomized controlled trial to evaluate a strategy for adults with acute heart failure presenting to the emergency department. The trial was designed to address short-comings in the current model of care, including inappropriate admissions and discharges, costly readmissions, and limited patient follow-up for those not admitted to inpatient care, to name a few. The strategy included in the COACH trial was designed to improve care for heart-failure patients by:

- overcoming some of the challenges clinicians face when trying to determine whether a patient presenting with heart failure in the emergency department is at high risk and should be admitted to hospital, or when they are at low risk and can be discharged to be managed at home (i.e., triaging patients to the care pathways that will benefit them most); and
- developing a new model of rapid follow-up care for discharged patients (i.e., ensuring patients have access to care that can improve their outcomes in the 30 days after experiencing heart failure).

The trial consists of three main components:

- a computer algorithm to help doctors make decisions in the emergency department about the risk faced by their patient;
- a rapid follow-up clinic for low-risk patients who are discharged to facilitate timely access to follow-up care up care from a heart specialist for up to 30-days following discharge; and
- a mobile smartphone app to enhance self-care activities for patients with comorbid hypertension (high blood pressure).

This new approach for supporting patients presenting to emergency rooms with heart failure is being evaluated through the COACH trial as it may help to reduce deaths and hospital readmissions within 30 days following discharge. If the trial is shown to be successful, those involved in running it, as well as the full range of health-system

### Box 1: Background to the evidence brief

This evidence brief mobilizes both global and local research evidence about a problem, two elements (one of which has two distinct sub-elements) 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 and key stakeholder groups and the McMaster Health Forum;
- 2) developing and refining the terms of reference for an evidence brief, particularly the framing of the problem and two viable elements 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 of an approach to addressing it, 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 two elements for addressing the problem were not designed to be mutually exclusive, and could be pursued simultaneously or in a sequenced way, and each element could be given greater or lesser attention relative to the others. However, for this evidence brief the second element has two distinct sub-elements which are mutually exclusive.

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.

policymakers and stakeholders who are involved in decision-making about improving care for heart-failure patients, will need to determine whether the strategy could be considered as a candidate for scaling up across the province. These considerations would need to take into account recent initiatives put in place in Ontario that could be influenced by the results of the trial (to be published in late fall of 2019), as well as forthcoming initiatives that, alongside the results, will increase interest in heart-failure care in the province and continue to shape the conversation about improving care for patients. Specifically, these include:

- the 2015 Ministry of Health and Long-Term Care/Health Quality Ontario (HQO) Quality-Based Procedures Clinical Handbook for Heart Failure (Acute and Postacute), which establishes the types of care that should be provided and that will be funded in Ontario;(1)
- the Canadian Cardiovascular Society’s 2017 update of its heart failure guidelines, which set the standard of care for heart failure in Canada, and which identified a gap in the evidence to inform best practices in risk assessment (and scoring mechanisms) of heart-failure patients in emergency settings;(2)
- the 2018 release of a CorHealth report on minimal requirements and key clinical services for heart-failure programs within a spoke-hub-node model of care, which is being used to guide integrated care initiatives in Ontario;(3)
- the forthcoming HQO Quality Standard on Heart Failure (Care in the Community for Adults), which will be released in spring 2019 and have implications for how care (including rapid follow-up) can be provided outside of hospital settings, particularly in primary care;(4)
- the forthcoming HQO Special Report on Heart Failure Care in Ontario, which will be released alongside the Quality Standard in spring 2019, and will provide a snapshot of the current state of care in the province; and
- the forthcoming CorHealth report – due to be released in the spring of 2019 – on the Integrated Heart Failure Care Initiative, which will provide a roadmap for the province on the regional health-system requirements for implementing the HQO Quality Standard on Heart Failure and CorHealth Standards for the organizational design of heart-failure care.

Given Ontario’s history of piloting innovations, of which very few have been successfully scaled up and sustained across the province (due in part to a history of challenges planning for the implementation of these pilots), this trial could benefit from a more deliberate attempt among those likely to be involved in or affected by decisions related to the issue to adopt a rapid-learning orientation, as it would prepare them to act on what is learned from evaluating the intervention. Furthermore, the rapid-learning orientation can ensure that the interim period when the ‘jury is still out’ is used strategically so that all necessary levels in the health system are primed to support any actions that need to be taken in light of these results. Actively considering this orientation in the context of

## Box 2: Equity considerations

A problem may disproportionately affect some groups in society. The benefits, harms and costs of two elements (one of which has two distinct sub-elements) to address 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 four groups:

- older adults, and particularly those who are frail;
- women who experience differential access to care and are more reliant on home-care support;
- ethnocultural groups who are at a higher risk for hospital readmission (urban-dwelling western Europeans) or death (urban-dwelling East Asians); and
- those in lower socio-economic status groups.

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.

the COACH trial could also create spillover effects that would help to prepare Ontario's health system for the next round of rapid learning. However, it should be noted that the ongoing provincial review of programs and provincial organizations including HQO and CorHealth Ontario, among others, may affect the ways in which the COACH trial or lessons from it are scaled up to the broader health system.

In considering this issue, this evidence brief will focus on care pathways, clinical-decision supports and models of care to treat patients with heart failure presenting to the emergency department (as opposed to the care received in primary and community settings as part of ongoing chronic-disease management), as well as innovative models of care designed to reduce hospital readmission and death among heart-failure patients presenting in the emergency department. In addition, the evidence brief will address the range of approaches available to ensure continuous learning from (and where appropriate planning for the scaling up of) innovative models of care.

While the entire continuum of care is acknowledged as being an important determinant of patient outcomes for heart failure, the evidence brief will not address health promotion and/or prevention efforts aimed at reducing the prevalence of heart failure in Ontario, or the treatment and management approaches for the continuing care of individuals with heart failure. Instead the brief will focus exclusively on addressing the efficiency and effectiveness of hospital-based heart failure (with a particular emphasis on the 30-day period after a patient experiences heart failure). This decision was made to ensure that the focus of this brief was in line with the scope of the interventions being evaluated in the COACH trial, and to ensure the task of clarifying the problem, identifying the most appropriate elements of an approach for addressing it, as well as identifying implementation considerations were manageable in the context of the evidence brief. However, if proven to be successful, the ways in which the interventions evaluated in the COACH trial (or select components of the interventions) can be integrated into the continuum of programs and services available for those with heart failure will be an important consideration.

While the brief strives to address all Ontarians, where possible, it also gives particular attention to four key groups, in light of their increased risk for heart failure, challenges accessing care for heart failure, or disproportionately poor outcomes. These groups were chosen based on the advice of steering committee members and key informants, as well as having been prioritized in the COACH trial proposal. The four groups are:

- older adults, and particularly those who are frail;
- women who experience differential access to care and are more reliant on home-care support;
- ethnocultural groups who are at a higher risk of hospital readmission (urban-dwelling western Europeans) or death (urban-dwelling East Asians); and
- those in lower socio-economic status groups.

To address these groups, the COACH trial has sought out partnerships with hospital sites that serve these populations, translated relevant patient material, and committed to data collection and analysis to better understand the impacts of these determinants (e.g., sex, ethnicity and socio-economic status) on patients with heart failure. Where possible, additional information about these four priority groups has been included throughout the brief, as well as in a dedicated section following each the problem and elements sections highlighting unique challenges for these four groups that differ from the general population.

## **THE PROBLEM**

### **The number of Ontarians with heart failure is increasing, and many will visit the emergency department and be hospitalized**

Heart failure is one of the leading causes of cardiovascular morbidity, mortality and healthcare use in Canada. It is a complex, often unpredictable condition, with patients experiencing periods of relative stability interspersed with worsening symptoms, often resulting in a hospital admission. It is the most common cause of hospitalization among those over the age of 65, and the fifth leading cause of medical admissions overall.(4; 5) It is estimated that five million Canadians alive today have experienced heart failure or will experience heart failure in their lifetime. This estimate includes 46,000 hospital admissions for acute heart failure each year, costing Canadian health systems \$482 million.(6)

Ontario faces a significant amount of this burden. For example, from 1997 to 2008, there were nearly 420,000 incident cases of heart failure in Ontario,(7) and in 2015-16 (fiscal year) the Institute for Clinical Evaluative Sciences (ICES) found that there were 247,304 individuals in the province – or 1.8% of the population – living with heart failure (which included 27,939 incident cases diagnosed that year). Rates of incident heart failure vary widely across the province, with 134 per 10,000 in the Mississauga Halton LHIN to almost double that in the North East LHIN (253 per 10,000). However, these numbers likely underestimate the prevalence of individuals with heart failure living in the community.(8)

Despite the many Ontarians living well in their communities with mild chronic forms of heart failure, the growing number of Ontarians with heart failure remains a significant health-system challenge. For example, approximately one in five patients hospitalized with heart failure in Ontario are readmitted within 30-days – a statistic that has held constant since 2011. Furthermore, there are currently over 20,000 emergency-department visits leading to hospitalizations annually due to heart failure, costing the Ontario health system more than \$170 million.(6)

The situation in Ontario is complicated by the fact that those with repeated hospitalization often have high rates of comorbidity. Specifically, it was estimated in 2015 that 92% of those living with heart failure had one or more comorbid condition, and 37.1% of these individuals had four or more. The top five comorbid conditions among heart-failure patients in Ontario are:

- hypertension without complication (49.1% of patients);
- diabetes without complications (37.8% of patients);
- cardiac arrhythmia (34.6% of patients);
- depression (28.3% of patients); and
- chronic pulmonary disease (21.6%).(8)

The combined effects of heart failure alongside other comorbid conditions can lead to significant physical, emotional, and functional impairment, as well as reduced quality of life and increased caregiver burden.(9)

In addition to the challenges resulting from the comorbidities associated with heart failure, the condition is also one that has high rates of mortality. In Ontario in 2015, the 30-day mortality rate following a hospital admission for heart failure was 11.5% across the province, but as high as 15% in the North Simcoe Muskoka LHIN.(8)

#### **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 PubMed, namely the one for qualitative research. Grey literature was sought by reviewing the websites of a number of domestic organizations, such as Health Quality Ontario and the Institute for Clinical Evaluative Sciences.

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.

As briefly noted above, the incidence and prevalence of heart failure varies regionally. It is also the case that different populations are affected by the condition more than others. In particular, individuals living in northern, rural and remote areas in Ontario experience significantly higher rates of heart failure and associated hospitalization compared to their urban counterparts. Those with lower socio-economic status are also disproportionately affected in Ontario, where 21.6% of prevalent cases occur among individuals living in neighbourhoods in the lowest income quintile, whereas 17.8% occur in the highest income quintile.(8) In Ontario, rates of comorbidity also follow this pattern, whereby individuals with heart failure in lower-income groups also have higher rates of comorbidity, with 42% of those in the lowest income quintile in Ontario having four or more conditions compared to 32% of those in the highest income quintile.(8) These findings are consistent with broader trends identified in a systematic review, which showed socio-economic status to be associated with higher incidence, hospitalization and mortality from heart failure. These considerations are critical for planning services and may have implications for the COACH trial and its potential scale up across the province.

### **Ontario's health system is not optimized to reduce emergency-department visits and hospitalizations among heart-failure patients**

Getting the right programs, services and technologies (including drugs) to the growing number of heart-failure patients in Ontario who need them requires health-system arrangements to be oriented toward this objective. Unfortunately, Ontario's health-system arrangements (e.g., governance, financial and delivery arrangements) are not fully conducive to this aim in general, and are not optimized to support a reduction in emergency-department visits and hospitalizations more specifically.

With respect to delivery arrangements, there are three major challenges in Ontario. First, there is no widespread form of decision support (e.g., point of care clinical-practice guidelines or prompts) in place to ensure emergency-department physicians can accurately stratify heart-failure patients into low- and high-risk groups. Currently, most patients with acute heart failure are assessed in hospital, even if they don't require inpatient care, and emergency department-physicians are relied upon to stratify patients as either being high risk (e.g., require admission) or low risk (e.g., may be sent home and cared for outside of the hospital). However, these decisions are difficult to make without informational supports, particularly in light of the fact that there are relatively few identifiable variables available to help physicians stratify patients. As such, physicians tend to err on the side of caution when making decisions about how to group heart-failure patients, which can result in 'over-admissions.' Some studies from the U.S. estimate that these challenges in stratification add up to 50% of heart-failure admissions that could be avoided.(10) This is extremely costly to the health system and ties up hospital resources that are needed by other priority patients. Despite a tendency towards over-admission, it is also important to acknowledge that incorrect decisions about patient risk can result in the under-treatment of heart-failure patients, which may result in higher rates of 30-day readmissions and increased risk of mortality. A second related challenge is the lack of accountability for heart-failure patients as they transition between settings. While hospital and emergency departments are responsible for inpatients, once discharged, there is little accountability for patient care until they are provided with follow-up care in the community, which can often take upwards of 60 days to arrange. During this time, a patient's condition may deteriorate, and they may end up back in hospital. The third challenge related to delivery arrangements is that delivery systems for providing care to acute heart-failure patients are not integrated across inpatient and outpatient settings, which can negatively affect the continuity of care across these settings and between providers. One particularly problematic example of this is the lack of specialized, rapid follow-up care for patients who are discharged to home. This gap in care is reflected in the data available on patients in Ontario who had a follow-up cardiologist visit within 30 days of being discharged from hospital. Specifically, in 2015-16, only 40% of heart-failure patients had seen a cardiologist within 30 days after discharge and just over 10% had a cardiologist visit within seven days.(8) While this challenge remains a significant one, gaps in the continuity of care for heart-failure patients is increasingly being recognized in the province, as many hospitals and organizations are advocating for the implementation of integrated-care

systems to support heart-failure patients. One example of this is the introduction of a ‘spoke-hub-node’ model of care, which is currently being piloted by CorHealth Ontario to facilitate an integrated and person-centred approach to coordination and delivery of services for heart-failure patients.<sup>(5)</sup> In this model, less complex care is provided in the patient’s own community and more complex care, when required, is provided at a more centralized and specialized centre or program.

Financial arrangements also limit the delivery of services outside of acute-care settings, which further contributes to the potential for future emergency-department visits and hospitalizations once heart-failure patients are discharged. There are at least three interrelated components of the challenges related to health-system financial arrangements in Ontario. First, hospitals are not funded in a way that incentivizes the coordination of care for heart-failure patients across sectors. For example, hospital funding mechanisms including global budgets and the health-based allocation model (HBAM), which are calculated in large part based on historical service volumes, are one of the primary methods of remunerating hospitals in Ontario. This funding mechanism presents a potential disincentive for reducing the number or length of admissions – even if deemed appropriate based on a patient’s risk profile – as a reduction in expenditures resulting from fewer inpatients in one fiscal year could result in a reduced budget allocation in the next. Furthermore, while the introduction of the Quality-Based Procedures (often referred to simply as ‘QBP’) has helped to ensure greater attention is placed on the appropriateness and quality of care delivered to each heart-failure patient in the hospital setting, the approach does not incentivize the coordination of effective follow-up care outside of this setting. Second, alternative funding models have not been widely implemented to support the remuneration of care providers outside of hospital settings for providing rapid follow-up care in home-, community- and primary-care settings, or for providing remote monitoring of patients discharged from hospital, with one exception being the ongoing pilot of bundled care for musculoskeletal conditions. Finally, the lack of dedicated financial resources for supporting the implementation of innovations at the regional level restricts the widespread adoption and implementation of promising models of care that could better support patients outside of hospital settings. Specifically, Local Health Integration Networks (LHINs), which are responsible for funding hospitals, face increasing demands for resources and are limited in their ability to allocate resources towards fostering innovations. Instead, this responsibility is often left to the discretion of leaders in hospitals, who do not have the decision-making authority to change funding models to support the adoption of new models of care, should innovations be identified (see governance arrangements below). However, hospitals also vary significantly in the resources available to finance the introduction, evaluation and adoption of innovative models of care, which significantly limits the potential for uniform adoption across the province of those that show the most promise.

Finally, with respect to governance arrangements, current decision-making authority is not conducive to easily scaling up innovative approaches such as rapid follow-up for heart failure. For example, the ministry and the LHINs have shared decision-making authority related to how funds for heart-failure patients can be allocated to hospitals and to teams of specialists (in the form of QBPs). The decision to move away from this model of funding, or to an adjusted version of it, lies with the ministry and LHIN rather than the individual hospital wishing to adopt the new model of care.

**There is growing pressure to rapidly identify and scale up models of heart-failure care that will achieve the ‘triple aim’**

In recent years, members of the public and the media have placed significant attention on over-crowded emergency departments and hospitals that are stretched beyond their capacity to provide timely care to patients.<sup>(11)</sup> This issue has also been taken up by the newly elected government in Ontario, featuring prominently in their election platform and more recently through the establishment of the Premier’s Council on Improving Health Care and Ending Hallway Medicine.<sup>(12)</sup> The number of emergency-department visits and hospitalizations resulting from heart failure, combined with the increasing emphasis from the public, media and government on solving the issues of over-crowding emergency departments and under-resourced hospitals, have put pressure on health-system leaders to rapidly identify and scale up new models of care for

heart failure – such as those included in the COACH trial – that have the potential to achieve the ‘triple aim’ of improving the patient experience and population health while keeping the amount spent per person manageable.

One approach to facilitate the rapid identification, piloting, evaluation and scale up of promising innovations is to apply a rapid-learning health-system orientation. The concept of a rapid-learning health system at the government level is an analogue to what has been called ‘radical incrementalism,’ which couples small incremental policy changes that focus on improving effectiveness with small scale and tightly focused evaluations to identify what policy changes warrant keeping. The publication of a rapid synthesis conducted by the McMaster Health Forum in early 2018 proposed the following Ontario-appropriate definition of a rapid-learning health system:

“...the combination of a health system and a research system that at all levels – self-management, clinical encounter, program, organization, LHIN sub-region, LHIN and government – is: 1) anchored on patient needs, perspectives and aspirations (and focused on improving their care experiences and health at manageable per capita costs and with positive provider experiences); 2) driven by timely data and evidence; 3) supported by appropriate decision supports and aligned governance, financial and delivery arrangements; and 4) enabled with a culture of and competencies for rapid learning and improvement.”(13)

Applying a rapid-learning health-system orientation to improving access to care and outcomes for heart failure has the potential to:

- enable data- and evidence-informed transformations at all levels of the health system, including the nascent LHIN sub-regions, in ways that are more rapid, better sustained locally and more widely spread across teams, programs, organizations, LHIN sub-regions and LHINs (and thereby join up the different parts of the system so they work well together);
- motivate greater collaboration among and enable greater impacts of (and returns on investments in) all elements of the research system; and
- better leverage the quality-improvement infrastructure operating at the interface between the health and research systems.(13)

As part of the rapid synthesis conducted in March, assets and gaps were identified in each of seven domains that are conducive to establishing a rapid-learning health system in Ontario. These domains included:

- 1) engaged patients;
- 2) digital capture, linkage and timely sharing of relevant data;
- 3) timely production of research evidence;
- 4) appropriate decision supports;
- 5) aligned governance, financial and delivery arrangements;
- 6) culture of rapid learning and improvement; and
- 7) capacity for rapid learning and improvement.

Below, Table 1 presents a similar mapping of the important assets and gaps that exist to support rapid learning for improving care and outcomes for heart-failure patients in Ontario’s health system. On the whole, the process of identifying assets and gaps in the context of heart failure provides stakeholders involved in the COACH trial with an understanding of what assets may be leveraged to support rapid learning from the trial, and what gaps may still need to be addressed to ensure widespread adoption, evaluation and adaptation should the trial be shown to be successful. For example, the range of decision supports offered by different stakeholders such as Canadian Agency for Drugs and Technology in Health, CorHealth Ontario, eHealth Ontario, HQO and Ministry of Health and Long-Term Care could integrate insights from the COACH model (when appropriate) into recommendations about the most appropriate care pathways, clinical standards, practice guidelines, and quality standards. Furthermore, the existence of aligned health-system arrangements provides opportunities to work within the current system to promote the integration of the

COACH model should it be effective (e.g., by adjusting how heart-failure targets are represented in Quality Improvement Plans, adjusting funding mechanisms to support rapid follow-up in non-hospital settings, or adjusting incentives to promote the provision of care that enables the types of supports offered in the COACH trial).

However, despite the assets identified, there are still a number of areas that could benefit from a greater emphasis on supporting rapid learning (which would in turn help to prime the system for acting on the insights coming out of the COACH trial). Some examples include the need for additional efforts to engage heart-failure patients in organizational decision-making and program co-design processes, enhanced support for the ongoing collection of practical data related to care processes (both quantitative and qualitative), and greater flexibility in decision-making authority related to how innovations are funded (and scaled up) across the province. This framing may help to support policymakers, stakeholders and researchers plan for the next phase of its implementation and further advance the province’s adoption and transition towards a rapid-learning health system. In the section that follows, we use this orientation to present some potential solutions to the challenges outlined above.

**Table 1. Assets and gaps in the treatment and management of heart failure in Ontario**

Characteristic	Examples	Health system	Research system
		Receptors and supports	Supports
<p><b>Engaged patients:</b> Systems are anchored on patient needs, perspectives and aspirations (at all levels) and focused on improving their care experiences and health at manageable per capita costs and with positive provider experiences</p>	<ol style="list-style-type: none"> <li>1) Set and regularly adjust patient-relevant targets for rapid learning and improvement (e.g., improvements to a particular type of patient experience or in a particular health outcome)</li> <li>2) Engage patients, families and citizens in:                             <ol style="list-style-type: none"> <li>a) their own health (e.g., goal setting; self-management and living well with conditions; access to personal health information, including test results)</li> <li>b) their own care (e.g., shared decision-making; use of patient decision aids)</li> <li>c) the organizations that deliver care (e.g., patient-experience surveys; co-design of programs and services; membership of quality-improvement committees and advisory councils)</li> <li>d) the organizations that oversee the professionals and other organizations in the system (e.g., professional regulatory bodies; quality-improvement bodies; ombudsman; and complaint processes)</li> <li>e) policymaking (e.g., committees making decisions about which services and drugs are covered; government advisory councils that set direction for (parts of) the system; patient storytelling to kick off key meetings; citizen panels to elicit citizen values)</li> <li>f) research (e.g., engaging patients as research partners; eliciting</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>• Ministry of Health and Long-Term Care (MoHLTC) has a team of five staff to support patient engagement and a growing database of individuals who have signed up to act as patient advisors in the health system</li> <li>• Health Quality Ontario (HQO) is leading several initiatives on patient engagement including developing a patient conversation guide to support those with heart failure to ask the right questions, and specific Choosing Wisely resources related to heart failure and heart surgery</li> </ul>	<ul style="list-style-type: none"> <li>• Ontario SPOR SUPPORT Unit (OSSU) hosts a range of capacity-building including the OSSU masterclass that engages patients as well as providers, policymakers and researchers</li> </ul>

	<p>patients' input on research priorities)</p> <p>3) Build patient/citizen capacity to engage in all of the above</p>		
<p><b>Digital capture, linkage and timely sharing of relevant data:</b> Systems capture, link and share (with individuals at all levels) data (from real-life, not ideal conditions) about patient experiences (with services, transitions and longitudinally) and provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)</p>	<ol style="list-style-type: none"> <li>1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing)</li> <li>2) Capacity to capture patient-reported experiences (for both services and transitions), clinical encounters, outcomes and costs</li> <li>3) Capacity to capture longitudinal data across time and settings</li> <li>4) Capacity to link data about health, healthcare, social care, and the social determinants of health</li> <li>5) Capacity to analyze data (e.g., staff and resources)</li> <li>6) Capacity to share 'local' data (alone and against relevant comparators) – in both patient- and provider-friendly formats and in a timely way – at the point of care, for providers and practices (e.g., audit and feedback), and through a centralized platform (to support patient decision-making and provider, organization and system-wide rapid learning and improvement)</li> </ol>	<ul style="list-style-type: none"> <li>• CorHealth Ontario coordinates and maintains a patient registry of cardiac catheterization, angioplasty, stent procedures, and cardiac surgeries</li> <li>• HQO uses data from the Institute for Clinical Evaluative Sciences (ICES) to report on key heart-failure indicators with comparisons in mind</li> <li>• Canada Health Infoway supports the development, adoption and effective use of digital health solutions</li> <li>• Canadian Institute for Health Information (CIHI) captures, analyzes and shares data about health systems and health, both through its own site and through 'Your Health System' (and a CIHI project is linking patient satisfaction and utilization data)</li> </ul>	<ul style="list-style-type: none"> <li>• Ministry of Health and Long-Term Care funds ICES to provide a data management and analytics platform including for data on heart failure-related admissions and readmissions to the hospital</li> <li>• OSSU has funded ICES Data and Analytic Services to respond to data requests, including for data linkage, by decision-makers</li> <li>• A SPOR national data platform will soon be launched to provide a single point of timely access to a broad range of harmonized healthcare data</li> <li>• CIHI presents cross-provincial comparisons of readmission rates (including for heart failure)</li> </ul>
<p><b>Timely production of research evidence:</b> Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations</p>	<ol style="list-style-type: none"> <li>1) Distributed capacity to produce and share research (including evaluations) in a timely way</li> <li>2) Distributed research ethics infrastructure that can support rapid-cycle evaluations</li> <li>3) Capacity to synthesize research evidence in a timely way</li> <li>4) One-stop shops for local evaluations and pre-appraised syntheses</li> <li>5) Capacity to access, adapt and apply research evidence</li> <li>6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers</li> </ol>		<ul style="list-style-type: none"> <li>• Many hospital research institutions have large-scale clinical-trial platforms (e.g., St Michael's Hospital and Ottawa Heart Institute)</li> <li>• MoHLTC funds research groups to work on priority system challenges which requires them to use 25% of their funds to respond to emerging research requests by decision-makers (called Applied Health Research Question), one of which has focused specifically on heart failure and patient outcomes</li> <li>• Canadian Institutes of Health Research (CIHR) Institute for Health Services and Policy Research is midway through a five-year agenda to provide scientific leadership for rapid-learning health systems, and as part of this effort it has supported 'embedded' clinical researchers (clinician scientists) and health policy and services researchers (Health System Impact Fellows), and will be supporting a new program focused on 'embedded' clinical change leaders</li> <li>• Canadian Health Services and Policy Research Alliance has created a</li> </ul>

			<p>working group to support rapid-learning health systems</p> <ul style="list-style-type: none"> <li>• CIHR’s Strategy for Patient-Oriented Research (SPOR), including its national networks and provincial SPOR SUPPORT Units, support patient-oriented research, and the ‘Rewarding Success’ program rewards rapid learning and improvement</li> <li>• CIHR-funded researchers (Monica Taljaard &amp; Charles Weijer) are studying the ethical issues in rapid-learning health systems and collaborating with national funding agencies to prepare a guidance document on the topic</li> <li>• CIHR, Natural Sciences and Engineering Research Council (NSERC) and Social Sciences and Humanities Research Council (SSHRC) support the Networks of Centres of Excellence Programs to mobilize research, development and entrepreneurial expertise to address strategic priorities within and beyond health, although none specifically focus on cardiovascular disease</li> <li>• OSSU funds a joined-up approach across 12 research groups to provide: 1) data platforms and services; 2) methods support and development; 3) real-world (pragmatic) clinical trials (including the COACH trial); 4) health-systems research, implementation research and knowledge translation; 5) career development in methods and health-services research; 6) consultation and research services (with cross-cutting support for sex and gender issues and francophone and indigenous populations), as well as on-off funding to patient-and impact-oriented research projects that involve decision-makers</li> <li>• Cochrane Canada, SPOR Evidence Alliance and other groups prepare rapid syntheses on health-system priorities</li> </ul>
<p><b>Appropriate decision supports:</b> Systems support informed decision-making at all levels with appropriate data, evidence, and decision-</p>	<p>1) Decision supports at all levels – self-management, clinical encounter, program, organization, regional health authority and government – such as</p> <ol style="list-style-type: none"> <li>a) patient-targeted evidence-based resources</li> <li>b) patient decision aids</li> <li>c) patient goal-setting supports</li> <li>d) clinical-practice guidelines</li> <li>e) clinical-decision support systems (including those</li> </ol>	<ul style="list-style-type: none"> <li>• Many groups make recommendations to providers about optimal care for congestive heart failure:             <ul style="list-style-type: none"> <li>○ HQO has produced quality standards on heart failure and has plans to issue a new standard in 2019</li> <li>○ CorHealth makes recommendations about cardiac, stroke and vascular care, which includes clinical standards and key clinical services for heart failure</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• ICES conducts data analysis and shares with CorHealth to support them in discussions and decision-making with the MoHLTC</li> <li>• Ottawa Hospital Research Institute (OHRI) Patient Decisions Aids provide pre-appraised decision aids on heart failure and other cardiac conditions</li> <li>• Many national health charities focus on particular categories of health conditions (e.g., arthritis, diabetes</li> </ul>

<p>making frameworks</p>	<p>embedded in electronic health records)</p> <ul style="list-style-type: none"> <li>f) quality standards</li> <li>g) care pathways</li> <li>h) health-technology assessments</li> <li>i) descriptions of how the health system works</li> </ul>	<ul style="list-style-type: none"> <li>o MoHLTC produced care pathways for heart failure (funded using the Quality-Based Procedures approach)</li> <li>o HQO is releasing a specialized report in late 2019 or early 2020</li> <li>• eHealth Ontario (and Canada Health Infoway) provide supports to providers for electronic records that incorporate decision supports</li> </ul>	<p>and heart and stroke) and prepare patient-targeted materials</p> <ul style="list-style-type: none"> <li>• A book describes how the Ontario health system works, including providing details on how the specialty care sector works</li> <li>• McMaster Optimal Aging Portal provides patient-targeted, evidence-based resources to support self-management and shared decision-making, including for heart failure</li> <li>• ACCESSS provides access to pre-appraised studies and reviews about clinical interventions, including for heart failure</li> <li>• Health Systems Evidence and Social Systems Evidence provide access to pre-appraised synthesized research evidence about how to strengthen health and social systems and get the right programs, services and products to those who need them</li> <li>• Canadian Agency for Drugs and Technologies in Health prepares health-technology assessments (for drugs, diagnostic tests, devices and procedures), which complements similar bodies operating in provincial and territorial health systems and in select hospitals</li> </ul>
<p><b>Aligned governance, financial and delivery arrangements:</b> Systems adjust who can make what decisions (e.g., about joint learning priorities), how money flows and how the systems are organized and aligned to support rapid learning and improvement at all levels</p>	<ol style="list-style-type: none"> <li>1) Centralized coordination of efforts to adapt a rapid learning health system approach, incrementally join up assets and fill gaps, and periodically update the status of assets and gaps</li> <li>2) Mandates for preparing, sharing and reporting on quality-improvement plans</li> <li>3) Mandates for accreditation</li> <li>4) Funding and remuneration models that have the potential to incentivize rapid learning and improvement (e.g., focused on patient-reported outcome measures, some bundled-care funding models)</li> <li>5) Value-based innovation-procurement model</li> <li>6) Funding and active support to spread effective practices across sites</li> <li>7) Standards for provincial expert groups to involve patients, a methodologist, use existing data and evidence to inform and justify their recommendations</li> <li>8) Mechanisms to jointly set rapid-learning and improvement priorities</li> <li>9) Mechanisms to identify and share the ‘reproducible building blocks’ of a rapid-learning health system</li> </ol>	<ul style="list-style-type: none"> <li>• Government of Ontario requires hospitals to create Quality Improvement Plans (and to incorporate equity considerations in these plans), many of which include targets for 30-day readmission rates for heart failure</li> <li>• MoHLTC prioritized chronic heart failure as a Quality-Base Procedure and allocates funding accordingly</li> <li>• MoHLTC piloted bundled-care payment models for six pilot projects in the province for congestive heart failure alongside other conditions (e.g., COPD and stroke)</li> <li>• OHIP Heart Failure Management Incentive fee code provides a \$125 annual payment (per patient) available to physicians in Patient Enrolment Models for coordinating and documenting all required elements of care for enrolled heart-failure patients</li> <li>• Ongoing efforts by CorHealth to develop a hub-spoke-node model of care for heart failure</li> <li>• ARTIC (Adopting Research to Improve Care) provides funding and active support to spread across sites the use of proven clinical interventions or practice changes</li> </ul>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>

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		that have already been successfully implemented in at least one site	
<p><b>Culture of rapid learning and improvement:</b> Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability</p>	<p>1) Explicit mechanisms to develop a culture of teamwork, collaboration and adaptability in all operations, to develop and maintain trusted relationships with the full range of partners needed to support rapid learning and improvement, and to acknowledge, learn from and move on from 'failure'</p>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>
<p><b>Competencies for rapid learning and improvement:</b> Systems are rapidly improved by teams at all levels who have the competencies needed to identify and characterize problems, design data- and evidence-informed approaches (and learn from other comparable programs, organizations, regions, and sub-regional communities about proven approaches), implement these approaches, monitor their implementation, evaluate their impact, make further adjustments as needed, sustain proven approaches locally, and support their spread widely</p>	<p>1) Public reporting on rapid learning and improvement 2) Distributed competencies for rapid learning and improvement (e.g., data and research literacy, co-design, scaling up, leadership) 3) In-house capacity for supporting rapid learning and improvement 4) Centralized specialized expertise in supporting rapid learning and improvement 5) Rapid-learning infrastructure (e.g., learning collaboratives)</p>	<ul style="list-style-type: none"> <li>• All hospitals have quality-improvement units</li> </ul>	<ul style="list-style-type: none"> <li>• None identified</li> </ul>

### **Additional equity-related observations about the problem**

As noted in box 2 and in the accompanying text on the same page, this brief gives particular attention to four groups: 1) older adults and in particular those considered frail; 2) women who experience differential access to care and who are more reliant on home-care support; 3) ethnocultural groups who are at a higher risk for hospital readmission (urban-dwelling western Europeans) or death (urban-dwelling East Asians); and 4) those with lower socio-economic status. Each of these groups were chosen because they experience differential access to care for heart failure or outcomes from the management and treatment of heart failure. While it would be ideal to provide a comparison between these specific groups and the general population, no data were found to provide these specific insights. However, we provide an overview of some of the considerations for each of these groups below.

With respect to older adults, the prevalence of heart failure has been found to increase as people age, approximately doubling with each decade after 65.(14) Further, the diagnosis and management of heart failure is often more challenging in elderly patients due to:

- the presence of multi-morbid illness, which may independently increase mortality;
- polypharmacy and the potential for inappropriate medications; and
- cognitive impairment and frailty, which are associated with reduced self-care abilities and medication adherence among older patients.(14)

Women are known to develop heart failure an average of five years later than men, and findings from Ontario have shown significant differences in management between the two genders.(15) In particular, women with heart failure in Ontario are more likely to be reliant on home-care support and often require more support days than men. In addition, women are less likely than men to be seen by a physician within seven days and also within the later timeframe of 30 days (two timeframes which are viewed as critical 'windows' of care for patients with heart failure).(15) This difference in access presents significant challenges for the proactive management and treatment of heart failure.

Ethnicity is also an important equity consideration, as there are significant differences observed among ethnic groups in the prevalence of heart failure and rates of hospitalization.(15) In particular, the highest age- and sex-adjusted rates of mortality occur among individuals of East Asian descent, while those of western European descent have the highest rates of hospital readmission within one year.(15) Interestingly, the majority of at-risk patients within these two ethnocultural groups live in urban areas.(15) This nuanced understanding of how the incidence and prevalence of heart failure, as well as important health outcomes associated with it, are distributed across ethnocultural groups in Ontario is critical to planning for the effective management of the condition. For instance, these insights may help to make the case for the development of tailored approaches that adapt innovations such as those being tested in the COACH trial to the unique needs of different ethnocultural groups.

Finally, individuals with low socio-economic status also need to be given specific consideration, given they have increased rates of heart failure combined with a number of challenges managing the condition when compared with more affluent individuals. One systematic review found that adjusted risk for developing heart failure was significantly higher, as were readmission rates, following hospitalization among more deprived patients.(16) While the mechanisms accounting for the increased risk are not well established in the literature, numerous challenges faced by individuals of lower socio-economic status, including limited access to healthcare (particularly beyond acute-care services), transportation costs, higher rates of co-morbidity and low adherence to drug regimes, diet and physical activity, may all act as contributing factors.(16) These considerations are important in any effort to learn from and scale up the innovations being tested in the COACH trial, as overcoming the types of challenges listed above for each of these groups would likely require the adoption of additional strategies that can support successful implementation for this group.

Overall, despite their prioritization in the COACH trial, many of these groups have not historically been prioritized (and in some cases not included) in previous clinical trials, leading to some uncertainty about the effectiveness of select models of care and best practices in managing and treating heart failure for these groups.

**TWO ELEMENTS (ONE OF WHICH HAS TWO SUB-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 improving access to care and outcomes for heart-failure patients in Ontario. With initiatives such as the COACH trial still in progress (with results expected in late 2019), it is important to consider both what needs to be done while promising innovations are still being tested (i.e., while the ‘jury is still out’ on whether and how they improves access to care and outcomes), as well as what should be done once the results are available (i.e., when there are opportunities to act on what was learned). To promote discussion about the pros and cons of potentially viable strategies for overcoming some of the challenges outlined in the previous section, we have selected two elements of a potentially comprehensive approach, one of which has two sub-elements that are contingent on the results of the trial. The two elements and their sub-elements were developed and refined through consultation with the Steering Committee and key informants who we interviewed during the development of this evidence brief:

- 1) prepare the health system for rapid learning about the promising innovations included in the COACH trial while they are being tested; and
- 2) adopt an approach to move forward on improving access and outcomes for patients with heart failure based on the results from the COACH trial, which includes two potential sub-elements:
  - a) develop a plan for scaling up rapid follow-up clinics if they are shown to be effective in the COACH trial;
  - b) establish an approach for moving forward if promising innovations included in the COACH trial are inconclusive, ineffective or harmful.

These two elements would ideally be pursued as complements to each other to ensure that the system is being primed for acting in light of the results once available. However, how the two sub-elements included in element 2 ought to be approached will be further shaped depending on the results of the COACH trial. For example, if the results are entirely positive, it could be that element 2a is pursued. On the other hand, if the results are mostly inconclusive, or the innovation is shown to be ineffective (or harmful), it could be that element 2b is pursued. There is also a real possibility that the results of the COACH trial provide a picture that isn’t as ‘black and white.’ For instance, after decomposing components of the intervention in the analysis,

**Box 4: Mobilizing research evidence about the elements for addressing the problem**

The available research evidence about the two elements and sub-elements for a potentially comprehensive approach for addressing the problem was sought primarily from Health Systems Evidence ([www.healthsystemsevidence.org](http://www.healthsystemsevidence.org)), which is a continuously updated database containing more than 7,000 systematic reviews and more than 2,600 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 approach elements and two 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 approach elements and sub-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 approach element or sub-element may want to search for a more detailed description of the element or sub-element for additional research evidence.

it may become clear that different pieces of the intervention work in some contexts and settings and/or for select populations, whereas others don't. In this scenario, it could be that a third hybrid sub-element (i.e., 2c) is pursued in which plans are put in place for scaling up the effective components of the intervention, while simultaneously planning for how to move forward in response to the fact that some components are inconclusive, ineffective or harmful. Below, the elements are presented separately to foster deliberations about their respective components, the relative importance 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 (and the two sub-elements that could be pursued as part of element 2) 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. 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.

### **Element 1 – Prepare the health system for rapid learning about the promising innovations included in the COACH trial while they are being tested**

As outlined above, the focus of this element is to ensure the system is primed to act on what is learned from the results of evaluations such as the COACH trial. The main components of this element could include a range of efforts to ensure that innovations like rapid follow-up clinics can be sustained in the short term (i.e., while the jury is still out), with a view to the medium and long term, including:

- reviewing and learning from previous instances in which experimental or innovative approaches to care were tested in Ontario to proactively identify factors likely to influence next steps;
- identifying opportunities to reduce costs during pilot phases (given the low likelihood of receiving more funding while awaiting trial results);
- collecting the necessary quantitative and qualitative data to answer practical questions that are vital for sustaining the innovation, such as easily measurable process indicators that provide insights related to reducing costs by substituting lower-cost providers, or patients' views and experiences about the acceptability of such substitutions;
- establishing a fund to ensure smooth transitions after the formal end of trials to give people time to change how they're providing care (if necessary);
- establishing clear points of accountability for care, associated outcomes, and value-for-money; and
- bridging gaps between the experimental/pilot phase and having the definitive result (e.g., ensuring a plan is in place to ensure patients can access the services they need while new models are being considered).

We identified eight systematic reviews addressing three of the six components listed above. For the second component – identifying opportunities to reduce costs during pilot phases – we found one recent low-quality review which suggested that time-driven activity-based costing may be used to efficiently capture the cost of care processes.(17) While the use of time-driven activity-based costing may not on its own reduce costs, the review found that it could be used to clarify how costs are incurred during the care process and inform decisions about care during the piloting process.(17)

We identified two older medium-quality reviews and one costing study for the third component – collecting the necessary quantitative and qualitative data to answer practical questions that are vital for sustaining the innovation.(18-20) One of the reviews examined the extent to which measurement tools were available to assess the implementation of a health innovation. The review found a number of tools that can be reliably used to assess implementation of organization-, provider- and innovation-level constructs, however, relatively few to assess either structural or patient-level outcomes.(20) The second review (which was older and

medium quality) explored the use of knowledge-exchange portals, which could be considered as one mechanism for collecting and disseminating quantitative and qualitative data.(19) This review found that knowledge-exchange portals can support access to data and information, knowledge creation and knowledge transfer if collaborative features are embedded.(19) The review further found that these portals support the use of evidence in policy and program decision-making at the organizational level.(19) The costing study tested a framework for implementing evidence-based and value-based decisions which included four key actions: 1) collecting research and financial data on clinical operations for decision-making; 2) clearly articulating goals and targeted clinical outcomes to be clearly communicated to all practitioners; 3) close monitoring; and 4) documenting targeted operation outcomes and communicating these outcomes in a quantitative way to stakeholders to complete the cycle and adjust plans accordingly.(18) The study found that innovations that applied this framework in the initial planning and implementation were found to have significant financial benefits and short pay-back periods.(18)

No reviews were identified that related to the fourth component (establishing a fund to ensure smooth transitions after the trial) or the fifth component (establishing clear points of accountability for care), but four systematic reviews (one recent medium quality, two older medium quality and one older low quality) were identified that related to the sixth component (bridging gaps between experimental/pilot phase and having the definitive result). These reviews identified a number of key facilitators at the practice, organizational, and systems level that could be planned for or implemented to ease implementation. These included:

- at the practice level, applying a needs assessment, linking the new practice to the organization's strategic direction, ensuring there are clear champions and mentors to take the work forward, standardizing new practices, and clarifying new roles and responsibilities for staff;
- at the organizational level, centrally developing an innovation, linking potential users with developers or change agents at an early stage to capture and incorporate the user's perspective, and designating change agents and ensuring they are trained and supported to develop strong interpersonal relationships;
- at the level of the health system, decision-making processes could be facilitated by providing access to information, establishing methods for the evaluation of complex interventions, targeting the dissemination of evidence, convening individuals with expertise in research utilization, integrating evidence, providing administrative support, and creating a culture that supports the use of evidence; and
- also at the level of the health system, government-led system transformation could be facilitated by ensuring transparent communication and visibility of the transformation, creating a central coordinating body, clearly articulating the goals of change, implementing information-technology systems for data collection and reporting, establishing independent oversight of measurement development, conducting organizational readiness assessments, collecting information about past change efforts, working with educational institutions and regulatory colleges for professional engagement, and engaging patients, families and citizens in planning for change processes.(21-24)

A summary of the key findings from the synthesized research evidence is provided in Table 2. For those who want to know more about the systematic reviews contained in Table 2 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 1.

**Table 2: Summary of key findings from systematic reviews relevant to Element 1 – Prepare the health system for rapid learning about the promising innovations included in the COACH trial while they are being tested**

Category of finding	Summary of key findings
Benefits	<ul style="list-style-type: none"> <li>• <b>Identifying opportunities to reduce costs during pilot phases</b> <ul style="list-style-type: none"> <li>○ One recent low-quality review found that time-driven activity-based costing can be used to efficiently cost care processes for conditions that have traditionally been difficult to accurately capture the cost of care, however, its ability to inform bundled payment reimbursements remains unknown.                             <ul style="list-style-type: none"> <li>▪ The review highlighted that an advantage of time-driven activity-based costing was the ability to clarify how costs are incurred which has the potential to inform improvement initiatives.(17)</li> </ul> </li> </ul> </li> <li>• <b>Collecting the necessary quantitative and qualitative data to answer practical questions that are vital for sustaining the innovation</b> <ul style="list-style-type: none"> <li>○ One recent costing study identified a framework to support the implementation of evidence-based and value-based innovations, which includes collecting research and financial data on clinical operations for decision-making, clearly articulating goals and targeted clinical outcomes to be clearly communicated to all practitioners, closely monitoring and documenting targeted operation outcomes, and communicating these outcomes in a quantitative way to stakeholders to complete the cycle and adjust plans accordingly.(18)</li> <li>○ One older medium-quality review found that knowledge-exchange portals can support knowledge access, knowledge creation and knowledge transfer if collaborative features are embedded.                             <ul style="list-style-type: none"> <li>▪ The review found that these portals appear to support the use of evidence in policy and program decision-making at the organizational level, though have been shown to have some challenges in retaining users.(19)</li> </ul> </li> <li>○ One older medium-quality review examined the extent to which measurement tools were available to assess the implementation of a given health innovation. The review found a number of measure tools to assess organization-, provider- and innovation-level constructs, but relatively few to assess structural and patient-level outcomes.(20)</li> </ul> </li> <li>• <b>Bridging gaps between experimental/pilot phase and having the definitive result</b> <ul style="list-style-type: none"> <li>○ One older medium-quality review found that innovations that are centrally developed and include input from users early on in the development phase are more likely be widely and successfully adopted.                             <ul style="list-style-type: none"> <li>▪ The review also found that if external change agents are used, they will be more successful if trained and supported to develop strong interpersonal relationships with potential users, and to explore and empathize with the user’s perspective.(24)</li> </ul> </li> </ul> </li> </ul>
Potential harms	<ul style="list-style-type: none"> <li>• None identified</li> </ul>
Costs and/or cost-effectiveness in relation to the status quo	<ul style="list-style-type: none"> <li>• <b>Identifying opportunities to reduce costs during pilot phases</b> <ul style="list-style-type: none"> <li>○ One recent costing study found that effective evidence-based decision-making had major financial benefits and short pay-back periods on program innovations.(18)</li> </ul> </li> </ul>
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the option were pursued)	<ul style="list-style-type: none"> <li>• <b>Bridging gaps between experimental/pilot phase and having the definitive result</b> <ul style="list-style-type: none"> <li>○ One recent medium-quality review identified themes related to organizational, context and process factors that influence the uptake of evidence-based practices, however, the review found a lack of research around how evidence-based practices can be sustained by organizations.(23)</li> </ul> </li> </ul>
Key elements of the policy option if it was tried elsewhere	<ul style="list-style-type: none"> <li>• <b>Bridging gaps between experimental/pilot phase and having the definitive result</b> <ul style="list-style-type: none"> <li>○ One older low-quality review examined how governments can enable large system transformations and focused on five themes: leadership; monitoring and reporting; historical context; physician engagement; and patient and family engagement; facilitators for each of these five include:                             <ul style="list-style-type: none"> <li>▪ implementing transparent transformation efforts, creating a central coordinating body that is isolated from political influence, and clearly articulating the goals of the change;</li> <li>▪ budgeting for IT systems, establishing independent oversight of measurement and reporting, and offering rewards and sanctions for achievement of measures;</li> <li>▪ consideration of historical context and careful assessment of readiness for transformation, and storing and reporting information on past change measures;</li> <li>▪ significant physician engagement in the change process by working with educational institutions and regulatory bodies; and</li> </ul> </li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>▪ significant engagement of patients and families in governance and advisory mechanisms for healthcare institutions and bodies, and collecting information on patient wishes through surveys.(21)</li> <li>○ One older medium-quality review examined barriers and facilitators to the use of evidence in decision-making at the program management level, and barriers were identified as the informational, organization (structure and process) and organization (culture) levels, and included, among others, availability of research evidence that could be used at the local level and the complex nature of organizational decision-making and challenges integrating evidence.             <ul style="list-style-type: none"> <li>▪ The review also identified facilitators to the use of evidence across all three levels, including, among others, complex intervention-evaluation methods, established processes for integration of evidence, and inter-organizational collaboration and visible research utilization.(22)</li> </ul> </li> </ul>
Stakeholders' views and experience	<ul style="list-style-type: none"> <li>• None identified</li> </ul>

## **Element 2 – Adopt an approach to move forward on improving access and outcomes for patients with heart failure based on the results from the COACH trial**

Given that the COACH trial is ongoing and results will not be known until later this year, it is imperative to begin planning for different scenarios in light of the results so that researchers as well as the full range of policymakers and stakeholders involved in decision-making about heart-failure care in Ontario can rapidly integrate the lessons learned from the trial into the health system, and begin to adjust the delivery of care accordingly. Below, we present two possible sub-elements for a way forward.

### **Element 2a – Develop a plan for scaling up rapid follow-up clinics if they are shown to be effective in the COACH trial**

If the results of the COACH trial show that the rapid follow-up clinic model being evaluated is effective in improving access to care and outcomes, policymakers and stakeholders in Ontario would ideally consider what the best approach would be for widespread adoption across the province. In doing so, they may consider the following components:

- using the Adopting Research to Improve Care (ARTIC) model to plan for the scale up and widespread adoption of rapid follow-up clinics in Ontario, which includes:
  - strategic selection of interventions that have the potential for high impact (which would already be accomplished if the results of the COACH trial were positive),
  - education and training;
  - guidance and facilitating (and institutional-level coaching as needed to ensure organizations are optimized for change),
  - executive championship and a clear governance structure,
  - evaluation, and
  - institutional-level coaching; and
- aligning health-system arrangements to support the adoption of rapid follow-up clinics across Ontario, which would include:
  - ensuring decision-making authority related to the reallocation of resources to support new models of care for heart-failure patients is reflective of the need for service providers to remain nimble while supporting the scale up of innovations;
  - creating new funding arrangements that support the adoption of rapid-follow-up clinics (e.g., establishing ‘bundled payments’ for heart-failure patients to support integration of care for heart-failure patients across inpatient and outpatient settings);
  - ensuring alignment with other transitional programs for heart failure within the province (including the Detection of Indicators and Vulnerabilities for Emergency Room Trips Scale – DIVERT - and the proposed CorHealth hub-node-spoke model) and nesting the model within other supports such as nurse navigators;
  - adapting the approach as needed to the unique nature of providing care for heart-failure patients in rural and remote communities (e.g., establishing rapid follow-up clinics that rely on remote consultations with specialists supported by alternate providers, such as nurse practitioners, in person; establishing transportation services to support individuals in getting to and from the clinics), and for specific populations (e.g., older adults, those from neighbourhoods with lower incomes); and
  - considering ways in which the innovation could be ‘scaled out’ as well as ‘scaled up’ to inform the development of innovative models of care for other conditions when there are clear parallels (e.g., for chronic obstructive pulmonary disease).

While we still don’t know if the rapid follow-up model being evaluated in the COACH trial will be shown to be effective (and therefore a candidate for scaling up), we searched for and found some evidence to suggest that models of care with similar elements to those being tested are promising. For example, one recent medium-quality review of multidisciplinary heart-failure clinics found that patients had reduced heart-failure hospitalizations and lower incidence of all-cause mortality when frequent follow-up within the first three

months was a characteristic of care.(25) In addition, we identified seven systematic reviews varying in recency and quality that focused more generally on identifying the effective characteristics of post-discharge follow-up, rather than a rapid follow-up model.(26-32) Models of post-discharge follow-up that were found to be effective included patient education and continuous post-discharge telephone calls, transitional nurse-led programs, community-based specialty-clinics, heart-failure management program with a pre-discharge nurse-led component, and home-visiting programs.(26-32) Generally, the reviews identified found that these interventions reduced rates of hospital admission in the medium and long term and in some reviews reported increases in patient quality of life and cost-effectiveness.(26-32)

In addition to this heart-failure-specific literature that shows the promise of certain components of care that are similar to those included in the COACH trial, we identified a number of systematic reviews (and one overview) that related more directly to the components of sub-element 2a focusing on what can be done to scale up effective interventions.

Specifically, four systematic reviews (two recent medium quality, one recent low quality and one older low quality) were identified that related to the first component of scaling up the adoption of rapid follow-up clinics.(33-36) Three of the reviews identified facilitators and barriers to scale up at each the intervention, staff and system level, including:

- at an intervention level: ease of integration with existing models of care (or other transitional care), face validity and evidence base supporting the intervention, and legal and ethical concerns specific to the intervention;
- at the staff level: access to resources for implementation, workforce capacity and needed skills, identifiable roles and skills, and staff abilities and confidence to implement the intervention; and
- at a systems level: establishing monitoring and evaluation systems, undertaking costing and economic modelling of the intervention, ensuring strong leadership and governance, and active engagement of implementor and target community.(33-35)

The fourth systematic review presented a framework that could be used to inform the key stages in scaling up an innovation. The framework conceptualizes sustainability and scale up as a 16-step process to institutionalization, and provides prompts for important considerations for aligning these steps with three key stakeholder groups (innovators, end users and decision-makers) while taking into account three contextual considerations (social and physical environment, the health system, and the regulator, political and economic environment).(36) Taken together, these reviews provide those who may be intent on scaling up an innovation such as COACH with a range of factors to consider in their planning. However, it is also important to acknowledge that one of them noted that partial sustainability was more common than the continuation of an entire intervention in those studies included in the review, and that fewer than half of the providers adopting innovations had high levels of fidelity to the intervention over the long term.(35)

We also identified one overview and three systematic reviews (one older high quality, one recent medium quality and one recent low quality) which examined mechanisms that could be considered in order to adapt heart-failure monitoring to rural and remote communities. The results suggested mixed evidence regarding remote monitoring using telemedicine, with limited studies conducted that included interventions delivered directly to rural or remote populations.(32; 37-39) The overview of reviews and one systematic review found evidence suggesting that remote telemonitoring was effective in reducing heart-failure-specific hospitalization, all-cause hospitalization and overall mortality, however, one older high-quality review and one recent low-quality review found inconclusive results regarding the effectiveness of this model and varied acceptance by patients.(32; 37-39) The overview of reviews also suggested that those models which were effective collected data on blood pressure, heart rate and weight as well as ECGs.(37) Further, the older low-quality review suggested that adapting telemonitoring interventions to rural and remote communities will require adequate installation and technical support.(38) Finally, the last systematic review examined the importance of hospitals in rural and remote communities for providing services.(40) The review found that access to a broad array of models of care may support individuals in remaining at home and in their community while receiving outpatient services from a hospital.(40) The review further suggested that limited resources available in these communities, including shortages of specialists, can reduce the ability for rural hospitals to provide emergency

care, and while telemonitoring and telehealth have been proposed as solutions, these have mixed evidence supporting their effectiveness.(40)

Finally, we also identified one primary study which validates the use of emergency-department risk stratification for chronic obstructive pulmonary disease in a similar manner to that being explored in the COACH trial. This parallel suggests that there is potential that some, if not all, components of the COACH model could be ‘scaled out’ (i.e., expanded to other populations or adapted to meet the needs of other conditions) as well as ‘scaled up.’(41)

A summary of the key findings from the synthesized research evidence is provided in Table 3. For those who want to know more about the systematic reviews contained in Table 3 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 2.

**Table 3: Summary of key findings from systematic reviews relevant to Element 2a – Develop a plan for scaling up rapid follow-up clinics if they are shown to be effective in the COACH trial**

Category of finding	Summary of key findings
Benefits	<ul style="list-style-type: none"> <li>● <b>Using the Adopting Research to Improve Care (ARTIC) model to plan for the scale up and widespread adoption of rapid follow-up clinics in Ontario</b> <ul style="list-style-type: none"> <li>○ One recent medium-quality review found key success factors for scaling up health interventions included: establishment of monitoring and evaluation systems; cost and economic modelling of intervention approaches; strong leadership and governance; active engagement of implementers and the target community; and tailoring the approach to local contexts.(34)</li> <li>○ One recent medium-quality review examined barriers and facilitators to the implementation of hospital interventions at each the system, staff and intervention level, with strong associations between the staff and intervention barriers. At each level, barriers/facilitators included:                             <ul style="list-style-type: none"> <li>▪ at the system level: environmental context, culture, communication processes and external requirements;</li> <li>▪ at the staff level: staff commitment and attitudes, understanding and awareness, identifiable roles and skills, staff abilities and confidence to implement the intervention; and</li> <li>▪ at the intervention level: ease of integration, face validity and evidence base, legal and ethical concerns, and supportive components.(33)</li> </ul> </li> <li>○ One recent low-quality systematic review developed a framework for guiding the implementation and scale up from an innovation by mapping process steps towards institutionalization on three critical stakeholder groups and three contextual factors.                             <ul style="list-style-type: none"> <li>▪ The aim of the framework developed through the systematic review is to support decision-makers in identifying potential problems in sustaining and scaling up innovations.(36)</li> </ul> </li> </ul> </li> <li>● <b>Adapting the approach as needed to the unique nature of providing care for heart-failure patients in rural and remote communities</b> <ul style="list-style-type: none"> <li>○ A recent overview of remote monitoring for heart failure found that it was effective in reducing heart failure rehospitalization, all-cause hospitalization and mortality.                             <ul style="list-style-type: none"> <li>▪ The telemonitoring interventions that were effective collected clinical data on: blood pressure, heart rate, weight and ECG.(37)</li> </ul> </li> <li>○ A recent medium-quality meta-analysis found that remote monitoring (with human-to-human contact, telemonitoring during office hours, and telemonitoring 24/7) reduced all cause mortality.                             <ul style="list-style-type: none"> <li>▪ In addition, the review found that telemonitoring interventions reduced all-cause hospitalizations, but structured telephone support on its own had no effect.(32)</li> </ul> </li> <li>○ A recent medium-quality review on models of care at rural hospitals found that rural hospitals play a significant role in the delivery of care for people in these areas, and often allow patients to remain in or near their own community when receiving services.                             <ul style="list-style-type: none"> <li>▪ However, the review identified that limited resources can reduce the ability for rural hospitals to provide emergency care, and while telemonitoring and telehealth have been proposed as solutions these have mixed evidence supporting their effectiveness.(40)</li> </ul> </li> </ul> </li> </ul>
Potential harms	<ul style="list-style-type: none"> <li>● None identified</li> </ul>
Costs and/or cost-effectiveness in relation to the status quo	<ul style="list-style-type: none"> <li>● None identified</li> </ul>
Uncertainty regarding benefits and potential	<ul style="list-style-type: none"> <li>● <b>Adapting the approach as needed to the unique nature of providing care for heart-failure patients in rural and remote communities</b></li> </ul>

<p>harms (so monitoring and evaluation could be warranted if the option were pursued)</p>	<ul style="list-style-type: none"> <li>○ A recent low-quality review was unable to identify studies related to telemonitoring for heart failure that focused on rural or remote settings, however, the included studies found varied acceptance by patients with one study, noting that a mediator of the intervention may be the extent to which the technology was perceived to undermine an individual’s sense of identity.             <ul style="list-style-type: none"> <li>▪ The same review suggested that adequate installation and technical support would be necessary for patients using telemonitoring, especially for those not used to using technology or living in a rural setting.(38)</li> </ul> </li> <li>○ One older high-quality review found inconclusive results regarding the effectiveness of telemonitoring using telephone support on all-cause mortality.(39)</li> </ul>
<p>Key elements of the policy option if it was tried elsewhere</p>	<ul style="list-style-type: none"> <li>● <b>Using the Adopting Research to Improve Care (ARTIC) model to plan for the scale up and widespread adoption of rapid follow-up clinics in Ontario</b> <ul style="list-style-type: none"> <li>○ While not relating directly to the ARTIC model, one older low-quality review found the following factors relevant to the sustainability of a new program or innovation: both inner and outer context (e.g., policies and legislation, culture and structure); the innovation itself; processes, and the capacity to sustain such as having sufficient funding; workforce characteristics; and stability and interpersonal processes.                 <ul style="list-style-type: none"> <li>▪ The review also found qualitative findings related to capacity which included the stability and attributes of the workforce, workforce skills and attitudes, as well as the support or participation of key stakeholders and funding.</li> <li>▪ The review identified that within the literature, there was relatively less emphasis being placed on the importance of evaluation, feedback and other quality-improvement processes on sustainability.</li> <li>▪ The same review found that partial sustainability was more common than continuation of an entire program or intervention, and that fewer than half of the providers adopting an innovation had high levels of fidelity to the program over the long term.(35)</li> </ul> </li> </ul> </li> </ul>
<p>Stakeholders’ views and experience</p>	<ul style="list-style-type: none"> <li>● None identified</li> </ul>

**Element 2b – Establish an approach for moving forward if innovations included in the COACH trial are inconclusive, ineffective or harmful**

If the results of the COACH trial are inconclusive, or show that the rapid follow-up clinic model being evaluated is ineffective or harmful, then policymakers and stakeholders in Ontario would ideally consider what the best approach would be for moving ahead in light of these results. Specifically, a number of efforts could be considered, including:

- establishing criteria for guiding decisions about whether to extend or repeat evaluations (e.g., identifying a minimum effectiveness threshold); and
- developing an alternative approach to improving the status quo (e.g., using process evaluations to determine what, if any, components of the intervention were successful, scaling up at specific hospital sites where the intervention was successful, and looking to other examples of innovations focused on other conditions, from other sectors, or from other jurisdictions that may be useful in Ontario).

These would likely also need to include proactive efforts to disseminate the trial findings (including through secondary and tertiary publications that provide nuanced assessments of what was learned).

We were unable to identify any systematic reviews that addressed this element or its specific components. However, we did find one overview of reviews and one recent low-quality systematic review that developed frameworks to support decision-makers to either pursue new innovations, parts thereof, or to abandon programs that should not be sustained. The first framework was developed from the overview to help predict and evaluate the success of a technology-supported health program.(42; 43) The framework may be used for one of four purposes of which the first, second and fourth are directly relevant to element 2b: 1) to inform the design of new technology; 2) to identify those technologies that have limited chance of achieving scale; 3) to plan the adoption of a technology (which is more relevant to element 2a); or 4) to explain failures in implementation.(42) The framework has seven components (each with a range of questions) that classify a given intervention as being simple, complicated or complex.(42) The seven components are: 1) condition or illness; 2) technology; 3) value proposition; 4) adopted system; 5) organization(s); 6) wider context; and 7) interaction and mutual adaptation among all these over time. The framework generally found that

interventions that are classified as being complicated are difficult to implement, while those that are classified as complex rarely became mainstreamed.(42) The second framework, which was also described in relation to element 2a above, was developed to support decision-makers in identifying the stage of maturity of their innovation and to help facilitate discussion on key considerations with stakeholders, which may include adapting or changing the innovation.(36) The framework consists of 72 cells, each of which contain questions that help stakeholders to determine where they are in the scale-up process, and evidence-based recommendations about how to move forward in various scenarios.

Additionally, in searching for reviews that addressed the first element we found a recent medium-quality review that examined decision-making criteria that could be considered when determining which components of the intervention may be worth implementing into an alternative approach to the status quo.(44) The criteria found in the review included: effectiveness, equity, affordability, cost-effectiveness, and the number of beneficiaries.(44)

While the elements outlined above and the evidence found to inform their implementation consider the possibility that select components of the trial may be more effective than other components, the trial results may also reveal that this new model of care is effective in some settings, but not in others (i.e., while the results may be inconclusive, ineffective or harmful on average, certain sites may have data suggesting it works for them). To address this possibility, it is likely that decision-makers would require:

- a description of the intervention;
- a logic model that outlines the proposed mechanisms of action;
- any supporting evidence that may exist related to the intervention (or particular components of it);
- a description of the necessary conditions for success; and
- prompts that can help them to think through practical considerations (e.g., the technical feasibility of the intervention, the costs associated with implementing it).(45)

On the whole, considering both the necessary and practical conditions for success may spur decision-makers to consider the fit between the intervention and their own context, and in cases where the data suggest that the effectiveness of the innovation in their context differs from the average, to think to what contextual factors may have supported its success.

A summary of the key findings from the synthesized research evidence is provided in Table 4. For those who want to know more about the systematic reviews contained in Table 4 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix 3.

**Table 4: Summary of key findings from systematic reviews relevant to Element 2b – Establish an approach for moving forward if promising innovations included in the COACH trial are inconclusive, ineffective or harmful**

Category of finding	Summary of key findings
Benefits	<ul style="list-style-type: none"> <li>• None identified</li> </ul>
Potential harms	<ul style="list-style-type: none"> <li>• None identified</li> </ul>
Costs and/or cost-effectiveness in relation to the status quo	<ul style="list-style-type: none"> <li>• None identified</li> </ul>
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the element were pursued)	<ul style="list-style-type: none"> <li>• None identified</li> </ul>
Key elements of the policy option if it was tried elsewhere	<ul style="list-style-type: none"> <li>• <b>Developing an alternative approach to improving the status quo</b> <ul style="list-style-type: none"> <li>○ One recent low-quality systematic review developed a framework for guiding the implementation and scale up from an innovation by mapping process steps towards institutionalization on three critical stakeholder groups and three contextual factors.                             <ul style="list-style-type: none"> <li>▪ The aim of the framework developed through the systematic review is to support decision-makers in identifying potential problems in sustaining and scaling up innovations.(36)</li> </ul> </li> <li>○ One recent overview of reviews also developed a framework to help predict and evaluate the success of a technology-supported health program.                             <ul style="list-style-type: none"> <li>▪ The review includes seven components, each with a series of questions that classifies interventions as being either simple, complicated or complex.</li> <li>▪ The review found generally found that interventions that are classified as being complicated are difficult to implement, while those that are classified as complex rarely became mainstreamed.(42)</li> </ul> </li> </ul> </li> </ul>
Stakeholders' views and experience	<ul style="list-style-type: none"> <li>• <b>Establishing criteria for guiding decisions about whether to extend or repeat evaluations</b> <ul style="list-style-type: none"> <li>○ A recent medium-quality review that examined decision-making criteria related to program decisions, found that stakeholders typically considered included: effectiveness; equity; affordability; cost-effectiveness; and the number of beneficiaries.(44)</li> </ul> </li> </ul>

**Additional equity-related observations about the two elements (and two sub-elements)**

In our review of the synthesized research evidence we did not identify any systematic reviews that related to how the two elements (and their sub-elements) should be tailored to meet the needs of the prioritized groups (older adults and in particular those considered frail; women who experience differential access to care and who are more reliant on home-care support; ethnocultural groups who are at a higher risk for hospital readmission or death such as urban-dwelling western Europeans and East Asians, respectively; and those with lower socio-economic status). This is primarily a result of the literature that was included, which mostly focused on change management, as well as the sustainability and scale up of innovations. However, given the prevalence and challenges reviewed in the equity-related observations about the problem, it is clear that decision-makers should bear in mind:

- how changes to the model of care may affect these prioritized groups;
- how to effectively communicate these changes;
- whether select components of the trial may be more or less effective among these groups; and
- how to integrate the model of care with other supports and services that exist for these groups.

## **IMPLEMENTATION CONSIDERATIONS**

A number of barriers might hinder implementation of the two elements (and the two sub-elements included as part of the second element) of a potentially comprehensive approach to improving access to care and outcomes for heart failure in Ontario, which needs to be factored into any decision about whether and how to pursue any given element (Table 5). Key barriers to implementing the elements (and sub-elements) include the challenges in creating a willingness and accountability to act without concrete results or definitive results, as well as the complexity in coordinating and ‘linking up’ the many different groups that need to be involved in preparing the health system for rapid-learning about promising innovations, and in developing and adopting an approach to move forward in light of the results of evaluations such as the COACH trial. Furthermore, in the event that the COACH trial shows rapid follow-up clinics are effective, a key barrier is also in determining who is best positioned to take a leadership role in championing the adoption of this innovation across the province, particularly in a context where many other innovations spanning many conditions and sectors are potential candidates for scaling up (and additional resources). There are also a number of other barriers that could be considered at the level of patients, providers, leaders in healthcare delivery organizations and policymakers (both elected officials and civil servants).

**Table 5: Potential barriers to implementing the elements and two sub-elements**

<b>Levels</b>	<b>Element 1 – Prepare the health system for rapid learning about the promising innovations included in the COACH trial while they are being tested</b>	<b>Element 2a – Develop a plan for scaling up rapid follow-up clinics if they are shown to be effective in the COACH trial</b>	<b>Element 2b – Establish an approach for moving forward if promising innovations included in the COACH trial are inconclusive, ineffective or harmful</b>
<b>Patient/ Individual</b>	<ul style="list-style-type: none"> <li>Patients with heart failure may be too concerned with their own health to be completely engaged in efforts to learn about results from the trial</li> </ul>	<ul style="list-style-type: none"> <li>The diverse needs of heart-failure patients from different regions, and from different ethnocultural and socio-economic backgrounds, could create challenges with adapting and scaling up components of the model outside of the sites where it is currently being piloted</li> </ul>	<ul style="list-style-type: none"> <li>Patients with positive experiences, and those who view innovative models of care as being beneficial to them as individuals, may disagree with the results and push back on decisions that include ceasing to provide the same kind of services</li> </ul>
<b>Care provider</b>	<ul style="list-style-type: none"> <li>Providers involved in caring for heart-failure patients may be overstretched, and have limited capacity to become involved in determining how to prepare for the adoption of promising new innovations</li> </ul>	<ul style="list-style-type: none"> <li>Providers may not feel that their standard approach to care for heart-failure patients needs to change in light of the results, particularly if they are responsible for the care of patient groups not well represented by those enrolled in the COACH trial</li> </ul>	<ul style="list-style-type: none"> <li>Providers who have patients that seem to benefit at the individual level from innovative models of care may be unsupportive of ceasing to provide the same kind of services</li> </ul>
<b>Organization</b>	<ul style="list-style-type: none"> <li>Organizations may not have adequate human and financial resources to allocate to strategic planning related to rapid learning</li> </ul>	<ul style="list-style-type: none"> <li>Organizations providing services for heart-failure patients may not have the administrative or financial flexibility to adopt a new model of care in the short or medium term</li> </ul>	<ul style="list-style-type: none"> <li>Organizations may not be able to prioritize planning processes that are rooted in inconclusive or negative results</li> </ul>
<b>System</b>	<ul style="list-style-type: none"> <li>There may be no system-level imperative to make adjustments that are necessary for rapid learning without concrete (and positive) results to drive the process</li> </ul>	<ul style="list-style-type: none"> <li>Decision-makers with the ability to champion an innovation in Ontario such as COACH may have many other health-system priorities competing for their attention</li> <li>Governance arrangements (e.g., decision-making authority) and financial arrangements (e.g., organizational funding arrangements) to support widespread adoption of the COACH model across the province can be very challenging to change, and may not be realistic in the short or medium term</li> </ul>	<ul style="list-style-type: none"> <li>There may be no system-level imperative to take additional steps towards planning for new innovations without positive results to drive the process</li> </ul>

		<ul style="list-style-type: none"> <li>Governance arrangements and financial arrangements may limit the extent to which the COACH model can be integrated with the existing continuum of care for heart-failure patients or with care for common co-morbidities</li> </ul>	
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A number of potential windows of opportunity could be capitalized upon (Table 6), which also need to be factored into any decision about whether and how to pursue the approach elements.

**Table 6: Potential windows of opportunity for implementing the elements and two sub-elements**

Type	Element 1 – Prepare the health system for rapid learning about the promising innovations included in the COACH trial while they are being tested	Element 2a – Develop a plan for scaling up rapid follow-up clinics if they are shown to be effective in the COACH trial	Element 2b – Establish an approach for moving forward if promising innovations included in the COACH trial are inconclusive, ineffective or harmful
<b>General</b>	<ul style="list-style-type: none"> <li>Increasing emphasis in the province on addressing persistent health-system challenges directly relevant to improving access to care and outcomes for heart failure (e.g., emergency-department overcrowding and limited hospital resources)</li> <li>The importance of supporting rapid-learning health systems is increasingly acknowledged in Ontario and nationally</li> </ul>		
<b>Element/option-specific</b>	<ul style="list-style-type: none"> <li>Awareness about the COACH trial among cardiologists and emergency physicians may be used as opportunity to engage them and other key stakeholders in initial discussions about planning for implementation and scale up</li> </ul>	<ul style="list-style-type: none"> <li>Provincial government emphasis on achieving efficiencies and reducing ‘hallway medicine’ could be leveraged to gain support for widespread implementation if the trial is shown to be effective</li> </ul>	<ul style="list-style-type: none"> <li>Sticking with the status quo and moving forward without a new model may be more feasible in a system where the dominant focus is finding cost savings</li> </ul>

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## APPENDICES

The following tables provide detailed information about the systematic reviews identified for each element. Each row in a table corresponds to a particular systematic review and the reviews are organized by element and sub-element (first column). The focus of the review is described in the second column. Key findings from the review that relate to the element 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 heart failure. 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 older adults and in particular those considered frail; women who experience differential access to care and are more reliant on home-care support; ethnocultural groups who are at a higher risk for hospital readmission (urban dwelling western Europeans) or death (urban dwelling East Asians); and those in lower socioeconomic status groups.

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 and economic evaluations relevant to Element 1 – Prepare the health system for rapid learning

Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
Element 1 – Prepare the health system for rapid learning about promising innovations while they are being tested	Examining government’s role in large-scale health-system transformations (1)	<p>This systematic realist review and evidence synthesis drew from both the published literature and current practice regarding large systems transformation generally. The authors identified a lack of literature on large system transformation at the macro level, but were able to identify five evidence-based themes which were validated and modified during two rounds of merit review with international experts.</p> <p>The review found that large system transformation in healthcare systems requires both top-down leadership that is passionately committed to change, as well as distributed leadership and engagement of personnel at all levels of the system. Recommendations for action in this area include facilitating communication and visibility of the transformation efforts by working with those who have a history of leadership in the area, providing a central coordinating body for the change initiative that is isolated from political influence and change, and clearly articulating the goals of the change.</p> <p>The review found that measurement and reporting on progress toward short and long-term goals is critical for achieving effective and sustainable large system transformations. Recommendations for action in this area include providing resources including IT systems for collecting and reporting on measures, establishing independent oversight of measurement development, reporting, and interpretation, and offering equitably distributed rewards and sanctions for the measures.</p> <p>The review found that consideration and acknowledgment of historical context will help avoid unnecessary pitfalls and increase buy-in and support from stakeholders. Recommendations for action in this area include carefully assessing organizational readiness for transformation, and storing and reporting information about past change efforts, especially efforts that were unsuccessful.</p> <p>The review found that large system transformation in healthcare systems relies on significant physician engagement in the change process. Recommendations for action in this area include working with educational institutions and regulatory bodies to modify initial and continuing training</p>	Not reported	3/9 (AMSTAR rating provided by McMaster Health Forum)	Not reported	Not reported	Not reported

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
		<p>curricula to provide skills and roles that are consistent with transformational efforts, engaging physicians and other health professionals in policy development, and providing funding, regulations, and incentives for physician engagement.</p> <p>The review found that large system transformation that aims to increase patient-centredness requires significant engagement of patients and families in the change process. Recommendations for action in this area include setting up independent governance and advisory mechanisms for health care institutions and bodies at the provincial, regional, and local levels, ensuring the right players are involved in the change process through adequate funding and compensation, and collecting information on patients' wishes through robust surveys or other data collection methods, while being careful to ensure that patient engagement is not reduced to patient satisfaction surveys alone.</p>					
	<p>Enabling evidence-informed decision-making at the program management level (2)</p>	<p>This review identified 14 relevant papers to be included in the systematic review, following a comprehensive search for published, peer-reviewed, and grey literature that explores the use of evidence in program management. Papers were included only if they were examining evidence use in OCED (Organisation for Economic Cooperation and Development) countries. Results were summarized through narrative review.</p> <p>The review identified multiple barriers to evidence use. In general, barriers experienced by managers were informational, including availability of relevant research that could be used to make decisions at the local level, and organizational structure and process-related, including problems linked to the complex nature of organizational decision-making and the challenges of integrating evidence therein. Seven studies reported individual barriers to evidence use and seven studies reported organizational culture as a barrier.</p> <p>Informational barriers to evidence use included irrelevance of research, unclear definition of evidence, negative perceptions of research, limited access to information, mismatch of research to complex reality, time required to produce research, and excess quantity of information.</p> <p>Organizational (structure and process) barriers to evidence use included time limitations, lack of internal research resources, human resource constraints,</p>	<p>2011</p>	<p>6/9 (AMSTAR rating provided by McMaster Health Forum)</p>	<p>10/14</p>	<p>0/14</p>	<p>0/14</p>

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
		<p>financial constraints, lack of data and systems, deficient planning processes, absence of processes, poor support from senior management, rigid program silos, competing priorities, and poor communication. Organization (culture) barriers to evidence use included decision-making, crisis management, resistance to change, politically influenced decisions, and challenging the promotion of evidence use.</p> <p>The review also identified 10 studies that included facilitators for evidence use in program management. The majority of facilitators for evidence use experienced by managers were informational, followed by organizational (structure and process) and organizational (culture), all within a framework of individual skills or interaction.</p> <p>Informational facilitators to evidence use included access to information, complex intervention-evaluation methods, and targeted dissemination. Organizational (structure and process) facilitators included intra-organizational linkages, expertise in research utilization, processes for integration of evidence, administrative support, and operational data availability. Organizational (culture) facilitators included supporting evidence use, human resources training and rewards, inter-organizational collaboration, and visible research utilization.</p>					
	<p>Identifying structural, organizational, provider-, patient-, and innovation-level measurement tools relevant to assessing the implementation of health innovations (3)</p>	<p>The systematic review's comprehensive search strategy identified 62 measurement tools that were relevant to the research question. Most of these measurement tools assessed only one type of factor that can affect implementation outcomes. The review categorized collected information into five types of factors that can affect implementation outcomes: organizational, structural, provider, patient, and innovation factors. Implementation outcomes considered by the review were adoption, fidelity, implementation cost, penetration, and sustainability. Roughly three-quarters of the measurement tools that were assessed by the review were either developed for or implemented in healthcare settings, particularly in the context of measuring factors having an impact on the adoption of clinical practice guidelines.</p> <p>Many of the measurement tools included in the review were not assessed for criterion validity in their original validation studies or subsequent publications identified through the review's searches, limiting the review's</p>	<p>2012</p>	<p>4/10 (AMSTAR rating provided by McMaster Health Forum)</p>	<p>10/62</p>	<p>Not provided</p>	<p>Not provided</p>

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
		<p>ability to reach conclusions about the utility of those tools. The only implementation outcomes that were measured by tools with validated criterion validity were adoption, and more infrequently, fidelity; no measurement tool included in the review that assessed implementation cost, penetration, or sustainability was found to have been validated for criterion validity.</p> <p>The type of implementation outcomes measured by the tools included in the review varied widely: constructs included funding and policy support, patient benefit, patient characteristics, hospital characteristics, provider perceived confidence and control, patient interest in treatment, and management support.</p>					
	<p>Examining factors that affect the sustainability of new programs and innovations (4)</p>	<p>The systematic review identified 125 studies that were relevant to examining the sustainability of a new program or innovation. A large majority of the included studies were health-related. Of the 125 studies, 41 reported on medical interventions or healthcare programs, 42 reported on public-health or health-promotion programs, 33 reported on mental or behavioural-health interventions, and nine reported on educational interventions. Most of the studies were methodologically weak, naturalistic and retrospective. A majority of the studies included in the review did not provide an operational definition of sustainability, and fewer than half of included studies appeared to be guided by a published definition or model of the concept. Additionally, few included studies employed independent evaluation or observation. Roughly half of the studies used interviews or self-reported measures to assess sustainability.</p> <p>Though review findings were limited, it was noted that there was a high rate of “partial sustainability” across the included studies, meaning that some elements of a new intervention or program were sustained, while other elements were discontinued after or during implementation. It was not possible to determine the impact of partial sustainability on outcomes for program participants, and studies did not reveal the process by which elements of a program were identified for removal, and subsequently discontinued.</p> <p>Among studies that reported on provider-related outcomes, fewer than half of the observed providers sustained newly introduced practice(s) at a “high</p>	<p>2011</p>	<p>3/9 (AMSTAR rating provided by McMaster Health Forum)</p>	<p>5/125</p>	<p>0/125</p>	<p>0/125</p>

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
	Examines the diffusion of innovation in service-delivery organization (5)	<p>level of skill, intensity, or fidelity” upon follow-up. Reviewers note that the study of factors that have an impact on sustainability is a small but developing field, and recommend further study.</p> <p>The review included a total of 495 sources (including grey literature), of which 213 of the sources were empirical studies and 282 were non-empirical. The review was focused on health services, but included sources from various research traditions that the authors identified, including rural sociology, medical sociology, communication studies, marketing, development studies, health promotion, evidence-based medicine, structural determinants of organizational innovativeness, studies of organizational process, context, and culture, inter-organizational studies, knowledge utilization, narrative studies, and complexity studies. Authors note that each of these research traditions has its own conceptualization of the diffusion of innovations. The review identified potential determinants that support the diffusion of innovations.</p> <p>The review found that linkage at the development stage supports diffusion. The evidence suggested that an innovation that is centrally developed (e.g., in a research centre) is more likely to be widely and successfully adopted if the developers or their agents are linked with potential users at the development stage in order to capture and incorporate the user’s perspective.</p> <p>Additionally, the review found that if a change agency is part of a dissemination program, the connection between the change agency and adopter organizations can have an impact on both the likelihood that the innovation will be adopted, and subsequently the likelihood that implementation will succeed. Factors found to promote adoption and increase implementation success were supportive and positive human relations, as well as shared resources, language, and value systems between the change agency and adopter organizations.</p> <p>Among studies included in the review, it was found that adoption and implementation success at adopter organizations was facilitated by external change agents who had credibility and homophily with the providers who will be users of the innovation. The ability for external change agents to share feedback from innovation users with developers of the innovation was also associated with increased effectiveness.</p>	2003	6/9 (AMSTAR rating provided by McMaster Health Forum)	Not reported	Not reported	Not reported

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
	Examining the use of time-driven activity-based costing in healthcare (6)	<p>Twenty-five articles were included in the systematic review. Time-driven activity-based costing, the cost-component of value-based healthcare, was found to be applicable in healthcare to efficiently cost processes. While time-driven activity-based costing has been shown to address the challenge of costing conditions in healthcare, its ability to inform bundled payment reimbursement has not been well-established.</p> <p>The study suggests that time-driven activity-based costing should be gradually implemented into functional systems while ensuring that we remain cautious of replacing existing systems.</p>	2016	2/9 (AMSTAR rating provided by McMaster Health Forum)	1/26	0/26	0/26
	Implementing best-practices into healthcare organizations (7)	<p>The review identified major themes of organizational-level factors, context, and processes that influence evidence-based practice in healthcare. These include: the selection of evidence-based practice, use of a needs assessment, linkage to the strategic direction, organizational culture, internal social networks, resources, leadership, the presence of champions/mentors, standardization of processes, role clarity of staff, and presence of social capital.</p> <p>The review found a lack of research and several gaps on the barriers and facilitators to the sustainability of evidence-based practice in healthcare. In particular, there was a lack of longitudinal research demonstrating the relationship between organizational characteristics and the uptake, implementation and sustainability of evidence-based practice. Existing studies also failed to provide detail concerning the cost of adopting and using new practices.</p>	2014	4/9 (AMSTAR rating provided by McMaster Health Forum)	7/30	0/30	0/30
	Examining evidence-based and value-based decision-making about healthcare design (8)	<p>The study proposed a research-based and value-based design framework for communicating the life-cycle costs and savings of evidence-based design interventions to stakeholders involved in the process of planning, design, construction operation, and evaluation of healthcare facilities. Six cases, as identified by a literature review, were evaluated for financial returns of evidence-based investments, utilizing engineering economy tools.</p> <p>Calculated net present values, internal rates of return, and pay-back periods indicated that the long-term benefits of interventions substantially outweighed the costs of intervention. A considerable return on investment (ROI) resulted from improved clinical outcomes in all the evidence-based design cases. The highest New Present Value was found in cases that used</p>	2015	No rating tool available for this type of document	n/a	n/a	n/a

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
		single-patient rooms in an intensive-care unit and neonatal intensive-care unit to reduce hospital-acquired infections. Overall, effective evidence-based design interventions had major financial benefits with short pay-back periods.					
	Use of knowledge-exchange portals in evidence-informed decision-making (9)	<p>The systematic literature review included 15 articles, including eight case studies, six evaluation studies and one commentary article.</p> <p>The review examined knowledge-exchange portals in the context of knowledge access, knowledge creation, and knowledge transfer and exchange, but findings were limited when assessing the success of knowledge-exchange portals in these areas. Authors identified factors that users wanted and did not want in knowledge-exchange portals. One study found that portal users wished to have interactive features and convenient access to published evidence that had been sorted and rated. Two studies found that users wanted to be provided with links to relevant websites outside the knowledge-exchange portal, and one study noted that search functions that were time consuming or complex to use could frustrate users.</p> <p>Two of the knowledge-exchange portals examined in the study had increased usage (number of unique visits) over time, however user retention was a recurring issue. An unrelated knowledge-exchange portal found that adding additional knowledge-translation strategies (such as webinars, videos, and tailored email updates) increased the amount of time users spent per visit to the portal from 35 seconds to upwards of four minutes.</p> <p>Authors conclude that further research is necessary to determine whether knowledge-exchange portals can support evidence-informed decision-making.</p>	2013	4/9 (AMSTAR ratings provided by McMaster Health Forum)	7/15	0/15	0/15

**Appendix 2: Systematic reviews and economic evaluations relevant to Element 2 – Establish an approach for moving forward if promising innovations are inconclusive, ineffective or harmful**

Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
<p>Element 2 – Establish an approach for moving forward if promising innovations are inconclusive, ineffective or harmful</p>	<p>Examining the sustainability of new programs and innovations (4)</p>	<p>A review of 125 studies on sustainability was included to examine influences on the sustained use of new practices, programs or interventions.</p> <p>The review determined that influences included organizational context, capacity, processes and factors related to the new program/practice themselves. Consideration should be given to the interactions among influences at varying levels, as well as issues on fidelity, modification, and changes in implementation over time.</p> <p>Key findings indicate that partial sustainability was more common than continuation of an entire program or intervention, but no studies indicated the nature or reasons for the change. Fewer than half of the providers studied continued the practice/intervention at high levels of fidelity. There has been an increase in the number of studies reporting data on sustainability of patient- or recipient-level benefits.</p> <p>Limited research is available on the extent, nature, or impact of adaptations to interventions/programs following implementation. Recommendations call for a clearer definition and conceptual framework of sustainability.</p>	<p>2011</p>	<p>3/9 (AMSTAR rating from McMaster Health Forum)</p>	<p>5/125</p>	<p>0/125</p>	<p>0/125</p>

**Appendix 3: Systematic reviews and economic evaluations relevant to Element 3 – Develop a plan for scaling up rapid follow-up clinics if they are shown to be effective**

Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
Element 3 – Develop a plan for scaling up rapid follow-up clinics if they are shown to be effective	Developing a framework for monitoring development and uptake of health innovations (10)	<p>Sixty-nine articles were included in a scoping review to identify pre-existing dialogue or tools that aid innovators and decision-makers in implementing and scaling up innovations. No such tool was identified.</p> <p>Thus, the development of the Nose to Tail Tool (NTT), an atheoretical, stage-based tool, aims to: 1) identify the stage of the process that the idea is at; 2) address key considerations from three stakeholder perspectives (innovators, end users, decision-makers); and 3) identify contextual barriers (social and physical environment, health system, regulatory/political/economic environment).</p> <p>The tool utilized the 16 most commonly described stages of innovation development and the six contingency factors (three critical stakeholder groups and three broader contexts) as the rows and columns respectively. Designed in a deliberative and collaborative fashion, it is meant as a guide in the innovation process to identify potential problems and facilitate early medication.</p>	Not reported	2/9 (AMSTAR rating provided by McMaster Health Forum)	2/ 63	0/63	0/63
	Examining models and success factors for scaling up public-health interventions (11)	<p>The narrative review identified eight frameworks focusing on scaling up health interventions in low- and middle-income countries. Three of those focused on scaling up specific health interventions, while five focused on general frameworks.</p> <p>Several key success factors were identified, including the establishment of monitoring and evaluating systems, cost and economic modelling of intervention approaches, strong leadership and governance, active engagement of implementers and the target community, and tailoring the approach to local contexts. For effective scaling up, conceptual frameworks and systematic use of evidence is necessary.</p>	2013	4/9 (AMSTAR rating provided by McMaster Health Forum)	N/A	N/A	N/A
	Staff-reported barriers to the implementation of hospital-based interventions (11)	<p>Forty-three papers included in the systematic review grouped barriers and facilitators to implementation of patient-focused interventions, as identified by staff, into three main domains: system, staff, and intervention. Twelve distinct categories of barriers or facilitators existed.</p> <p>System-level barriers and facilitators included environmental context,</p>	Not reported	7/9 (AMSTAR rating provided by McMaster Health Forum)	6/43	0/43	0/43

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
		<p>culture, communication processes, and external requirements. Staff-level factors included staff commitment and attitudes, understanding and awareness of role identity and skills, abilities, and confidence. Intervention-level factors included the ease of integration, face validity and evidence based, safety, legal, and ethical concerns, and supportive components.</p> <p>Associations between the domains were bi-directional, with the strongest links between staff and intervention. These 12 key domains and three overarching domains must be considered to support effective implementation in the hospital setting.</p>		Forum)			
	Decision-making criteria for priority setting (12)	<p>A systematic review of 33 peer-reviewed and grey literature papers examined the criteria used by decision-makers in ‘real world’ settings. It determined that the most frequently used decision criteria included program effectiveness, equity, affordability, cost-effectiveness, and the number of beneficiaries. The decision-making method and the relative economic strength of the country in which preference elicitation exercises occurred did not have a strong effect on what types of criteria was chosen.</p> <p>The review determined that while health-specific decision-making criteria are important, criteria relating to organizational and political considerations are also important elements. Other findings suggested that fewer than half of the articles included in the review focused on health economic evidence, while issues related to equity and fairness were foremost in the process, followed by program effectiveness and affordability.</p>	2013	5/9 (AMSTAR rating provided by McMaster Health Forum)	12/33	0/33	0/33
	Effectiveness of remote patient monitoring of patients with heart failure (13)	<p>A total of 27 systematic reviews were included in the overview. The type of remote patient-monitoring intervention varied widely between the included systematic reviews, varying from simple telephone-based monitoring to more advanced and comprehensive technology-based remote patient-monitoring interventions. The interventions included telemonitoring, home telehealth, mobile phone-based monitoring, and videoconferencing. The length of follow-up for the interventions also differed widely, from 30 days to 26 months.</p> <p>Most commonly, the outcomes identified by the included systematic reviews were all-cause mortality and heart-failure mortality. Other systematic reviews reported outcomes such as quality of life,</p>	2015	No rating tool available for this type of document	4/19	0/19	19/19

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
		<p>rehospitalization, emergency-department visits, and length of stay in hospital. Self-care and knowledge were less commonly identified.</p> <p>The review concluded that telemonitoring and home telehealth were found to be broadly effective in reducing heart-failure rehospitalization, all-cause hospitalization, and mortality. The telemonitoring intervention that was shown to be effective collected key clinical data: blood pressure, heart rate, weight, and ECG. Healthcare professionals who seek a more rigorous and stronger rapid prompting method intervention that is evidenced to improve clinical outcomes of patients with heart failure may adopt telemedicine key elements.</p> <p>The included systematic reviews also demonstrated that other interventions, predominantly the use of mobile phone-based monitoring and videoconferencing, show promise, but require further study to determine their utility. Although the authors argue the current evidence is not sufficient to support the effect of mobile phone and video monitoring on heart-failure mortality or healthcare utilization, it was evident that their uptake and adherence is high.</p>					
	Examining patient experience of remote telemonitoring for heart-failure patients in a rural setting (14)	<p>A total of 11 reviews met inclusion criteria for the literature search. Authors noted that there was limited literature generally on patient experiences with remote telemonitoring for heart failure, and authors were not able to identify any studies that focused specifically on patient experiences with remote telemonitoring in a rural setting. The outcomes measured in the 11 studies varied and included hospitalizations, quality of life, patient perceptions, difficulties encountered by patients, usage, all-cause mortality, patient knowledge and self-care, and total time spent in hospital. The majority of available literature focussed on the primary outcomes of mortality, cost effectiveness and hospitalizations. This was also reflected in the reviewed literature which showed few studies reported on adherence and acceptance or satisfaction with telemonitoring.</p> <p>Of studies that did report on adherence and acceptance or satisfaction with telemonitoring, the outcomes were varied, with a systematic review and meta-analysis reporting acceptance and satisfaction rated between 76% and 100%, another showing good acceptance of 80–90%, compared with another reporting dropout rates of 55% at completion of the trial. However, of the studies that did report on the patient experience,</p>	2014	3/9 (AMSTAR rating provided by McMaster Health Forum)	0/11	0/11	11/11

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		<p>acceptance, adherence or satisfaction with telemonitoring, there was limited data available to identify and discuss the factors that influenced these outcomes.</p> <p>One study noted that the acceptance of telemonitoring and assistive technologies was reliant on whether the intervention was perceived to support or undermine an individual’s sense of identity. Participants in this study reported concerns about the impact telemonitoring had on their autonomy and self-management of their condition, including undermining their self-perceptions of health status. Patients in this cohort also reported that telemonitoring interventions threatened to undermine their sense of control over their management of their heart failure, suggesting further education was required surrounding the role of telemonitoring in supporting self-management to increase adherence. The findings of an included randomized controlled trial supported this assertion, and showed that ongoing patient education and supporting self-management may improve patient compliance.</p> <p>In some patient groups an inability to operate telemonitoring equipment was a barrier to acceptance and required users to develop skills to use the equipment. It was also required to ensure that patient perceptions of telemonitoring were realistic, as many had refused to participate due to inaccurate expectations, misunderstandings and unanswered questions. It was hypothesized that without sufficient education to promote realistic perceptions, only patients familiar with technology accepted the intervention, leading to unreliable results. The communication style and delivery of information was important in promoting uptake and adherence.</p> <p>Practical operating barriers and difficulties identified suggest that adequate installation and technical support is necessary for patients in using telemonitoring, especially those who were unfamiliar with technology, or living in a rural setting. As this technology has been identified to improve access for geographically isolated individuals, ensuring adequate connection to the internet and data transmission is vital to promote efficacy of the intervention and support of the patient.</p>					
	Clinical effectiveness and cost-effectiveness of home	This systematic review conducted a network meta-analysis and built a Markov model to analyze the impact and cost-effectiveness of different modalities of remote monitoring for patients with heart failure recently	Not provided	No rating tool available	Not provided	Not provided	Not provided

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Element	Focus of systematic review or economic evaluation	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 access and outcomes of care for heart failure
	telemonitoring or structured telephone support for adult patients who have been recently discharged (15)	<p>discharged from hospital. The review did not include cardiovascular monitoring devices. Authors noted heterogeneity in the packaging of remote monitoring and usual care across the U.K. health system, therefore the cost-effectiveness analysis was undertaken using a set of scenarios meant to accurately reflect the costing, as it would be in different configurations of usual care and remote monitoring in the U.K.</p> <p>The meta-analysis concluded that remote monitoring was effective at reducing all-cause mortality when delivered as structured telephone support with a human-to-human interface, telemonitoring during office hours, and telemonitoring 24/7. These results fell below statistical significance; however, authors note that when a study that provided better than usual care to the control group is excluded from analysis, the reductions in all-cause mortality are statistically significant. Authors describe telemonitoring as the electronic transmission of physiological data to a healthcare team, and structured telephone support as the delivery of self-care support to patients via the use of phone calls (typically from specialist nurses, or through machine interfaces).</p> <p>The cost-effectiveness analysis demonstrated that telemonitoring during office hours was the most cost-effective modality of remote monitoring, with an estimated incremental cost-effectiveness ratio per quality-adjusted life-year of \$20,355 CAD, when compared with usual care. Structured telephone support with human-to-human interface had a significantly higher incremental cost-effectiveness ratio per quality-adjusted life year: 228,035 British pounds. Telemonitoring 24/7 was excluded from cost-effectiveness analysis due to what authors described as unsuitability to the U.K. setting. Structured telephone support with human-to-machine contact was also excluded from the cost analysis due to it being dominated by usual care.</p>		for this type of document			
	Examining the effectiveness of remote monitoring strategies to improve outcomes for adults who have been recently discharged (within 28 days)	This review identified 21 randomized controlled trials that enrolled a total of 6,317 patients. Studies were classified by the type of remote monitoring being examined. Modalities of remote monitoring that were found included telemonitoring (subclassified into business hours only or 24/7), structured telephone support (subclassified into structured telephone support with human-to-human contact or with human-to-machine contact), and telemonitoring in combination with structured telephone support. Meta-analysis concluded that when compared with usual care, remote monitoring	Not applicable	7/11 (AMSTAR rating provided by the McMaster Health Forum)	2/21	0/21	21/21

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	<p>following an unplanned admission to hospital due to heart failure (16)</p>	<p>decreased all-cause mortality, though this finding was below statistical significance. Authors note that when one trial that was found to provide better than average support to its control group is excluded from the meta-analysis, the difference in all-cause mortality is statistically significant between the remote monitoring and control groups. Thus, authors conclude that remote monitoring may be most beneficial where “usual” care is of lower quality.</p> <p>Not all types of remote monitoring were effective at reducing all-cause mortality. Human-to-human structured telephone support, telemonitoring during regular office hours, and telemonitoring 24/7 were found to be effective, however structured telephone support with a human-to-machine interface was not. Human-to-human structured telephone support was associated with the largest reduction in all-cause mortality rates. Interestingly, telemonitoring during business hours only was found to be more effective than 24/7 telemonitoring. Telemonitoring 24/7 or during business hours only were associated with modest decreases in all-cause hospitalizations, whereas structured telephone support did not reduce all-cause hospitalizations.</p> <p>Patient satisfaction and adherence with remote monitoring programs were analyzed in five of the studies included in the review. Adherence was found to be between 55.1% and 84% for structured telephone support. Adherence was generally higher for telemonitoring, with rates ranging from 81% to 98.5%. Nearly all studies that examined satisfaction reported positive results, however one study was terminated early because of a large number of patients being unable to operate telemonitoring equipment. Quality-of-life outcomes were conflicted among the included studies, with some studies reporting increased general, physical, and disease-specific quality of life in both telemonitoring and structured-telephone-support arms compared to control, and other trials reporting no significant differences across quality-of-life measures.</p>					
	<p>Identifying models of care that incorporate district hospitals and have relevance to the Australian rural and remote context (17)</p>	<p>This review included a total of 24 studies, of which 21 were peer-reviewed publications and three were from the grey literature. The models of care that the review focused on related specifically to maternal and child health, end-of-life care, cancer-care services, Aboriginal health, surgery and emergency medical care.</p>	<p>2013</p>	<p>6/9 (AMSTAR rating provided by McMaster Health)</p>	<p>Not reported</p>	<p>Not reported</p>	<p>Not reported</p>

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		<p>In analyzing the utility of district (community) hospitals, the review concluded that the district hospitals found in rural and remote parts of Australia, aside from being important symbolic structures, play an important role in the delivery of care to people living in these areas. The district hospitals had the biggest effects at key times in a person's life (e.g., birth, death, acute illness), and enable people to remain in or near their own community with support of a range of services. The district hospitals were also found to play an important role in the "essential fabric" of the community in which they were located, and to be a key player in the vertical integration of health services in Australia.</p> <p>This review found limited evidence on the skill mix required in district hospitals, however the skill mix underpins the extent of service and speciality that can be provided locally, particularly with regard to the provision of surgery and emergency services. International evidence suggests that providing surgical services locally can help increase the sustainability of smaller hospitals because they typically provide high return, short episodes of care. However, this depends on the funding model being used. Similarly, the skill mix of staff required to sustain a functioning emergency department brings a skill base that supports a higher level of expertise across the hospital.</p>		Forum)			
	<p>Reviewing the evidence on equity as a policy goal in the English NHS (18)</p>	<p>A systematic review was conducted of peer-reviewed and grey literature published since 1990, including policy memorandums created by the clinical commissioning groups and other organizations within the NHS and English healthcare system.</p> <p>The review concluded that despite a stated policy commitment to equity of access in the NHS, the clinical commissioning groups in the English NHS are functioning within a framework that not only allows but encourages great variation and inconsistency between the devolved purchasers of care. Evidence suggests that clinical commissioning groups, which are structurally independent from public-health organizations, have limited capacity and incentive to commission in a manner that will achieve equity. The authors note that concepts of equity of access and health inequalities lack universal definitions.</p>	2015	4/9 (AMSTAR rating provided by McMaster Health Forum)	Not available	Not provided	Not provided





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