Evidence Brief

Supporting Rapid Learning and Improvement Across Ontario's Health System

28 March 2019

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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.

Authors
> Kerry Waddell, M.Sc., Lead, Evidence Synthesis, McMaster Health Forum
>
> Francois-Pierre Gauvin, PhD, Senior Scientific Lead, Citizen Engagement and Evidence Curation, McMaster Health Forum
>
> John N. Lavis, MD PhD, Director, McMaster Health Forum, and Professor, McMaster University

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KEY MESSAGES

What's the problem?
- There are several interrelated factors that underpin the need to support rapid learning and improvement across Ontario's health system:
  - there is (and always will be) room for improvement in the health system;
  - despite the many assets in Ontario's health and research systems, many gaps remain; and
  - there are opportunities to better connect assets in Ontario and leverage pan-Canadian assets.

What do we know (from systematic reviews) about three elements of a potentially comprehensive approach to addressing the problem?
- Element 1 – Support problem-focused rapid learning and improvement
  - This element could include: sharing and supporting the adaptation of tools and mechanisms used to support rapid learning and improvement; adapting the Adopting Research and Improve Care (ARTIC) model to better align with the full rapid-learning health system framework and use it to plan for the scale up and widespread adoption of interventions across the province; and developing a community of practice across the problem-focused areas that could work on the co-production and dissemination of seven reports on practical lessons learned about rapid-learning health systems and next steps to connect assets and address gaps (with one report for each of the seven characteristics of a rapid-learning health system).
  - While there is a paucity of synthesized research evidence about the effectiveness of this element, strategic clinical networks (in Alberta), the ARTIC model (from Ontario), and communities of practice appear promising to support problem-focused initiatives.
- Element 2 – Support local area-focused rapid learning and improvement
  - This element could include: building local capacity (within health organizations and with front-line staff) and establishing dedicated staff to identify improvement priorities; determining what resources are available in (and beyond) local organizations and how they can be effectively harnessed to support rapid learning and improvement; and creating mechanisms for local organizations to ensure the spread of lessons learned from approaches implemented elsewhere and to foster an organizational culture favourable to rapid learning and improvement.
  - While there is a paucity of synthesized research evidence about the effectiveness of this element, there is a rich literature about measuring organizational culture change and organizational readiness for change, about fostering organizational culture change (and its barriers and facilitators), and about sustaining organizational culture change.
- Element 3 – Coordinate efforts to support rapid learning and improvement across the province
  - This element could include: adopting a rapid-learning health systems framework within the ministry and across relevant provincial agencies (within and beyond the health sector); determining who should be responsible for the coordination of efforts to use this framework; and supporting connections among assets at other levels of the system.
  - A low-quality systematic review examined attempts to adopt the rapid-learning health-system paradigm, with an emphasis on implementation and evaluating the impact on current medical practices, and found minimal focus on evaluating impacts on healthcare delivery and patient outcomes.

What implementation considerations need to be kept in mind
- While many barriers to implementing these elements may exist at the level of patients, providers, organizations and systems, perhaps the biggest barrier lies in achieving agreement to adopt, and an accountability to deliver on, a rapid-learning health-system orientation, as well as the complexity of coordinating and 'joining up' the many different assets across the system and at the pan-Canadian level.
- Windows of opportunity for implementing these elements might include that the rapid-learning health system framework and related concepts are gaining traction in Ontario and across Canada.

REPORT

Ontario has both a health system and a research system that are increasingly aiming to support rapid learning and improvement. In the health system, one step in this direction was the passing and subsequent implementation of the *Patients First Act* in 2016.(1-4) This led to significant changes, including: 1) the creation of Health Links that are forging partnerships among providers and organizations to better meet the needs of frequent service users; 2) experimentation with funding models (known as 'bundled care') to promote greater integration in healthcare delivery, drive high-quality and efficient care, and improve patient experiences and outcomes; and 3) the establishment of the Patients' Ombudsman to champion fairness in health organizations across the province. In the research system, one step in this direction was the creation and operationalization of the Ontario Strategy on Patient-Oriented Research (SPOR) SUPPORT Unit, which has enabled the local implementation of the pan-Canadian strategy in Ontario by funding patient-oriented research and building capacity among patients, providers, policymakers and researchers to support the conduct and use of patient-oriented research.(5)

Yet, Ontario's health system still faces complex challenges, such as reducing emergency-room wait times, ending 'hallway medicine,' improving support for people with mental health and substance-use problems, and providing optimal care to a growing aging population.(6) To contend with these challenges, the government recently introduced *The People's Health Care Act*, which will enact the *Connecting Care Act* and amend and repeal a number of existing acts and regulations.(7) These acts will trigger substantial system redesign, including:

- the consolidation of the province's six arm's-length agencies (i.e., Cancer Care Ontario, eHealth Ontario, Health Quality Ontario, Health Shared Services Ontario, HealthForce Ontario Marketing and Recruitment Agency, and Trillium Gift of Life Network) with the 14 Local Health Integration Networks into a single agency to be called Ontario Health;
- the creation of Ontario Health Teams to provide seamless access to various types of health services, which could include home and community care, primary care, hospital care, and residential long-term care, as well as mental health and addictions care and palliative care; and
- the institutionalization of the Minister's Patient and Family Advisory Council as a permanent advisory body to provide patient and family insights on key health priorities.

Box 1: Background to the evidence brief

This evidence brief mobilizes both global and local research evidence about a problem, three elements of a potentially comprehensive approach for addressing the problem, and key implementation considerations. Whenever possible, the evidence brief summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies and to synthesize data from the included studies. The evidence brief does not contain recommendations, which would have required the authors of the brief to make judgments based on their personal values and preferences, and which could pre-empt important deliberations about whose values and preferences matter in making such judgments.

The preparation of the evidence brief involved five steps:
1) convening a Steering Committee comprised of representatives from the partner organizations (in this case, the Ontario Ministry of Health and Long-Term Care and the Ontario SPOR SUPPORT Unit) and the McMaster Health Forum;
2) developing and refining the terms of reference for an evidence brief, particularly the framing of the problem and three elements of a potentially comprehensive approach for addressing it, in consultation with the Steering Committee and a number of key informants, and with the aid of several conceptual frameworks that organize thinking about ways to approach the issue;
3) identifying, selecting, appraising and synthesizing relevant research evidence about the problem, elements of a potentially comprehensive approach to address the problem, and implementation considerations;
4) drafting the evidence brief in such a way as to present concisely and in accessible language the global and local research evidence; and
5) finalizing the evidence brief based on the input of several merit reviewers.

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

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

This redesign provides a unique opportunity to take stock of the health and research system assets that exist within each of these agencies, at each level of health system and across the different parts of the health system to determine how they can best be joined up to maximize their value. The redesign also provides an opportunity to ask how a rapid-learning health-system approach – if 'baked into' the redesign and its implementation from the beginning – could assist with ensuring that the redesign (and course corrections based on rapid feedback and real-time learning) continually 'moves the needle' in ways that matter most to patients and families.(8; 9)

In the sections that follow, we propose a definition of a rapid-learning health system and its key characteristics. We then describe the range of challenges associated with supporting rapid learning and improvement across Ontario's health system. Following this, we discuss three elements of a potentially comprehensive approach for addressing these challenges (including what is known from the best available research evidence about these elements), as well as key implementation considerations associated with each element.

Definition of a rapid-learning health system

The concept of a 'learning healthcare system' was originally developed by the U.S. Institute of Medicine (IoM). It was defined as a system in which "science, informatics, incentives, and culture are aligned for continuous improvement and innovation, with best practices seamlessly embedded in the delivery process and new knowledge captured as an integral by-product of the delivery experience."(10) A recent search of the literature found no new definitions of a rapid-learning health system that went substantively beyond the original IoM definition.(8)

There are four challenges to using this definition 'as is' in Ontario's health system:
1) it uses the language 'healthcare system' (at least in early formulations) and not 'health system' as is more commonly used in Ontario and in most other countries (or health and social systems as may be more appropriate in the future as education, housing, social services and other sectors are increasingly engaged in efforts to improve health outcomes);
2) it is silent on how improving the patient experience needs to be considered alongside the other parts of the 'triple aim' of a health system, namely improving population health and keeping per capita costs manageable (or of the 'quadruple aim,' which adds improving the provider experience);
3) it focuses primarily on the clinical encounter and not the full range of self-management, clinical encounter, program, organization, local and provincial health authority (e.g., Ontario Health Teams and Ontario Health, respectively), and government levels that are relevant in Ontario; and
4) it uses some labels for the categories of the characteristics of a learning health system that are not commonly used in Ontario, such as informatics instead of data, science instead of (research) evidence, and incentives instead of decision supports and governance, financial and delivery arrangements.

For the purpose of this evidence brief, we define a rapid-learning health system as the combination of a health system and a research system that 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. A rapid-learning health system can be implemented at all levels – self-management, clinical encounter, program, organization, local and provincial health authority, and government.(8; 9)

The concept of a rapid-learning health system at the government level has an analogue in what has been called 'radical incrementalism,' which couples small incremental policy changes that focus on improving cost-effectiveness with small-scale and tightly focused evaluations that identify which policy changes improved cost-effectiveness and warrant keeping.(11)

We use the word 'patients' here to mean:
1) patients in the usual sense of those receiving care in the health system;
2) potential patients who need care, whether or not they are receiving it now;
3) families of and caregivers to these patients or potential patients;
4) citizens, by which we mean all Ontarians – whether as taxpayers or voters or in other roles, and regardless of their formal citizenship status and whether they may also currently be considered a patient – who should have a voice in the rapid learning about and improvements in the health system; and
5) communities, by which we mean groups of citizens – whether defined by geography, lived experience with particular conditions or treatments (or health determinants), ethnocultural group or other factors – who should also have a voice in the rapid learning about and improvements in the health system.

We use the term 'improvement' not just in the sense of ensuring that care is increasingly safe and effective, but also in ensuring that care is increasingly patient-centred, timely, efficient and equitable. This broader definition of improvement, which was first developed by the IoM and later adopted by many quality councils in Canada,(12; 13) includes addressing both underuse and overuse of healthcare. In addition, we emphasize that rapid learning and improvement can happen at all levels of the system (including self-management, clinical encounter, program, organization, local and provincial health authority, and government levels).

Characteristics of a rapid-learning health system

In Table 1 below, we propose four categories and seven characteristics of a rapid-learning health system (and note that 'all levels' refers to self-management, clinical encounter, program, organization, local and provincial health authority, and government levels).(8; 9)

Table 1: Characteristics of a rapid-learning health system (RLHS)

Category	Characteristic	Examples

Patient-centred	**Engaged patients:** 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	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)
		 2) Engage patients, families and citizens in:
		   a) their own health (e.g., goal setting; self-management and living well with conditions; access to personal health information, including test results)
		   b) their own care (e.g., shared decision-making; use of patient decision aids)
		   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)
		   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)
		   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)
		   f) research (e.g., engaging patients as research partners; eliciting patients' input on research priorities)
		 3) Build patient/citizen capacity to engage in all of the above

Data and evidence driven	**Digital capture, linkage and timely sharing of relevant data:** 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	1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing) 2) Capacity to capture patient-reported experiences (for both services and transitions), clinical encounters, outcomes and costs 3) Capacity to capture longitudinal data across time and settings 4) Capacity to link data about health, healthcare, social care and the social determinants of health 5) Capacity to analyze data (e.g., staff and resources) 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

Category	Characteristic	Examples
	outcome indicators (e.g., health status)	platform (to support patient decision-making and provider, organization and system-wide rapid learning and improvement)
	Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations	1) Distributed capacity to produce and share research (including evaluations) in a timely way 2) Distributed research ethics infrastructure that can support rapid-cycle evaluations 3) Capacity to synthesize research evidence in a timely way 4) One-stop shops for local evaluations and pre-appraised syntheses 5) Capacity to access, adapt and apply research evidence 6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers Note that for Indigenous peoples, this row would ideally be re-conceptualized to include traditional knowledge, however, more broadly the entire framework would need to be assessed by Indigenous leaders to determine if it adds value to Indigenous peoples-led approaches

System supported	**Appropriate decision supports**: Systems support informed decision-making at all levels with appropriate data, evidence, and decision-making frameworks	1) Decision supports at all levels – self-management, clinical encounter, program, organization, local health authority and government – such as
		  a) patient-targeted evidence-based resources
		  b) patient decision aids
		  c) patient goal-setting supports
		  d) clinical practice guidelines
		  e) clinical decision support systems (including those embedded in electronic health records)
		  f) quality standards
		  g) care pathways
		  h) health technology assessments
		  i) descriptions of how the health system works

	Aligned governance, financial and delivery arrangements: 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	1) Centralized coordination of efforts to adapt a RLHS approach, incrementally join up assets and fill gaps, and periodically update the status of assets and gaps 2) Mandates for preparing, sharing and reporting on quality-improvement plans 3) Mandates for accreditation 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) 5) Value-based innovation-procurement model 6) Funding and active support to spread effective practices across sites 7) Standards for provincial expert groups to involve patients, a methodologist, and use existing data and evidence to inform and justify their recommendations 8) Mechanisms to jointly set rapid-learning and improvement priorities 9) Mechanisms to identify and share the 'reproducible building blocks' of a rapid-learning health system
Culture and competencies enabled	**Culture of rapid learning and improvement**: Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability	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'
	Competencies for rapid learning and improvement: 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, local areas 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	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)

Combining characteristics-related assets in 'rapid learning and improvement' cycles

Rapid learning and improvement is about harnessing assets related to each of the seven characteristics (e.g., teams that support robust patient- and public-engagement mechanisms to identify problems and design care and evaluation) in 'rapid learning and improvement' cycles (see Figure 1, where the cycle begins at 12 o'clock and then moves clockwise). The language used in these cycles often varies by level, and the language used here is more in keeping with the clinical encounter, program and organization levels than with the patient or government levels.

Figure 1: Rapid learning and improvement cycle

Aim of the evidence brief

This evidence brief aims to inform deliberations about how to support rapid learning and improvement across Ontario's health system. In doing so, the brief explores the overarching question of how to make the rapid-learning health system framework actionable in Ontario. It mobilizes the best available data and evidence on this topic, including two rapid syntheses on rapid-learning health systems published by the McMaster Health Forum in 2018. The first one examined the creation of a rapid-learning health system in Ontario (with a focus on identifying assets and gaps).(9) The second examined the creation of rapid-learning health systems in Canada, with a focus on identifying the assets and gaps across Canadian jurisdictions, windows of opportunity that can be capitalized on or created to stimulate the development and consolidation of rapid-learning health systems across Canada, and any interdependencies or issue-based commonalities among Canadian jurisdictions that can be used as a focal point to facilitate pan-Canadian collaboration.(8)

While the brief strives to address the health and research systems as a whole, where possible, it also gives particular attention to people working in local areas and specific sectors (or working on certain conditions, treatments or populations) that do not have ready access to data analytics and research capacity and/or rapid learning and improvement capacity. This group was prioritized given the potential challenges that such limited capacity may pose in implementing a rapid-learning orientation, and the additional considerations that will be needed to build capacity among these individuals and connect them to assets within the research system.

Box 2: Equity considerations

A problem may disproportionately affect some groups in society. The benefits, harms and costs of elements of a comprehensive approach 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 people working in local areas and specific sectors (or working on specific conditions, treatments and populations) who do not have ready access to data analytics and research capacity, and/or rapid learning and improvement capacity.

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 PROBLEM

The factors underpinning the problem can be broken down into the following three themes: 1) there is (and always will be) room for improvement in Ontario's health system; 2) despite the many assets in Ontario's health and research systems, substantial gaps remain; and 3) there are significant opportunities to better connect Ontario assets and leverage pan-Canadian assets

There is (and always will be) room for improvement in Ontario's health system

Although most Ontarians report being generally satisfied with the care they receive, there remain significant challenges in the system that need to be addressed. For example, the first interim report from the Premier's Council on Improving Health Care and Ending Hallway Medicine identified a number of challenges, including:

- health inequalities across the province;
- misuse of resources in select sectors (e.g., overuse of hospital beds);
- insufficient capacity in select sectors (e.g., long-term care) and in services for specific conditions (e.g., mental health and addictions);
- difficulties experienced by many patients in navigating the system;
- overburdening of caregivers and health providers; and
- challenges receiving timely access to care in the primary-care, specialty-care, and long-term care sectors.(14)

The report also notes that changes like shifting demographics and population-health needs and the introduction of new technologies may further compound these challenges.

> **Box 3: Mobilizing research evidence about the problem**
>
> The available research evidence about the problem was sought from a range of published and 'grey' research literature sources. Published literature that provided a comparative dimension to an understanding of the problem was sought using three health-services research 'hedges' in MedLine, namely those for appropriateness, processes and outcomes of care (which increase the chances of us identifying administrative database studies and community surveys). Published literature that provided insights into alternative ways of framing the problem was sought using a fourth hedge in MedLine, namely the one for qualitative research. Grey literature was sought by reviewing the websites of a number of domestic and international organizations, such as Health Quality Ontario, Office of the Auditor General of Ontario, and Institute for Healthcare Improvement. In addition, many of the tables were adapted from two previous rapid syntheses and information provided from two rounds of key informant interviews, one with 28 key informants in Ontario and a second round with 50 key informants from across Canadian provinces and territories.
>
> 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.

While this provides an overview of some of the areas for improvement, another way of conceptualizing what improvements need to be made in the system is through comparisons to a health system's 'triple aim:' 1) improving the patient experience of care (including quality and satisfaction); 2) improving patient outcomes (or population health); and 3) keeping per capita costs manageable.(15) The framework can also be considered with a fourth dimension – the 'quadruple aim' – which adds improving the provider experience.(13)

Table 2 provides a brief overview of where Ontario's health system is achieving the triple aim and where it is falling behind in various sectors. The table was developed based on recent reports from Health Quality Ontario's 'Measuring Up' series,(16) reports from the provincial Auditor General,(17) and an analysis conducted by the McMaster Health Forum in 2016 as part of our book entitled 'Ontario's health system: Key insights for engaged citizens, professionals and policymakers.'(18) Each point is preceded by a symbol indicating whether the assessments framed them as positive (✓), neutral (-), or negative (X). We have chosen to omit the fourth dimension of the quadruple aim for Table 2, given the paucity of publicly available data that systematically report on the provider experience. However, collecting and reporting on such data could be an important first step towards identifying gaps and areas for improvement on this dimension.

Table 2: Summary of findings from assessments of Ontario's health system, by the triple aim (16-20)

Domain	Improving the patient experience	Improving population health	Keeping per capita costs manageable
Care across sectors	- No assessments identified	✓ Life expectancy is improving and people are losing fewer potential years of life to premature mortality ✗ Life expectancy in the North West and North East LHIN's remain an average of 2.5 years shorter than the rest of Ontario ✓ Tied for first with British Columbia as the highest life expectancy at birth ✗ Rates of potential years of life lost varies by more than two-fold between Mississauga Halton region and the North West region ✗ Rates of obesity and physical inactivity remain relatively high ✗ Rate of opioid-poising deaths has increased from 3.0 per 100,000 in 2003 to 8.9 per 100,000 in 2017	- Total health spending per capita reached $6,110 in 2015, which was lower than most other provinces but ranked mid-range compared to other OECD countries - Annual private per person expenditure has increased by 6.7% between 2011 and 2015 - The health system lags in technical efficiency, eHealth Ontario data (from 2012-13) indicate that 66% of family physicians use electronic medical records, while better than many provinces is significantly less than comparator countries
Care in select sectors - Home and community care	✓ In 2016-17 More than 90% of patients surveyed report having a positive experience with their home care and satisfaction remains high, despite small variations ✗ In 2016-17, 26.1% of people reported having a family member or friend who was a caregiver and experienced continued distress, anger or depression in their caregiving role ✗ Significant variation in the number of caregivers reporting continued distress between Ontario regions ✗ In 2016-17, only six in 10 home-care clients said they felt involved in the development of the plan for the home care they received	✗ In 2016-17 Ontario had the highest percentage among Canadian provinces of home-care clients who reported or showed evidence of daily pain	- No assessments identified
Care in select sectors - Primary care	✗ In 2016-17, 1 in 5 reported that their regular primary-care provider did not seem informed and up-to-date about the care they received from a specialist ✓ In 2017, two out of three people say the wait for primary care is about right ✗ In the same year there was a 20% difference between the percentage of people who are able to see their primary-care provider on the same day or next day when they are sick in the North West LHIN as compared to the provincial average ✗ However, 14.1% said it was much too long reportedly waiting eight days or more to see a primary-care provider ✓ In 2016-17 more than half of those who had more than three visits with a primary-care doctor in the previous two years reported having high continuity of care ✗ However, younger people (19-44) and those in large urban areas were more	✗ 62% of screen-eligible people in Ontario received at least one Pap test within 42 months, less than the 85% target ✗ Those living in lower-income urban neighbourhoods were less likely to be screened during the 42-month period than those in higher-income neighbourhoods	- No assessments identified

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Domain	Improving the patient experience	Improving population health	Keeping per capita costs manageable
	likely to have lower continuity of care than those in other demographics × In 2017, two of five people who went to an emergency department reported that their visit was for something their regular care provider could have managed, with the proportion being higher among rural residents		
Care in select sectors - Specialty care	× In 2016-17 4,233 Ontario hospital beds were occupied each day by patients waiting to receive care somewhere else × The proportion of inpatient hospital beds occupied by patients waiting for care elsewhere varied significantly across regions × Only 32.2% of people reported seeing a specialist less than 30 days after being referred, a decrease from 2016 × 33.5% of people reported waiting 90 days or longer to see a specialist × Less than 90% (the provincial target) of patients are receiving their hip and knee replacement surgeries within the maximum wait time ✓ However, more than 90% of patients who had hip replacement or general surgery had their first appointment with a surgeon within target × Average time spent in emergency department by patients admitted to the hospital increased to 16.0 hours in 2017-18, up from 2016 × Six in 10 people rate their emergency department experience positively ✓ 77% of surgeries last year were performed in hospitals that were part of the Ontario Surgical Quality Improvement Network - Province-wide peer review of MRI and CT scan results is not mandatory across Ontario hospitals, exposing patients and hospitals to the risk of misinterpretation of MRI and CT images	✓ The rate of hospital-acquired C. difficile infection has decreased in Ontario	× In 2017-18, hospitals reported a total of 48,320 MRI appointments where patients did not show up, which cost hospitals about $6.2 million × Inconsistency in rate paid for MRI scans at independent health facilities with some rates reported to be as high as 280% of the rate paid for a similar scan at another facility
Care in select sectors - Rehabilitation care	✓ Progress continues to be made on improving stroke rehabilitation care including increasing the proportion of inpatient stroke rehabilitation patients achieving the active-length-of-stay target	- No assessments identified	× In two sites audited, nearly one-third of patients receiving inpatient rehabilitation care in stroke programs might have been better serviced in less costly outpatient programs if they were available
Care in select sectors - Long-term care	× In 2016-17 half of alternate-level-of-care inpatient days were used for patients waiting for a place in a long-term care home × The median amount of time people waited in hospital before being moved into long-term care was 31.4% longer in 2016-17 than 2015-16 × Substantial difference between Ontario regions in how long people	✓ Reduction in the number of long-term care residents given antipsychotic medications in the absence of documented psychosis ✓ Reduction in the number of long-term care residents reporting experiencing moderate pain daily or any severe pain	- no assessment identified

Domain	Improving the patient experience	Improving population health	Keeping per capita costs manageable
	waited for admissions to long-term care homes	✓ Significant range in rate of falls among long-term care residents across long-term care homes	
Care in select sectors - Public health	- No assessments identified	- No assessments identified	- The total operating cost of the immunization program was approximately $250 million in 2013-14, however the MoHLTC does not track the information required to determine the total costs of delivering the immunization program and as a result cannot ensure that the program is being delivered in a cost-effective manner
Care for select conditions	✓ Fewer children and youths are receiving their first care for a mental health condition in the emergency department ✗ However, there is significant variation across the province in the rate of first-contact visits to emergency departments for a mental illness and addiction ✗ Ontario-wide the rate of follow-up visits with a doctor after a hospitalization for a mental illness or addiction has decreased since 2006 ✗ People from poorer neighbourhoods are more frequently readmitted to hospitals for mental health or addictions - In 2016-17, 25.8% of people reported receiving a home visit from a doctor in the last 30 days of life, an increase from 2011-12 ✓ In 2016-17 the proportion of people who received any home-care visit (including palliative) in their last 30 days of life rose to 51.2% from 47.1% in 2011-12 ✗ More than half of deaths occur in hospital, despite most people saying they would prefer to die at home, however this has decreased over recent years	✓ Reduction in the use of physical restraints among those hospitalized for mental health and addictions ✗ Potential years of life lost due to suicide are nearly three times higher in the North East and North West LHINs than the provincial average	✓ From 2006 to 2015, the capacity and efficient use of radiation machines has increased along with increases in new capital investment and radiation equipment ✓ In 2014, 90% of imaging tests for stage 1 breast cancer patients may have been unnecessary based on clinical practice guidelines
Care using select treatments	- No assessments identified	- No assessments identified	- Public drug spending per person is lower compared to peer countries, however drugs costs have gone up in Ontario as a result of greater use of expensive specialized medicines.
Care for select populations	- No assessments identified	- No assessments identified	- No assessments identified

Evidence >> Insight >> Action

Given the many areas ripe for improvement identified both in the table above and in the interim Premier's Council report, and the reality that there will always be ways that the system can even better achieve the triple (or quadruple) aim, it is important to consider how improvements can be made efficiently and in ways that leverage existing assets. Further, those looking to make improvements are always searching for ways to demonstrate clear results from their work. Adopting a rapid-learning health-systems orientation supports both the implementation of targeted improvements as well as clear monitoring and reporting on any improvements that are made.

Despite the many assets in Ontario's health and research systems, substantial gaps remain

While the list of assets in Ontario's health system is remarkably rich, there remain some key gaps that limit the extent to which a rapid-learning health system can be implemented. Notable gaps include, among others:

- patients being meaningfully engaged in prioritizing what 'needles to move' (in terms of the care experiences and outcomes that are priorities for rapid learning and improvement), or having many mechanisms beyond complaints and voting to register their frustration when 'needles don't move;'
- data about patient experiences (with services, transitions and longitudinally) are often not being linked and shared in a timely way (with many organizations still focused on developing an organization or at best sector-wide electronic health record that will in the near term often not include key sectors like primary care, and on producing one-off or annual data reports rather than many, small, immediately actionable reports);
- research evidence about priority problems and improvement options is often not produced, synthesized, curated and shared in a timely and locally contextualized way to support rapid learning and improvement;
- decision-support systems and functions are often not sufficiently oriented to meeting the needs of patients and families struggling to deal with complex health conditions or navigate a complex health system;
- alignments in governance, financial and delivery arrangements to support rapid learning and improvement are often inadequate or not yet fully in place in key areas such as primary care;
- a culture of rapid learning and improvement is not yet widespread across levels and across areas of focus (particularly the 'rapid' part); and
- competencies in data analytics and research methods in general, and implementation science specifically, are often not sufficiently well distributed to support rapid learning and improvement across levels and across problems or local areas.

In addition to these gaps, Table 3 summarizes how these and other gaps map across each of the seven characteristics of a rapid-learning health system. However, it should be noted that these observations have been made from a systems level and use a general approach to characterize Ontario's health system. In reality, the assets and gaps may vary significantly at different levels and for different problems or local areas. For an example of this, we are providing detailed tables of current assets and gaps: 1) at the provincial level (Appendix A1); 2) at the local level, using the Mississauga Halton LHIN as an example (Appendix A2); 3) in the primary-care sector (Appendix A3); 4) for aging or the elderly population (Appendix A4); and 5) in mental health and addictions (Appendix A5).

Table 3: Notable assets and gaps in Ontario's health system (8; 9)

Characteristic	Notable assets	Gaps
Engaged patients: 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	• Patient Advisors Network supports a membership-based community of independent advisors – both patients and caregivers – who use lived experiences (and build capacity among those with lived experiences) to improve healthcare • Recently announced redesign includes the institutionalization of the patient and family advisory councils at the ministry, and such councils are also mandated for select sectors (e.g., specialty hospital care and long-term care), conditions (e.g., cancer and mental health and addictions) and treatments (e.g., prescription drugs)	• Absence of requirements, incentives or guidance for co-design of publicly funded programs and services • Lack of mandate for the equivalent of patient and family advisory councils in some sectors and for most conditions, treatments (or health determinants) and populations
Digital capture, linkage and timely sharing of relevant data: 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)	• A SPOR national data platform will provide a single point of timely access to a broad range of harmonized healthcare data • Institute for Clinical Evaluative Sciences provides a data management and analytics platform, as well as data and analytic service, to respond to data requests (including for data linkage)	• Lack of standards for the types of patient-experience data to collect and how (e.g., about services, transitions and longitudinally, not just services) across sectors, conditions, treatments and populations, and ongoing uncertainty about what privacy policies mean for sharing data beyond the 'circles of care'
Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations	• CIHR's Strategy for Patient-Oriented Research, including its national networks and provincial SPOR SUPPORT Units, support patient-oriented research • Ontario SPOR SUPPORT Unit funds a joined-up approach across 12 research groups to support rapid learning and improvement	• Limited incentives and no consistent standards for introducing innovations, evaluating them and scaling up proven approaches • Lack of distributed research ethics and rapid-cycle evaluation infrastructure • Uneven capacity among decision-makers to access, adapt and apply research evidence
Appropriate decision supports: Systems support informed decision-making at all levels with appropriate data, evidence and decision-making frameworks	• 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 • Many groups use rigorous and participatory approaches to make recommendations to providers and healthcare institutions about optimal care	• Lack of a patient-targeted 'way in' to the 21 sites that publicly report data about the performance of (select parts of) the health system or to the decision supports available to them
Aligned governance, financial and delivery arrangements: 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	• Federal government has agreed to work with provincial and territorial governments to improve access to treatment services, among other approaches, to address the opioid crisis • New financial arrangements are beginning to or have the potential to incentivize rapid learning and improvement (e.g., Quality-Based Procedures, bundled care models) and	• Lack of centralized coordination of efforts to use this framework, incrementally join up assets and fill gaps, and periodically update the status of assets and gaps at the level of the ministry (e.g., as new funding models are piloted), local areas (e.g., as new reporting templates are developed for Ontario Health Teams),

	to focus attention on patient-reported outcome measures	sectors, conditions, treatments (or health determinants) and populations • Lack of mechanisms to set learning and improvement priorities or to identify and share the 'reproducible building blocks of a rapid-learning health system (e.g., data-sharing agreements; agreements with research-ethics boards about rapid-cycle evaluations)
Culture of rapid learning and improvement: Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability	• Accreditation Canada uses accreditation and related tools to develop and sustain a culture of improvement in health and social services	• Most health organizations do not have a culture of embedding rapid learning and improvement in their operations, of developing and maintaining trusted relationships with the full range of partners needed to support rapid learning and improvement, or of acknowledging, learning from and moving on from 'failure'

Competencies for rapid learning and improvement: 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, and local health authorities about proven approaches), monitor their implementation, evaluate their impact, make further adjustments as needed, sustain proven approaches locally, and support their spread widely	• Five federally funded pan-Canadian health organizations develop competencies and use an array of other approaches to support improvement in select areas:
	  o Canadian Foundation for Healthcare Improvement and Canadian Patient Safety Institute support the spread of healthcare innovations and increases in patient safety, respectively (and the former has supported learning collaboratives in a number of areas)
	  o Mental Health Commission of Canada and Canadian Centre on Substance Use and Addiction support the spread of evidence-based programs and tools in the area of mental health and addictions, respectively
	  o Canadian Partnership Against Cancer supports the spread of evidence-based practices and policies in cancer
	• Many organizations in the specialty (acute) care sector have business intelligence, clinical informatics, decision support, and quality-improvement staff who can support different aspects of rapid learning and improvement
		• Lack of agreement about the competencies needed (e.g., data literacy, co-design, scaling up, and leadership) and which are needed in all organizations versus in more centralized support units
		• Lack of learning collaboratives and other elements of the infrastructure needed to support rapid learning and improvement across local areas, sectors, conditions, treatments (and health determinants) and populations (e.g., to inform what and how to sustain, and what and how to scale up)
		• Uneven understanding among decision-makers about how research can help them, how to find and use existing research evidence, and how to engage researchers when evidence is lacking

There are significant opportunities to better connect Ontario assets and leverage pan-Canadian assets

In addition to having the right assets in place, it is equally important that they are well connected to enable rapid learning and improvement. Creating connections among assets ensures that they are being effectively used to feed information to each phase of rapid learning and improvement, and similarly to support small adjustments that help to meet health-system goals. However, in the process of taking stock of the many assets across specific sectors (primary care), conditions (mental health and addictions), treatments (e.g., prescription drugs) and populations (elderly) for the previous two rapid syntheses, it became clear that relatively few assets have been explicitly linked across the system. For example, Health Quality Ontario's development of MyPractice reports provide practice-level performance data to primary-care providers, however, these reports are only disseminated to those practices that subscribe to them, do not provide comparisons of similar populations, and are not aggregated to provide an overall picture of the performance of primary care in the province. Similarly, in the mental health and addictions 'sub-system,' despite the ad hoc collection of patient-experience data from individuals with lived experience, there are no consistent standards across the sub-system about what information to collect, how it should be reported, or its central storage, thereby limiting its use in decision-making.

With that being said, there are some examples of condition-specific initiatives that are further ahead in enabling these types of connections. For example, Cancer Care Ontario uses a rapid-learning orientation in its research strategy, and the Ontario HIV Treatment Network has recently adopted a rapid-learning orientation for its work on HIV/AIDS. However, even with these efforts in place, they have rarely extended beyond their individual sectors, conditions or treatments to the broader system, maintaining siloed approaches to rapid learning and in turn reducing the likelihood of learning from the experience of others. This final point about enabling system-wide learning is critical given the number of pilot projects that are implemented in the province and the lack of systematic monitoring of their implementation or evaluation of their impacts.

Finally, it should be noted that despite relatively few connections having been established between assets at the system level, the Ontario SPOR SUPPORT Unit is a good example of joining up research assets to support more timely, more patient-oriented and more impact-oriented research. Key opportunities to continue to connect assets identified in the previous two rapid syntheses include:
- at a provincial level:
  - joining up local assets such as local patient-engagement activities, datasets, capacity for the production of timely research evidence, and appropriate decision supports in the process of creating Ontario Health Teams,
  - the amalgamation of regional delivery bodies and arm's-length agencies in Ontario Health could spur greater alignment in support of rapid learning and improvement, and
  - leveraging the quality-improvement experience of Health Quality Ontario within the new mandate for Ontario Health to establish joint learning opportunities and host mechanisms that support these connections; and
- at a pan-Canadian level (to which Ontario could contribute and better leverage existing assets):
  - Advisory Council on the Implementation of National Pharmacare could make recommendations that would support rapid learning and improvement in the coverage and appropriate use of prescription drugs, and
  - pan-Canadian health organizations could support rapid learning and improvement more purposefully and in ways that are more synergistic with provincial initiatives.

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 people working in certain local areas and sectors (or working on certain conditions, treatments or with certain populations) who do not have ready access to data analytics and research capacity and/or rapid learning and improvement capacity.

Ontario is among a relatively small number of jurisdictions globally that hosts a high number of centres and small-to-medium-scale initiatives that can support rapid learning and improvement.(21) However, a significant number of these centres are based within the Greater Toronto and Hamilton Area (GTHA), including Cancer Care Ontario (which hosts a program in evidence-based care), Cochrane Canada, Health Quality Ontario, Institute for Clinical Evaluative Sciences (ICES), and regional office of the Canadian Institute for Health Information (CIHI). While this central location makes sense given it is the major population centre in the province and where much of the provincial government's infrastructure is based, it creates challenges by reducing the extent of interactions and partnerships with organizations outside of the GTHA, particularly those that take shape informally. Given the disparities across the goals of the triple aim (highlighted in Table 2 above) between rural and northern regions and Ontario averages, there is significant room for rural and northern communities to benefit from initiatives that can support rapid learning and improvement, particularly those that can enhance local capacity and enable partnerships with larger-scale efforts in urban centres. While centres like ICES have satellite sites, the travel required for those who work at a distance from any of these sites may restrict the routine use of data to inform decisions. In addition to the geographic restrictions, other considerations include the resource requirements (both time and money) for an organization to train local staff to access, interpret and use available data. Alternatively, an organization must have the resources to pay someone, such as a research analyst at ICES, to undertake the analysis on their behalf.

Capacity and resources available for data analytics and research also differ significantly across those working in different sectors (or working on different conditions and treatments or with different populations). Again, the majority of research infrastructure in the province is coordinated through universities and academic hospitals and only recently has this started to extend out to partnerships with the primary-care and home and community-care sectors. In taking stock of assets and gaps for the previous two rapid syntheses on rapid-learning health systems,(8; 9) significant gaps in the primary-care sector included a lack of distributed model of data and research supports across the sector. Other gaps exist in mental health addictions and include a lack of timely access to data, lack of centralized patient-experience data, and limited capacity for linkage of these data, as well as insufficient capacity among many mental health and addictions researchers to support rapid learning and improvement at all levels. While we did not take stock of assets and gaps across all sectors, conditions, treatments and populations, it is plausible that there will be some areas such as specialty care, cancer care, and prescription and over-the-counter drugs that may not have the types of deficits in research and analytic capacity described above. However, overcoming these limitations and building capacity in sectors such as home and community care, rehabilitation care and long-term care, or for other conditions, presents a significant challenge to moving forward with the widespread adoption of a rapid-learning health-system orientation.

THREE ELEMENTS OF A POTENTIALLY COMPREHENSIVE APPROACH FOR ADDRESSING THE PROBLEM

Many approaches could be selected as a starting point for deliberations about supporting rapid learning and improvement across Ontario's health system. To promote discussion about the pros and cons of potentially viable approaches, we have selected three elements of a comprehensive approach. The elements are:
1) support problem-focused rapid learning and improvement;
2) support local area-focused rapid learning and improvement; and
3) coordinate efforts to support rapid learning and improvement across the province.

The three elements were developed and refined through consultation with the Steering Committee and key informants who we interviewed during the development of this evidence brief. The elements could be pursued separately or simultaneously, or components could be drawn from each element to create a new (fourth) element. They are presented separately to foster deliberations about their respective components, the relative importance or priority of each, their interconnectedness and potential of or need for sequencing, and their feasibility.

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

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

The available research evidence about elements of a comprehensive approach for addressing the problem was sought primarily from Health Systems Evidence (www.healthsystemsevidence.org), which is a continuously updated database containing more than 7,200 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 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 element based on the identified studies. Where relevant, caveats were introduced about these authors' conclusions based on assessments of the reviews' quality, the local applicability of the reviews' findings, equity considerations, and relevance to the issue. (See the appendices for a complete description of these assessments.)

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

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

Element 1 – Support problem-focused rapid learning and improvement

This element focuses on supporting 'problem-focused initiatives' or initiatives addressing recent or current health-system priorities (e.g., shortening emergency-room wait times, ending 'hallway medicine,' improving support for those living with mental health and substance-use problems, and providing optimal care to a growing aging population). Such initiatives could help to mobilize stakeholders (including patients, providers, policymakers and researchers) around common problems, and enable them to work collaboratively to find new and innovative ways to address these problems. Mobilizing stakeholders around specific problems could help to connect assets in the province and leverage pan-Canadian assets, and seek greater alignment among existing health-system arrangements.

Specifically, this element might include:
- sharing and supporting the adaptation of tools and mechanisms used to drive rapid learning and improvement;
- adapting the Adopting Research and Improve Care (ARTIC) model to better align with the full rapid-learning health system framework and use it to plan for the scale up and widespread adoption of evidence-based practices across the province, which includes:
  o strategic selection of interventions that have the potential for high impact (e.g., engage key constituencies across local areas and prioritize areas for local improvement),
  o education and training,
  o guidance and facilitating,
  o executive championship and clear governance structure, and
  o evaluation; and
- developing a community of practice across the problem-focused areas that could work on the co-production and dissemination of seven reports on practical lessons learned about rapid-learning health systems and next steps to connect assets and address gaps (with one report for each of the seven characteristics of a rapid-learning health system).

Tools and mechanisms to drive rapid learning and improvements

We found no systematic review relevant to tools and mechanisms used to support problem-focused rapid learning and improvement. However, the rapid synthesis on creating rapid-learning health systems in Canada highlighted the use of strategic clinical networks to support problem-focused initiatives. Examples of such networks include the critical care and surgical networks in Ontario.(8) Since 2015, Health Quality Ontario supports hospitals to improve surgical care in the province through the Ontario Surgical Quality Improvement Network, a forum in which surgical teams can discuss best practices, share local innovations, and discover ways of improving surgical care. The network provides participating hospitals with data to identify top performers and areas for improvement, and to track progress in surgical quality improvement (with these hospitals accounting for 58% of Ontarians who have surgery).(22) A recent study indicated that the network resulted in increased quality-improvement capacity, the development of a community of practice dedicated to improving surgical care, and improvements in surgical outcomes.(23)

Other Canadian provinces like Alberta have been experimenting with strategic clinical networks. Since 2012, Alberta has developed 16 Strategic Clinical Networks (SCNs) to support learning and improvement in defined sectors, for defined categories of conditions or treatments, or for defined populations (including addictions and mental health, bone and joint health, cancer, cardiovascular health and stroke, critical care, diabetes, obesity and nutrition, emergency, maternal, newborn, child and youth, respiratory health, seniors health, surgery).(24) The SCNs are multi-stakeholder structures and processes bringing together various perspectives, such as patients, clinicians, policymakers and researchers. These collaborative networks aim to achieve the best outcomes, seek greatest value for money, and engage clinicians in all aspects of the work. While the SCNs are 'problem-focused', mechanisms have been put in place to encourage pan-SCNs initiatives.(25) The Alberta model of SCNs served as an inspiration to New Brunswick, which recently created strategic learning units and networks to drive rapid learning and improvement.(8; 26)

ARTIC model

The Adopting Research to Improve Care (ARTIC) program was developed in 2010 by the Council of Academic Hospitals of Ontario and is now co-led with Health Quality Ontario. It aims to accelerate the implementation and spread of research evidence into practice. We found no systematic review examining the ARTIC program. However, an evaluation revealed that the ARTIC "program made the implementation of evidence-based interventions more likely, faster and more consistent with the research evidence."(27) The evaluation also highlighted that funded projects have been sustained (76% reported full sustainability as of 2016) and spread to over 200 new sites. Each of the ARTIC projects reported a variety of outcomes related to improved patient care, interprofessional collaboration, patient experience, health outcomes, and system efficiency. Additional lessons learned from the evaluation include: 1) the importance of assessing readiness (e.g., identifying implementation resources before committing to a project); 2) the need to develop tailored implementation materials; 3) the need to consider characteristics of implementation supports; 4) the need to protect champion time; and 5) the need to consider the feasibility of an evaluation (and incorporate an efficient, timely feedback mechanism).(27-29)

Communities of practice

Communities of practice have become increasingly popular within the health sector to provide opportunities for health-system leaders, patients, researchers and other stakeholders to engage in collective problem-solving. We found two systematic reviews about communities of practice in the health sector. The first is a low-quality review examining how and why communities of practice are established.(30) The review revealed that communities of practice are complex, multifaceted programs that operate using different models. While communities of practice were often used to support learning, information and knowledge exchange, they are also increasingly used to improve clinical practice and to facilitate the implementation of evidence-based practice. Various methods are used by members of communities of practice to communicate, interact and share information and knowledge with each other (most notably face-to-face meetings, emails, and web-based platforms). Communities of practice appear promising to: gain competencies following completion of basic training; break down professional, geographical and organizational barriers; share information; reduce professional isolation; and facilitate the implementation of new processes and technology. An older medium-quality review found that communities of practice in business and healthcare sectors vary significantly in their structure and characteristics, with different levels of formality, making conclusions about their effectiveness difficult to draw.(31) The review noted that the structures of communities of practice varied greatly (including voluntary informal networks, work-supported formal education sessions, apprentice training, and multidisciplinary, multi-site project teams). Communities of practice had four characteristics: social interaction among members, knowledge sharing, knowledge creation, and identity building (but these were not consistently observed in all communities of practice). Research evidence also showed a lack of clarity regarding the responsibilities of facilitators, and how power dynamics should be handled.

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 B1.

Table 4: Summary of key findings from systematic reviews relevant to Element 1 - Support problem-focused rapid learning and improvement

Category of finding	Summary of key findings
Benefits	• **Communities of practice** ○ A low-quality review suggested that communities of practice appear promising to: ▪ gain competencies following completion of basic training; ▪ break down professional, geographical and organizational barriers; ▪ share information; ▪ reduce professional isolation; and ▪ facilitate the implementation of new processes and technology.(30)
Potential harms	• None identified
Costs and/or cost-effectiveness in relation to the status quo	• None identified
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the element were pursued)	• Uncertainty because no systematic reviews were identified ○ **Tools and mechanisms to drive rapid learning and improvements** ○ **ARTIC model** • Uncertainty because no studies were identified despite an exhaustive search as part of a systematic review ○ None identified • No clear message from studies included in a systematic review ○ A medium-quality review found that communities of practice in business and healthcare sectors vary significantly in their structure and characteristics, with different levels of formality, making conclusions about their effectiveness difficult to draw.(31) The responsibilities of facilitators, and how power dynamics should be handled also remain unclear.
Key elements of the policy element if it was tried elsewhere	• **Communities of practice** ○ A low-quality review found that various methods are used by members of communities of practice to communicate, interact and share information and knowledge with each other (mostly face-to-face meetings, emails, and web-based platforms).(30) ○ A medium-quality review found that the structures of communities of practice varied greatly (including voluntary informal networks, work-supported formal education sessions, apprentice training, and multidisciplinary, multi-site project teams). They generally had four characteristics: social interaction among members, knowledge sharing, knowledge creation, and identity building (but these were not consistently observed in all communities of practice).
Stakeholders' views and experience	• None identified

Element 2 – Support local area-focused rapid learning and improvement

This element focuses on supporting organizations (or groupings of organizations working together like the recently announced Ontario Health Teams)(7) that are investing in creating rapid-learning health organizations and contributing to cultural change in their local areas. These may include organizations delivering home and community care, primary care, hospital care, specialty care, rehabilitation care, long-term care, public-health programs and services, and cross-sectoral programs and services. Supporting these organizations may vary in light of local needs, capacities and constraints.

Specifically, this element might include:
- building local capacity (within local organizations and with front-line staff) and establishing dedicated staff to identify improvement priorities;
- determining what resources are available in (and beyond) local organizations and how they can be effectively harnessed to support rapid learning and improvement; and
- creating mechanisms for local organizations to ensure the spread of lessons learned from approaches implemented elsewhere, and to foster an organizational culture favourable to rapid learning and improvement.

Building local capacity

We identified one high-quality systematic review relevant to supporting local rapid learning and improvement. The review found a lack of evaluative research about the capacity of human-resource information systems (i.e., systems dealing with the management of human resources, such as recruitment, teaching, planning and resource allocation) to improve quality and efficiency, and enable learning health systems.(32) Yet, the authors argue that linking the administrative data from human-resource information systems with data on clinical processes and outcomes is promising and could enable real-time and predictive analytics alongside continuous monitoring and evaluation of a rapid-learning health system.

Our rapid synthesis also identified one study describing the experience of a health organization advancing its learning capabilities, as a core element of a rapid-learning health system. The study revealed six principles to advance an organization's learning capabilities: 1) draw on the wisdom of groups and value connections; 2) embrace sense-making over decision-making in dealing with the unexpected; 3) bring diverse perspectives to complex challenges; 4) animate people, provide direction, update regularly, and interact respectfully; 5) appreciate the power and ubiquity of emergent change and the limitations of planned change; and 6) concentrate on small wins and characterize challenges as mere problems.(33)

Determining what resources are available

We found no systematic review about this sub-element.

Creating mechanisms for local organizations to ensure the spread of lessons learned and foster cultural change

The literature on rapid-learning health systems emphasizes the need for a cultural shift, to embrace the concepts, frameworks and values as a core philosophy.(34-38) A recent rapid synthesis examined how to foster an organizational culture supportive of evidence-informed policymaking.(39) While the rapid synthesis did not focus on fostering a culture of rapid learning and improvement, it identified research evidence that spoke to aspects of these issues. Most of the retrieved literature focused on identifying barriers and facilitators to foster a culture shift or to increase the use of research evidence, and there was a paucity of literature examining the effectiveness of interventions to foster an organizational culture change.(40) Findings from the literature were grouped into three domains: 1) measuring organizational culture change and organizational readiness for change; 2) fostering organizational culture change (and its barriers and facilitators); and 3) sustaining organizational culture change.

Two systematic reviews identified tools to measure organizational culture and organizational readiness for change, but none focused specifically on rapid learning and improvement.(41; 42) A systematic review revealed a variety of factors influencing organizational culture change (e.g., types of change, degree of change, financial stability of the organization, strategy fit between the proposed change and the organization, public opinion, staff perceptions, and readiness for change of internal and external stakeholders).(43) Another systematic review listed six guiding principles to influence the sustainability of organizational culture change: align vision and action; make incremental change; foster distributed leadership; promote staff engagement; create collaborative interpersonal relationships; and continually assess and learn from cultural change.(44)

Lastly, one systematic review examined how innovations can be spread and sustained in health organizations (as well as how health-system leaders can foster a culture and climate that supports and enables change).(45) Innovations were referred to here as "a novel set of behaviors, routines, and ways of working that are directed at improving health outcomes, administrative efficiency, cost effectiveness, or users' experience and that are implemented by planned and coordinated actions."(45) The authors developed a conceptual model derived from their synthesis of theoretical and empirical findings, which reveals the various determinants of diffusion, dissemination and implementation of innovations in health organizations.

A summary of the key findings from the synthesized research evidence is provided in Table 5. For those who want to know more about the systematic reviews contained in Table 5 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix B2.

Table 5: Summary of key findings from systematic reviews relevant to Element 2 – Support local area-focused rapid learning and improvement

Category of finding	Summary of key findings
Benefits	• None identified
Potential harms	• None identified
Costs and/or cost-effectiveness in relation to the status quo	• None identified

Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the element were pursued)	• Uncertainty because no systematic reviews were identified
	  o **Determining what resources are available**
	• Uncertainty because no studies were identified despite an exhaustive search as part of a systematic review
	  o **Creating mechanisms for local organizations to ensure the spread of lessons learned and foster cultural change**
	    ▪ An older high-quality systematic review examined the effectiveness of strategies to change organizational culture to improve healthcare performance. This review did not find any rigorous evidence to demonstrate the effectiveness of strategies to change organizational culture on healthcare performance due to the paucity of robust empirical studies.(40)
	• No clear message from studies included in a systematic review
	  o **Building local capacity**
	    ▪ One high-quality systematic review found a lack of evaluative research about the capacity of human-resource information systems (i.e., systems dealing with the management of human resources, such as recruitment, teaching, planning and resource allocation) to enable learning health systems.(32)

Key elements of the policy element if it was tried elsewhere	• **Creating mechanisms for local organizations to ensure the spread of lessons learned and foster cultural change** o An older high-quality systematic review examined 13 quantitative measurements of organizational culture.(41) The instruments varied considerably in terms of their theory, format, scope and properties. The instruments could be divided into two categories – those that take a typological approach (e.g., assess different types of organizational culture) and those that take a dimensional approach (e.g., describe a culture by its position along different dimensions). All measurement approaches have

	strengths and limitations, and thus choosing an instrument from which to derive a baseline measurement of the organizational culture depends on the purpose, intended use of results, and resources available. The review further noted that there is little agreement among experts on what dimensions of culture are essential to measure or which are predictive of a conducive climate to introduce change. Further, the review brings forward the challenge of measuring and assessing an organizational culture based on self-reported indicators due to social desirability bias.
	○ One older medium-quality systematic review examined analytical tools to measure organizational readiness for change.(42) While the review identified 43 tools, only seven were found to have undergone systematic assessments of validity and reliability. These instruments have been developed to predict individual-level readiness for change and have not been assessed for their utility in predicting organizational-level outcomes such as successful implementation or changes in organizational performance.
	○ One high-quality systematic review focused on factors that influence broad culture change:
	  ▪ types of change (i.e., process change or product change);
	  ▪ degree of change (i.e., ranging from minor to radical change);
	  ▪ facilitators and inhibitors of change (revisited below);
	  ▪ financial stability of the organization;
	  ▪ strategic fit between the proposed change and the organization;
	  ▪ public opinion;
	  ▪ staff perceptions of change; and
	  ▪ readiness for change among both external and internal stakeholders.(43)
	○ One older medium-quality systematic review identified six guiding principles associated with sustaining organizational culture change: align vision and action; make incremental changes within a comprehensive transformation strategy; foster distributed leadership; promote staff engagement; create collaborative interpersonal relationships; and assess cultural change.(44)

Stakeholders' views and experience	• **Creating mechanisms for local organizations to ensure the spread of lessons learned and foster cultural change**
	○ One medium-quality systematic review examined how innovations can be spread and sustained in health-service delivery and organization (as well as how health-system leaders can foster a culture and climate that supports and enables change).(45) The review found that innovations are more likely to be adopted and sustained if:
	  ▪ they are advantageous;
	  ▪ they are compatible with organizational values and norms;
	  ▪ they are simple;
	  ▪ they are able to be experimented with;
	  ▪ they have observable benefits; and
	  ▪ they can be adapted or refined to suit the organization's needs.(45)
	○ While these factors are considered to be the 'standard' attributes necessary to explain the adoption of innovations, both individual- and system-level factors can also challenge adoption. At the individual level, psychological factors such as intellect, motivation and learning style can affect a staff member's ability or desire to adopt a new way of working. At the systems level, the structure and quality of a social network (e.g., horizontal or vertical), and presence of strong leadership can greatly affect the spread and sustainability of an initiative.(45)
	○ In terms of leadership, the review revealed the fundamental role of opinion leaders, champions and 'boundary spanners' (i.e., people who have significant social ties both inside and outside the organization and who are able and willing to link an organization to the outside world in relation to a specific innovation). Lastly, the presence of external influences such as inter-organizational networks and policy context were also found to be important variables to consider when examining the sustainability of an initiative.(45)

Element 3 – Coordinate efforts to support rapid learning and improvement across the province

Creating or consolidating a move towards rapid learning and improvement across the province likely requires some degree of coordination, as well as mechanisms to tackle barriers at a system level.

Specifically, this element might include:
- adopting a rapid-learning health systems framework within the ministry and across relevant provincial agencies (within and beyond the health sector);
- determining who should be responsible for the coordination of efforts to use this framework, including:
  o coordinating the connection of existing assets and prioritize addressing known gaps in the health and research system,
  o periodically updating the assets and gaps tables at each level (e.g., ministry, local, and problem-focused initiatives), and
  o clearly articulating quick-wins and next steps at each level of the health system; and
- supporting connections among assets at other levels of the health system by, for example:
  o aligning governance and financial arrangements to support innovations and rapid improvement,
  o establishing common standards (including core competencies, administrative standards, infrastructure standards, technical and scientific standards) to support the development and implementation of rapid learning and improvement,
  o establishing common performance measures to evaluate the development and implementation of rapid learning and improvement (both overall and in terms of the level of maturity of each of the seven characteristics of a rapid-learning health system),
  o collaborating and sharing lessons learned with other provinces and territories focused on interdependencies and issue-based commonalities.

Adopting a rapid-learning health systems framework

We found two systematic reviews relevant to the adoption of a rapid-learning health systems framework. The first is a low-quality systematic review, which examined attempts to adopt the rapid-learning health system paradigm, with an emphasis on implementation and evaluating the impact on current medical practices.(46) The review found minimal focus on evaluating impacts on healthcare delivery and patient outcomes.

The second is a low-quality systematic review, which examined the spectrum of ethical issues that arise in a rapid-learning health system. It revealed 67 distinct ethical issues within the following four phases of the rapid-learning health system:(47)
- designing activities: the risk of negative outcomes (e.g., reducing the quality and usability of results) from designing learning activities less rigorously so they are not classified as research, and the risk of inadequate engagement of stakeholders (which can affect the success of the learning activity due to a lack of established trust and support);
- ethical oversight of activities: the conflict between current oversight regulations and a learning health system, which can delay or even prevent learning activities from being conducted due to confusion regarding which learning activities require ethical oversight, and an inconsistent and burdensome oversight process;
- conducting activities: risks of misguided judgments regarding when and how participants should be notified and asked for consent, and the conflict between current data-management practices and regulations, and the goals of a learning health system; and
- implementing learning: difficulties with changing practice in a timely manner (e.g., due to conflicts with the current research infrastructure or current financial incentives), issues of transparency (e.g., due to underperforming providers or commercial interests), and unintended negative consequences from implementation (e.g., widening health disparities or increasing the risk of liability).

The same review identified three types of strategies to address these ethical issues:(47)
- clear and systematic internal policies and procedures to determine which learning health-system activities require ethical review, how data sharing and data protection should be handled, and how to inform patients in routine and systematic ways about learning health-system activities being conducted;
- training and guidance for ethics committee members to learn how to apply ethical principles in the context of learning health-system activities, and for researchers to learn about ethics guidelines; and
- simplified ethical review and consent process to make it easier for learning health-system activities to be conducted, including implementing dedicated ethical review process, standardizing and harmonizing the ethical review process across multiple research sites, and streamlining the consent process.

We also found a number of primary studies that spoke to the development and/or consolidation of rapid-learning health systems:
- one study examined factors allowing a health system to become a learning health system:(35)
  - five themes emerged about the process of transitioning towards a learning health system: 1) visionary leadership or influence of a key individual; 2) adaptation to a changing healthcare landscape; 3) external funding; 4) regulatory or legislative influence; and 5) mergers or expansions,
  - six challenges emerged: 1) organizational culture; 2) data systems and data sharing; 3) funding learning activities; 4) limited supply of skilled individuals; 5) managing competing priorities; and 6) regulatory challenges, and
  - eight strategies were identified to support transformation: 1) strong leadership; 2) setting a limited number of organizational priorities; 3) building on existing strengths; 4) training programs; 5) 'purposeful' design of data systems; 6) internal transparency of quality metrics; 7) payer/provider integration; and 8) within academic medical centres, academic/clinical integration;
- one study identified four key factors supporting the successful implementation of a rapid-learning health system: 1) clinician engagement with primary research and existing research evidence; 2) ongoing collection of robust data; 3) flexibility of the model in order to adapt to new challenges; and 4) culture change;(48)
- one study revealed that implementing a mechanism to share data and research evidence (via electronic health records) may not be sufficient for creating a rapid-learning health system, and the study identified:(49)
  - four key barriers for the timely sharing of data and research evidence via electronic health records: 1) different electronic health record systems do not record clinical data items consistently; 2) providers are rarely incentivized to maintain good data quality on the basis of research use alone; 3) legal and ethical constraints in many countries limit linkage of data and its use for research without consent; and 4) researchers are largely unaware of potential benefits offered by electronic systems to support research, and do not therefore create demand for wider deployment, and
  - four solutions to address these barriers: 1) promoting the mandatory adoption of information-exchange standards for the exchange of data across electronic health record systems; 2) provide good clinical reasons for data quality and detailed record keeping (e.g., audit or decision support); 3) promote international consensus as to how and when data can be linked without consent, and develop systems for managing consent to extraction or study participation across systems; and 4) conduct well-publicized pilot deployments and evaluations;
- one study explored the perspectives of health-system leaders regarding the operationalization of a rapid-learning health system and identified 10 themes related to operationalization: 1) align the learning infrastructure and learning health-system activities in support of the system's strategic goals; 2) align learning with employee incentives; 3) integrate cultural and operational silos; 4) balance learning and work flow; 5) shift the focus of learning from process improvement to improving outcomes; 6) address challenges in the current healthcare environment that have an impact on learning; 7) balance the need to execute and evaluate operational activities given limitations of evaluation methodologies; 8) support 'make-or-buy' decisions for learning (e.g., build an application or learning tool in house versus purchase the product from a vendor); 9) integrate the oversight of the research-quality improvement continuum;

and 10) determine the costs and value of learning (i.e., not adding additional costs to the health system through operationalizing the learning health system);(50) and

- one study examined residents' attitudes about quality improvement, which may have implications for the implementation of rapid-learning health systems, and it identified four barriers to residents' participation in quality-improvement initiatives: 1) challenges with understanding the vision of quality improvement; 2) confusion about basic aspects of quality improvement; 3) the perception that residents' contributions to quality improvement are not valued/valuable to the quality-improvement process; and 4) challenges with prioritizing responsibilities relating to quality improvement compared with other responsibilities.(51)

We also found a number of descriptive case studies of rapid-learning health systems:

- the descriptive case studies showcased various rapid-learning health systems, including for a health system as a whole, as well as some implemented in specific organizations (e.g., academic health centres) and sectors (e.g., specialty care) and for specific categories of conditions (e.g., chronic diseases and cancer), categories of treatments (e.g., surgery and palliative care), and populations (e.g., children and youth);
- the descriptive case studies generally focused on the key factors influencing the successful implementation of rapid-learning health systems, with the following common themes emerging:
  o meaningful stakeholder engagement, partnership and co-production being key pillars in the development and implementation of rapid-learning health systems,(36; 37; 52-54)
  o a robust data infrastructure being a central component of rapid-learning health systems (e.g., data need to be systematically and consistently captured, readily available and shared; the system must allow multi-institutional data sharing; standardized technological approaches should be used to reduce the burden of data entry such as electronic health record-based data collection forms; and patient-centred metrics are critical),(37; 38; 55-57)
  o leadership-instilled culture of learning required,(36-38)
  o strategic and operational assistance required to support the development of core competencies in various areas (including implementation science, systems redesign, health services research, and health information technology),(38; 58) and
  o clear set of performance and quality measures required to evaluate the development and implementation of rapid-learning health systems (including public reporting on performance and quality);(38; 53) and
- one descriptive case study highlighted the need to proceed in sequence: 1) assembling the core team and clarifying terms; 2) learning from existing models; 3) tailoring the model to the specific setting or sector; and 4) building the learning health system using rapid-cycle testing.(52)

Determining who should be responsible for the coordination of efforts

We found one low-quality review examining how governments can coordinate large health-system transformations.(59) The review reveals that coordinating large health-system transformations requires: 1) both top-down and distributed leadership and engagement at all levels of the system; 2) ongoing measurement and reporting on progress on short- and long-term goals; 3) consideration and acknowledgment of historical context to avoid pitfalls and increase support from all stakeholders; 4) significant engagement of physicians in the change process; and 5) significant engagement of patients and families in the change process.

Supporting connections among assets at other levels of the health system

We found no systematic review about how to support connections among assets at other levels of the health system. However, we found one article proposing a tool to track progress in developing, achieving and sustaining change in rapid-learning health systems.(60) Drawing from the implementation sciences, the author proposes LADDERS (Leadership, Alignment, Data, Demonstration, Evaluation, Replication, and Sustainability), a tool grounded in those elements regularly cited by health-system leaders implementing successful transformational changes.

We also identified one study examining the development of core competencies to support the implementation of rapid-learning health systems.(61) The study identified 33 core competencies for learning health-system researchers to guide the development of training programs, which were grouped into seven domains: 1) systems science; 2) research questions and standards of scientific evidence; 3) research methods; 4) informatics; 5) ethics of research and implementation in health systems; 6) improvement and implementation science; and 7) engagement, leadership and research management.

A summary of the key findings from the synthesized research evidence is provided in Table 6. For those who want to know more about the systematic reviews contained in Table 6 (or obtain citations for the reviews), a fuller description of the systematic reviews is provided in Appendix B3.

Table 6: Summary of key findings from systematic reviews relevant to Element 3 – Coordinate efforts to support rapid learning and improvement across the province

Category of finding	Summary of key findings
Benefits	• None identified

Potential harms	• **Adopting a rapid-learning health systems framework**
	  o A low-quality systematic review examined the spectrum of ethical issues that arise in a rapid-learning health system and it grouped the 67 distinct ethical issues within four phases of the rapid-learning health system: (47)
	    ▪ designing activities: the risk of negative outcomes (e.g., reducing the quality and usability of results) from designing learning activities less rigorously so they are not classified as research, and the risk of inadequate engagement of stakeholders (which can affect the success of the learning activity due to a lack of established trust and support);
	    ▪ ethical oversight of activities: the conflict between current oversight regulations and a learning health system, which can delay or even prevent learning activities from being conducted due to confusion regarding which learning activities, require ethical oversight, and an inconsistent and burdensome oversight process;
	    ▪ conducting activities: risks of misguided judgments regarding when and how participants should be notified and asked for consent, and the conflict between current data-management practices and regulations, and the goals of a learning health system; and
	    ▪ implementing learning: difficulties with changing practice in a timely manner (e.g., due to conflicts with the current research infrastructure or current financial incentives), issues of transparency (e.g., due to underperforming providers or commercial interests), and unintended negative consequences from implementation (e.g., widening health disparities or increasing the risk of liability).

Costs and/or cost-effectiveness in relation to the status quo	• None identified

Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the element were pursued)	• Uncertainty because no systematic reviews were identified
	  o **Supporting connections among assets at other levels of the health system**
	• Uncertainty because no studies were identified despite an exhaustive search as part of a systematic review
	  o None identified
	• No clear message from studies included in a systematic review
	  o **Adopting a rapid-learning health systems framework**
	    ▪ One low-quality systematic review examined attempts to adopt the learning health system paradigm, with an emphasis on implementation and evaluating the impact on current medical practices, and found minimal focus on evaluating impacts on healthcare delivery and patient outcomes.(46) The review identified three main themes:

	• clinical data reuse (i.e., building learning health systems by extracting knowledge from geographically distributed data collected in daily clinical practice); • patient-reported outcome measures (i.e., using patient reporting mechanisms for collecting health-related quality indicators); and • collaborative learning (i.e., using peer specialists for both capturing the indicators of healthcare delivery and encouraging changes through support/pressure).

Key elements of the policy element if it was tried elsewhere	• **Adopting a rapid-learning health systems framework**
	  ○ A low-quality systematic review identified three types of strategies to address ethical issues arising in a rapid-learning health system:(47)
	    ▪ clear and systematic internal policies and procedures to determine which learning health-system activities require ethical review, how data sharing and data protection should be handled, and how to inform patients in routine and systematic ways about learning health-system activities being conducted,
	    ▪ training and guidance for ethics committee members to learn how to apply ethical principles in the context of learning health-system activities, and for researchers to learn about ethics guidelines, and
	    ▪ simplified ethical review and consent process to make it easier for learning health-system activities to be conducted, including implementing a dedicated ethical review process, standardizing and harmonizing the ethical review process across multiple research sites, and streamlining the consent process.
	• **Determining who should be responsible for the coordination of efforts**
	  ○ One low-quality review examined how governments can coordinate 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:
	    ▪ implementing transparent transformation efforts, creating a central coordinating body that is isolated from political influence, and clearly articulating the goals of the change;
	    ▪ budgeting for IT systems, establishing independent oversight of measurement and reporting, and offering rewards and sanctions for achievement of measures;
	    ▪ consideration of historical context and careful assessment of readiness for transformation, and storing and reporting information on past change measures;
	    ▪ significant physician engagement in the change process by working with educational institutions and regulatory bodies;
	    ▪ and significant engagement of patients and families in governance and advisory mechanisms for healthcare institutions and bodies, and collecting information on patient wishes through surveys.(59)

Stakeholders' views and experience	• None identified

Additional equity-related observations about the three elements

The research evidence identified for each of the three elements did not provide specific equity-related observations about people working in local areas and sectors (or working on conditions, treatments and with populations) who do not have ready access to data analytics and research capacity and/or rapid learning and improvement capacity.

IMPLEMENTATION CONSIDERATIONS

A number of barriers might hinder implementation of the three elements of a potentially comprehensive approach to supporting rapid learning and improvement across Ontario's health system, which needs to be factored into any decision about whether and how to pursue any given element (Table 7). While potential barriers exist at the levels of providers, organizations and systems, perhaps the biggest barrier lies in achieving agreement to adopt and establish accountability for implementing a rapid-learning health system, as well as coordinating and 'joining up' the many different assets across both the health and research systems and at the pan-Canadian level. Should that barrier be addressed, the next biggest barrier lies in making the rapid-learning health systems framework actionable in Ontario.

Table 7: Potential barriers to implementing the elements (and with the corresponding rapid-learning health system characteristics in brackets)

Levels	Element 1 – Support problem-focused rapid learning and improvement	Element 2 – Support local area-focused rapid learning and improvement	Element 3 – Coordinate efforts to support rapid learning and improvement across the province
Patient/individual	• Patients may be hesitant to engage in problem-focused initiatives beyond those addressing a problem with which they have experience or for which they have developed a particular interest (characteristic 1) • Patients may be hesitant to engage in problem-focused initiatives for which understandable data, research and decision supports are not available (characteristics 2, 3 and 4) or for which they are not supported to develop appropriate competencies (e.g., to understand governance, financial and delivery arrangements, which is characteristic 5)	• Patients may be hesitant to engage in local area-focused initiatives that move beyond a problem with which they have experience or have developed a particular interest or that require them to make difficult trade-offs that will affect many people in their local area (characteristic 1) • Patients may be hesitant to engage in local area-focused initiatives for which understandable data, research and decision supports are not available (characteristics 2, 3 and 4) or for which they are not supported to develop appropriate competencies (e.g., to understand governance, financial and delivery arrangements, which is characteristic 5)	• Patients may be hesitant to engage in system-wide coordination efforts that move beyond a problem with which they have experience or have developed a particular interest or that require them to make difficult trade-offs that will affect many people in the province (characteristic 1) • Patients may be hesitant to engage in system-wide coordination efforts for which understandable data, research and decision supports are not available (characteristics 2, 3 and 4) or for which they are not supported to develop appropriate competencies (e.g., to understand ways to align governance, financial and delivery arrangements, which is characteristic 5)
Care provider	• Providers may be hesitant to engage in problem-focused initiatives where patients play a prominent role in 'moving the needle' (characteristic 1) and given financial arrangements may have already left them feeling overstretched (characteristic 5) • Providers may be hesitant to transition from using only the types of data, research and decision supports needed to inform their clinical decisions to the types of data, research and decision supports needed to support problem-focused initiatives (characteristics 2, 3 and 4)	• Providers may be hesitant to engage in local area-focused initiatives where patients play a prominent role in 'moving the needle' (characteristic 1) and given financial arrangements may have already left them feeling overstretched (characteristic 5) and the clinical culture emphasizes staying focused on problems for which one has developed substantial expertise (characteristic 6) • Providers may be hesitant to transition from using only the types of data, research and decision supports needed to inform their clinical decisions to the types of data, research and decision supports needed to	• Providers may be hesitant to engage in system-wide coordination efforts that move beyond a problem for which they have developed substantial expertise or that require them to make difficult trade-offs that will affect many providers in the province (characteristic 1) • Providers may be hesitant to transition from learning and operationalizing the competencies required of their clinical roles to the types of competencies required to provide leadership to and support system-wide coordination efforts (characteristic 7), including ways to align governance,

	• Providers may be hesitant to transition from learning and operationalizing the competencies required of their clinical roles to the types of competencies required to provide leadership to and support problem-focused initiatives (characteristic 7)	support local area-focused initiatives (characteristics 2, 3 and 4) • Providers may be hesitant to transition from learning and operationalizing the competencies required of their clinical roles to the types of competencies required to provide leadership to and support local area-focused initiatives (characteristic 7)	financial and delivery arrangements, which is characteristic 5)
Organization	• Organizational leaders may have not fully transitioned from sharing information and consulting with patients to more meaningful deliberation and empowerment in prioritizing what problem-focused 'needles to move' (in terms of the care experiences and outcomes that are priorities for rapid learning and improvement) and how to move them (characteristic 1)	• Organizational leaders in many local areas may not have the necessary competencies to analyze and share relevant local data, to conduct relevant research or to contextualize decision supports (characteristics 2, 3 and 4, as well as 7), particularly those in local areas (e.g., remote communities) or sectors (e.g., home and community care) that have not been supported to develop such competencies, or those that are small and community-based and have not been supported to develop the partnerships needed to access those with such competencies • Organizational leaders in any given local area may have not all faced a mandate for patient engagement, such as Patient and Family Advisory Councils (characteristic 1), or a broader set of governance, financial and delivery arrangements that actively support rapid learning and improvement (characteristic 5)	• Organizational leaders often work within a competitive culture that does not value actively sharing insights with, learning from and celebrating the success of other organizations (characteristic 6)
System	• System leaders may lack the types of data, research and decision supports needed to prioritize among problem-focused initiatives (characteristics 2, 3 and 4)	• System leaders may not be willing to relinquish control over the governance, financial and delivery arrangements that would allow local area-focused rapid learning and improvement to thrive (characteristic 5)	• System leaders may lack the competencies to meaningfully engage, and chart a common direction for, stakeholders drawn from across local areas, sectors, categories of conditions and treatments, and populations (characteristic 7)

On the other hand, a number of potential windows of opportunity could be capitalized upon (Table 8), which also need to be factored into any decision about whether and how to pursue one or more of the elements.

Table 8: Potential windows of opportunity for implementing the elements

Type	Element 1 – Support problem-focused rapid learning and improvement	Element 2 – Support local area-focused rapid learning and improvement	Element 3 – Coordinate problem-focused and local initiatives to support rapid learning and improvement across the province
General	• The rapid-learning health systems framework could assist with ensuring that the recently announced redesign of Ontario's health systems (including the creation of Ontario Health and Ontario Health Teams), and course corrections based on rapid feedback and real-time learning, continually 'move the needle' in ways that matter most to patients and families • The rapid-learning health system framework and related concepts are gaining traction in Ontario and across Canada, including among supporting bodies, such as through CIHR's Institute of Health Services and Policy Research (IHSPR), the Canadian Health Services and Policy Research Alliance, and the B.C. Academic Health Sciences Network, as well as provincially through work at the Ontario SPOR SUPPORT network and the critical care and surgical networks in Ontario • The upcoming federal election could result in a decision to improve the coverage and appropriate use of prescription drugs and/or to re-configure pan-Canadian health organizations, both of which could result in pan-Canadian health organizations supporting rapid learning and improvement more purposefully and in ways that are more synergistic with provincial initiatives • Increasing recognition across health systems in Canada about the key roles played by patient and family advisors • Planned SPOR national data platform that would permit benchmarking, the evaluation of natural experiments, as well as other national SPOR assets		
Element-specific	• Existing critical-care and surgical networks in the province provide an example of how to support problem-focused initiatives	• Existing initiatives like at Mississauga-Halton LHIN provide an example of how to support local area-focused initiatives	• Desire for targeted improvements (i.e., moving the needle in ways that matter to patients) by the provincial government may lend itself to adopting a rapid-learning health-system orientation • Newly proposed health-system reforms require taking stock of existing assets and may support considering how they can be 'joined up'

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APPENDICES A

Table A1: Assets and gaps at the level of Ontario's health system

Characteristic	Examples	Health-system receptors and supports	Research-system supports

Engaged patients: 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	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)
	 2) Engage patients, families and citizens in:
	   a) their own health (e.g., goal setting; self-management and living well with conditions; access to personal health information, including test results)
	   b) their own care (e.g., shared decision-making; use of patient decision aids)
	   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)
	   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)
	   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)
	   f) research (e.g., engaging patients as research partners; eliciting patients' input on research priorities)
		• Patient and Family Advisory Councils (PFACs) or their equivalent (e.g., Ontario Citizens' Council; Patient and Caregiver Advisory Table for Home and Community Care) help to set direction at the Ministry of Health and Long-Term Care (hereafter ministry), in Local Health Integration Networks (LHINs), and for select sectors (specialty hospital care; long-term care), conditions (e.g., cancer; mental health and addictions) and treatments (e.g., prescription drugs)
		 • Health Quality Ontario (HQO) is leading several initiatives on patient partnering in quality improvement (e.g., patient-engagement tools and resources, patient advisors program, and Choosing Wisely campaigns)
		 • Ministry 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
		 • Gaps may include: the absence of requirements, incentives or guidance for the co-design of publicly funded programs and services; the lack of mandate for PFACs or their equivalent in some sectors and for most conditions, treatments (or health determinants) and populations; and the lack of deliberate approach to bringing diverse perspectives to existing PFACs
			• Ontario SPOR SUPPORT Unit (OSSU) has supported three masterclasses on the conduct and use of patient-oriented research (for patients as well as providers, policymakers and researchers), as well as smaller patient-engagement projects and patient-partnership training workshops
			 • Many research groups and 'intermediary groups' (e.g., Change Foundation) work with a standing citizen panel, and the McMaster Health Forum convenes citizen panels on a range of topics

Characteristic	Examples	Health-system receptors and supports	Research-system supports
	3) Build patient/citizen capacity to engage in all of the above		
Digital capture, linkage and timely sharing of relevant data: 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)	1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing) 2) Capacity to capture patient-reported experiences (for both services and transitions), clinical encounters, outcomes and costs 3) Capacity to capture longitudinal data across time and settings 4) Capacity to link data about health, healthcare, social care, and the social determinants of health 5) Capacity to analyze data (e.g., staff and resources) 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)	• MyChart and other patient portals provide patients with access to their health information (if they receive care at participating organizations), and 'my results' provides patients with diagnostic test data (if they receive laboratory services through LifeLabs) • Many organizations collect patient-experience data and these data are often then aggregated and reported on by Health Quality Ontario ○ e.g., hospitals collect standardized data using NRC Health templates, submit the data on a daily basis, and can easily access comparative data ○ e.g., home and community-care organizations collect standardized data through the Client and Caregiver Experience Evaluation Survey and through the InterRAI assessment tools, and make them available through the Client Health and Related Information System • Some organizations and one professional association (Registered Nurses' Association of Ontario through its NQuIRE program) have the staff and infrastructure to manage, link, analyze and present data to support learning and improvement • Some organizations have access to linked patient-experience data (e.g., organizations participating in practice-based research networks such as the University of Toronto Practice-Based Research Network (UTOPIAN); the 65 organizations across six LHINs that are participating in the Integrated Decision Support (IDS) initiative) • Other organizations have access to complementary structure, process and/or outcomes data (e.g., through registries) • A new ministry initiative (SPARK) is helping digital health innovators to provide provincial health information to patients and providers • Gaps may include the lack of standards for the types of patient-experience data to collect and how (e.g., about services, transitions and longitudinally, not just services) across sectors, conditions, treatments and populations, and ongoing uncertainty about what privacy policies mean for sharing data beyond the 'circle of care'	• Ministry funds Institute for Clinical Evaluative Sciences (ICES) to provide a data management and analytics platform, and ICES and other groups are laying the groundwork for more comprehensive datasets • OSSU has funded the ICES Data and Analytic Services to respond to data requests, including for data linkage, by decision-makers • Ministry commissions periodic, large-scale patient surveys (e.g., Primary Care Access Survey, which is undertaken by York University's Institute for Social Research) • Ministry funds Centre of Excellence in Digital Health Evaluation to evaluate digital solutions • Some research groups have experience in designing and conducting surveys or other types of studies to capture patient experiences

Evidence >> Insight >> Action

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations	1) Distributed capacity to produce and share research (including evaluations) in a timely way 2) Distributed research-ethics infrastructure that can support rapid-cycle evaluations 3) Capacity to synthesize research evidence in a timely way 4) One-stop shops for local evaluations and pre-appraised syntheses 5) Capacity to access, adapt and apply research evidence 6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers	• Gaps may include: 1) limited incentives and no consistent standards for introducing innovations, evaluating them and scaling up proven approaches; 2) lack of a distributed research-ethics and rapid-cycle evaluation infrastructure; and 3) uneven capacity among decision-makers to access, adapt and apply research evidence	• Ministry funds research groups to work on priority system challenges and requires them to use 25% of their funds to respond to emerging research requests by decision-makers (called Applied Health Research Questions) • 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; 4) health-systems research, implementation research, and knowledge translation; 5) career development in methods and health-services research; and 6) consultation and research services (with cross-cutting support for sex and gender issues and francophone and Indigenous populations), as well as one-off funding to patient- and impact-oriented research projects that involve decision-makers

Appropriate decision supports: Systems support informed decision-making at all levels with appropriate data, evidence, and decision-making frameworks	1) Decision supports at all levels – self-management, clinical encounter, program, organization, regional health authority and government – such as
	a) patient-targeted evidence-based resources
	b) patient decision aids
	c) patient goal-setting supports
	d) clinical practice guidelines
	e) clinical decision support systems (including those embedded in electronic health records)
	f) quality standards
	g) care pathways
	h) health technology assessments
	i) descriptions of how the health system works
		• Many groups use rigorous and participatory approaches to make recommendations to providers about optimal care
		  o Cancer Care Ontario (through the Program in Evidence-Based Care) produces guidelines for cancer care
		  o CORhealth makes recommendations about cardiac, stroke and vascular care
		  o eHealth Ontario provides support to providers for electronic health records that incorporate decision supports
		  o Registered Nurses' Association of Ontario produces guidelines for optimal interprofessional practice and healthy work environments (and support their inclusion in order sets)
		  o Health Quality Ontario produces 'quality standards' on a broad range of topics
		  o Ministry produces care pathways for select clinical areas (funded using the Quality-Based Procedures approach) and organizational and program standards for public health
		  o Ministry provides a rapid evidence service for government staff
		• Health Quality Ontario (HQO) and Public Health Ontario have a formal role, and many other government-supported groups play an informal role, in providing data
			• Ottawa Hospital Research Institute (OHRI) Patient Decision Aids provide pre-appraised patient decision aids (which are also included in the McMaster Optimal Aging Portal)
			• A book (available on the McMaster Health Forum website) describes how the Ontario health system works, including by sector and for select conditions, treatments and populations (and will soon be supplemented by an online course)
			• Gaps may include the lack of common language and framework being used by the many groups supporting the evidence-based implementation of effective practices

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		and research to inform managerial and policy decision-making (e.g., to inform decisions about which prescription drugs and which non-drug technologies to pay for publicly) • Gaps may include the lack of a patient-targeted 'way in' to the 21 sites that publicly report data about the performance of (select parts of) the health system or to the decision supports available to them	
Aligned governance, financial and delivery arrangements: 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	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 2) Mandates for preparing, sharing and reporting on quality-improvement plans 3) Mandates for accreditation 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) 5) Value-based innovation-procurement model 6) Funding and active support to spread effective practices across sites 7) Standards for provincial expert groups to involve patients, a methodologist, use existing data and evidence to inform and justify their recommendations 8) Mechanisms to jointly set rapid-learning and improvement priorities 9) Mechanisms to identify and share the 'reproducible building blocks' of a rapid-learning health system	• Hospitals, long-term care homes and interprofessional team-based primary-care organizations are now required to prepare (following guidance from HQO), share and report on quality-improvement plans (and to incorporate equity considerations in these plans) • New financial arrangements are beginning to or have the potential to incentivize rapid learning and improvement (e.g., Quality-Based Procedures, bundled care models) and to focus attention on patient-reported outcome measures (e.g., EQ-5D-5L and Oxford Hip and Knee surveys to elicit patient-reported outcomes measures for hip and knee replacements) • A new value-based innovation procurement model has the potential to enable the more rapid assessment, sourcing and integration into clinical practice and spread across the province, of health technology solutions and processes • ARTIC (Adopting Research to Improve Care) provides funding and active support to spread across hospital sites the use of proven clinical interventions or practice changes that have already been successfully implemented in at least one site • Gaps may include: 1) lack of centralized coordination of efforts to use this framework, incrementally join up assets and fill gaps, and periodically update the status of assets and gaps at the level of the ministry (e.g., as new funding models are piloted), LHINs (e.g., as new reporting templates are developed for sub-regions), sectors, conditions, treatments (or health determinants) and populations; and 2) lack of mechanisms to set learning and improvement priorities or to identify and share the 'reproducible building blocks' of a rapid-learning health system (e.g., data-sharing agreements; agreements with research-ethics boards about rapid-cycle evaluations)	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Culture of rapid learning and improvement: Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability	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'	• Emerging leaders are often technologically savvy and more aligned with a culture of rapid learning and improvement • Gaps may include that most health organizations do not have a culture of embedding rapid learning and improvement in their operations, of developing and maintaining trusted relationships with the full range of partners needed to support rapid learning and improvement, or of acknowledging, learning from and moving on from 'failure'	• OSSU is proposing to use a rapid-learning health system as the organizing frame for the next phase in its evolution
Competencies for rapid learning and improvement: 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	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)	• Health Quality Ontario monitors and publicly reports on quality, and supports rapid learning and improvement • Many organizations in the specialty-care sector have business intelligence, clinical informatics, decision support, quality improvement, government relations and communications staff who can support different aspects of rapid learning and improvement • Some sub-systems, such as the cancer sub-system, have structures and processes to prioritize scale-up opportunities and ensure alignment between the health system and the research system • Gaps may include: 1) lack of agreement about the competencies needed (e.g., data literacy, co-design, scaling up, and leadership) and which are needed in all organizations versus in more centralized support units; 2) lack of learning collaboratives and other elements of the infrastructure needed to support rapid learning and improvement across LHINs, sectors, conditions, treatments (and health determinants) and populations (e.g., to inform what and how to sustain, and what and how to scale up); and 3) uneven understanding among decision-makers about how research can help them, how to find and use existing research evidence, and how to engage researchers when evidence is lacking	• IDEAS provides training in quality improvement to large cohorts of providers and managers • OSSU funds a provincial implementation science laboratory that works in partnership with Health Quality Ontario to design and test approaches to rapid learning and improvement at the clinical encounter level, and other centres of expertise (e.g., Centre for Implementation Research at the Ottawa Hospital Research Institute) either contribute to or complement this laboratory

Table A2: Assets and gaps at the level of the Mississauga Halton LHIN

Characteristic	Examples	Health-system receptors and supports	Research-system supports

Engaged patients: 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	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)
	 2) Engage patients, families and citizens in:
	 a) their own health (e.g., goal setting; self-management and living well with conditions; access to personal health information, including test results)
	 b) their own care (e.g., shared decision-making; use of patient decision aids)
	 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)
	 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)
	 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)
	 f) research (e.g., engaging patients as research partners; eliciting patients' input on research priorities)
	 3) Build patient/citizen capacity to engage in all of the above
		• As noted at the provincial level
		   o Some patients have opportunities to be engaged in self-management and focused on living well with their conditions
		   o Some clinicians use patient decision aids or more informal approaches to support shared decision-making
		 • Trillium Health Partners (THP), a large hospital in the LHIN, is using a co-design approach to develop bundled care pathways and is developing a standard co-design approach for use in all such work in future
		 • Patient and Family Advisory Councils (PFACs) help to set direction for the LHIN and for local health organizations
		 • Patient representatives sit on a range of governance, executive and clinical program committees
		 • Patient stories are used by clinical program committees and at the front-line to support learning and improvement
		
		 • Gaps may include: most front-line providers lack the competencies to support self-management and (especially among physicians) to support shared decision-making, particularly when a reasonable option is to not have a procedure; no patient representatives on all LHIN committees; difficult to identify patients who can be engaged in ways that are more time-intensive than filling out a questionnaire; and no standardized way to 'on-board' patient partners, including helping them to understand their role (e.g., not advocating for personal needs) and ensuring they have the competencies to execute it
			• THP's Institute for Better Health has experience in patient engagement in co-design
			
			 • Gaps may include: no ethical framework for engaging patients in patient-oriented research; no research advisory board or other robust process to engage patients in research governance; and limited 'bridges' between the health and research systems at the regional level

Evidence >> Insight >> Action

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Digital capture, linkage and timely sharing of relevant data: 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)	1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing) 2) Capacity to capture patient-reported experiences (for both services and transitions), clinical encounters, outcomes and costs 3) Capacity to capture longitudinal data across time and settings 4) Capacity to link data about health, healthcare, social care, and the social determinants of health 5) Capacity to analyze data (e.g., staff and resources) 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)	• Many health organizations in the LHIN collect patient experience data at multiple levels (e.g., at service, unit and organizational levels within the hospitals) • LHIN and THP have staff who understand the available data and the context in which the data were collected and who can manage, link, analyze and present that data to support learning and improvement • LHIN, THP and other organizations provide standardized quarterly reports to the MoHLTC about volume, wait times for priority procedures, etc. • LHIN and the hospitals have an emergency-communication tool to communicate with the Ministry about emergencies • Gaps may include the limited infrastructure for: 1) identifying common data elements (for patient-experience data) to enable cross-organization comparisons; 2) digitally (not manually) collecting patient-experience data (particularly across sectors); and 3) digitally (not manually) linking patient-experience data with discharge, finance, human resources and other types of data. Additional gaps may include: in-house staff do not have consistent approaches to data analysis and data interpretation; and no privacy agreement for sharing data	• THP's Institute for Better Health has experience in designing and conducting surveys and other types of studies to capture patient experiences • Gaps may include: no centralized platform for capturing, analyzing and sharing (especially in a timely way) patient-experience data or for linking these data to utilization, cost, health and well-being data; and no robust understanding of the drivers of patient satisfaction across sectors, conditions, treatments and populations
Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations	1) Distributed capacity to produce and share research (including evaluations) in a timely way 2) Distributed research ethics infrastructure that can support rapid-cycle evaluations 3) Capacity to synthesize research evidence in a timely way 4) One-stop shops for local evaluations and pre-appraised syntheses 5) Capacity to access, adapt and apply research evidence 6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers	• Some organizations have developed in-house capacity to conduct rapid-cycle evaluations • Gaps may include: no infrastructure to collect and curate existing research evidence; and no research-ethics infrastructure to support rapid-cycle evaluations	• THP's Institute for Better Health is growing in-house capacity to conduct rapid-cycle evaluations • MoHLTC funds the Health System Performance Research Network (the principal investigator of which is based at THP) to conduct research on performance measurement and improvement, and requires them to use 25% of their funds to respond to emerging research requests by decision-makers (called Applied Health Research Questions) • Gaps may include: limited requirements or incentives for research groups to work with one another and with decision-makers at all levels in support of rapid learning and improvements; and no effort to use a 'collective impact' lens

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Appropriate decision supports: Systems support informed decision-making at all levels with appropriate data, evidence, and decision-making frameworks	1) Decision supports at all levels – self-management, clinical encounter, program, organization, regional health authority and government – such as a) patient-targeted evidence-based resources b) patient decision aids c) patient goal-setting supports d) clinical practice guidelines e) clinical decision support systems (including those embedded in electronic health records) f) quality standards g) care pathways h) health technology assessments i) descriptions of how the health system works	• LHIN and THP have staff who understand the available data and the context in which the data were collected and who can manage, link, analyze and present that data to support learning and improvement • Gaps may include: inconsistent approaches to making recommendations to providers about optimal care across the LHIN; some decision-making frameworks exist, but they are not always well known or consistently applied; and in-house decision support personnel do not always have consistent approaches to data analysis and data interpretation	• THP's Institute for Better Health is developing a community-based data strategy that will address both data analytics and decision supports, and is well positioned to help with this work
Aligned governance, financial and delivery arrangements: 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	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 2) Mandates for preparing, sharing and reporting on quality-improvement plans 3) Mandates for accreditation 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) 5) Value-based innovation-procurement model 6) Funding and active support to spread effective practices across sites 7) Standards for provincial expert groups to involve patients, a methodologist, use existing data and evidence to inform and justify their recommendations 8) Mechanisms to jointly set rapid-learning and improvement priorities	• Hospitals, long-term care homes and interprofessional team-based primary-care organizations are now required to prepare, share and report on Quality Improvement Plans • All THP leaders at the manager level or above have a performance indicator (in the Leader Evaluation Management tool) that is based on patient satisfaction and that contributes to performance pay • The implementation of bundled care pathways demonstrated early successes with co-design and rapid-cycle evaluations • A primary-care network has been developed in the LHIN and now a hub model is being developed as a key piece of infrastructure to share best practices (initially in primary care and in mental health) • Gaps may include: no centralized coordination (e.g., in the office of the LHIN vice president for strategy) of efforts to use this frame, incrementally join up assets and fill gaps, and periodically update the status of assets and gaps at the level of the LHIN and of sectors, categories of conditions, and populations within the LHIN; some types of organizations (e.g., most in primary care) are not required to prepare, share and report on Quality Improvement Plans; funding comes from different ministries and from different funding models within MoHLTC, each of which may have its	• THP's Institute for Better Health is well positioned to provide recommendations about needed alignments • Gaps may include the absence of mechanism for regional health and research systems to jointly set learning and improvement priorities

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Characteristic	Examples	Health-system receptors and supports	Research-system supports
	9) Mechanisms to identify and share the 'reproducible building blocks' of a rapid-learning health system	own expectations and accountabilities; and no mechanism for regional health and research systems to jointly set learning and improvement priorities	
Culture of rapid learning and improvement: Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability	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'	• The LHIN and some local health organizations are now developing a culture of a rapid-learning health organization and it has for several years modelled a commitment at all levels of the organization to collaboration with partners • Gaps may include the need to build: 1) an appreciation within clinical operations about the value of rapid learning and improvement; and 2) a commitment to taking the extra time and making the extra effort in a context characterized by the 'tyranny of the urgent'	• THP's Institute for Better Health used a rapid-learning health system as the organizing frame for its renewal application, and it has a culture of collaboration with partners at all levels of the organization • THP's Institute for Better Health has a culture of working with decision-makers at all levels of the organization to support rapid learning and improvement • Gaps may include that research (e.g., modelling of trends or patterns in utilization and quality) hasn't been embedded in clinical operations, and when it is done it is as a reaction to the work of others
Competencies for rapid learning and improvement: 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	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)	• THP and other health organizations in the LHIN have a strong quality-improvement department that understands rapid-cycle evaluations • Gaps may include: lack of agreement about the competencies needed (and physicians and other staff typically don't have the competencies); lack of learning collaboratives; uneven understanding among decision-makers about how research can help them; and no competency-based, regional (cross-organization) approach to education and no measurement of competencies in the region	• THP's Institute for Better Health has some expertise in characterizing problems and supporting the design and implementation of data- and evidence-informed approaches • Gaps may include the absence of regional governance framework or strategy for research

Evidence >> Insight >> Action

Table A3: Assets and gaps in the <u>primary-care sector</u> in Ontario

Characteristic	Examples	Health-system receptors and supports	Research-system supports

Engaged patients: 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	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)
	 2) Engage patients, families and citizens in:
	   a) their own health (e.g., goal setting; self-management and living well with conditions; access to personal health information, including test results)
	   b) their own care (e.g., shared decision-making; use of patient decision aids)
	   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)
	   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)
	   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)
	   f) research (e.g., engaging patients as research partners; eliciting patients' input on research priorities)
	 3) Build patient/citizen capacity to engage in all of the above
		• Patient and Family Advisory Councils (PFACs) help to set direction for community-governed primary-care teams
		 • HQO, the Association of Family Health Teams of Ontario and the Alliance for Healthier Communities provide resources to support primary-care organizations in patient engagement
		 • Gaps may include: 1) the limited supports for self-management and living well in primary care; 2) the limited supports and incentives for shared decision-making in primary care; 3) the lack of mandate for PFACs, or reporting about patient-experience data in quality-improvement plans, in primary care outside interprofessional team models
			• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Digital capture, linkage and timely sharing of relevant data: 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)	1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing) 2) Capacity to capture patient-reported experiences (for both services and transitions), clinical encounters, outcomes and costs 3) Capacity to capture longitudinal data across time and settings 4) Capacity to link data about health, healthcare, social care, and the social determinants of health 5) Capacity to analyze data (e.g., staff and resources) 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)	• Some primary-care organizations collect patient-experience data (e.g., using a survey developed by the Association of Family Health Teams of Ontario) • Health Care Experiences Survey (formerly the Primary Care Access Survey) is commissioned annually by the ministry, and the Commonwealth Fund's annual survey sometimes addresses primary care • HQO's MyPractice reports provide practice-level performance data for primary-care providers • Electronic Medical Record Administrative Data Linked Database (EMRALD) provides clinically relevant information derived from electronic health records maintained by family physicians practising in Ontario, which can be linked to administrative databases held at ICES • Gaps may include: 1) few primary-care organizations outside interprofessional team models have the staff and infrastructure to collect, analyze and present locally contextualized data to support learning and improvement; and 2) HQO's MyPractice reports are only sent to those who subscribe to them, and the reports don't yet provide comparators that reflect comparable patient populations or focus on indicators that have been prioritized by patients and primary-care providers	• None identified
Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations	1) Distributed capacity to produce and share research (including evaluations) in a timely way 2) Distributed research-ethics infrastructure that can support rapid-cycle evaluations 3) Capacity to synthesize research evidence in a timely way 4) One-stop shops for local evaluations and pre-appraised syntheses 5) Capacity to access, adapt and apply research evidence 6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers	• None identified	• INSPIRE (Innovations Strengthening Primary Healthcare through Research) and BeACCoN (Better Access and Care for Complex Needs), both funded by the ministry, conduct research in primary care and use 25% of their funds to respond to emerging research requests by decision-makers (called Applied Health Research Questions) • Primary Health Care Patient Engagement Resource Centre provides tools and resources to support patient engagement in primary-care research

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Appropriate decision supports: Systems support informed decision-making at all levels with appropriate data, evidence, and decision-making frameworks	1) Decision supports at all levels – self-management, clinical encounter, program, organization, regional health authority and government – such as a) patient-targeted evidence-based resources b) patient decision aids c) patient goal-setting supports d) clinical practice guidelines e) clinical decision support systems (including those embedded in electronic health records) f) quality standards g) care pathways h) health technology assessments i) descriptions of how the health system works	• Health Quality Ontario and other groups make recommendations to providers about optimal primary care • Gaps may include the lack of awareness among many primary-care teams of existing decision supports	• Centre for Effective Practice provides support for electronic health record integration and evidence use
Aligned governance, financial and delivery arrangements: 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	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 2) Mandates for preparing, sharing and reporting on quality-improvement plans 3) Mandates for accreditation 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) 5) Value-based innovation-procurement model 6) Funding and active support to spread effective practices across sites 7) Standards for provincial expert groups to involve patients, a methodologist, use existing data and evidence to inform and justify their recommendations 8) Mechanisms to jointly set rapid-learning and improvement priorities	• Interprofessional team-based primary-care organizations are now required to prepare, share and report on quality-improvement plans • LHIN sub-regions, and primary-care networks within them, will provide the basis for community-driven decisions about rapid-learning and improvement priorities, approaches, etc. (if the new governing party does not change this plan) • Gaps may include the lack of requirements for other types of primary-care organizations to prepare, share and report on quality-improvement plans, and the lack of incentives or supports for primary-care providers to enter data appropriately	• UWO's Centre for Studies in Family Medicine is working with the Alliance for Healthier Communities to support its use of a rapid-learning health system as the organizing framework for much of its work with community-governed primary-care organizations

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Characteristic	Examples	Health-system receptors and supports	Research-system supports
	9) Mechanisms to identify and share the 'reproducible building blocks' of a rapid-learning health system		
Culture of rapid learning and improvement: Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability	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'	• Primary-care funding models have supported the emergence of more team-based primary care • Many community-care governed primary-care organizations are explicitly developing a culture of rapid learning and improvement • Gaps may include the limited focus of other types of primary-care organizations on developing a culture of rapid learning and improvement	• None identified
Competencies for rapid learning and improvement: 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	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)	• Ontario College of Family Physicians has supported communities of practice and mentorship networks focused on opioid management and medical assistance in dying	• Gaps may include the lack of a distributed model of data and research supports across primary care

Evidence >> Insight >> Action

Table A4: Assets and gaps in the area of <u>aging</u> (or for the elderly population or a relevant 'problem focus,' such as frailty) in Ontario

Characteristic	Examples	Health-system receptors and supports	Research-system supports

Engaged patients:
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
	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)
	2) Engage patients, families and citizens in:
	  a) their own health (e.g., goal setting; self-management and living well with conditions; access to personal health information, including test results)
	  b) their own care (e.g., shared decision-making; use of patient decision aids)
	  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)
	  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)
	  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)
	  f) research (e.g., engaging patients as research partners; eliciting patients' input on research priorities)
	3) Build patient/citizen capacity to engage in all of the above
		• None identified	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Digital capture, linkage and timely sharing of relevant data: 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)	1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing) 2) Capacity to capture patient-reported experiences (for both services and transitions), clinical encounters, outcomes and costs 3) Capacity to capture longitudinal data across time and settings 4) Capacity to link data about health, healthcare, social care, and the social determinants of health 5) Capacity to analyze data (e.g., staff and resources) 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)	• MyPractice reports enable physicians working in long-term care homes to confidentially see their prescribing patterns (including antipsychotics and benzodiazepines) in relation to peers across the province, and presents data on resident characteristics (e.g., aggressive behaviour scale, clinical indications, and percentage of new residents) • HQO provide various performance measures on long-term care and home care • Gaps may include that MyPractice reports are only sent to those who subscribe to them, and the reports don't yet provide comparators that reflect comparable patient populations or focus on indicators that have been prioritized by patients and providers	• None identified
Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations	1) Distributed capacity to produce and share research (including evaluations) in a timely way 2) Distributed research-ethics infrastructure that can support rapid-cycle evaluations 3) Capacity to synthesize research evidence in a timely way 4) One-stop shops for local evaluations and pre-appraised syntheses 5) Capacity to access, adapt and apply research evidence 6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers	• None identified	• Labarge Optimal Aging Opportunities Fund provides seed funding to support innovative and interdisciplinary projects that aim to improve the lives of Canada's older adults • Schlegel-UW Research Institute for Aging conducts research to enhance care and improve quality of life for older adults
Appropriate decision supports: Systems support informed decision-	1) Decision supports at all levels – self-management, clinical encounter,	• Government of Ontario hosts a portal providing information about programs and services available to	• McMaster Optimal Aging Portal provides patient-targeted, evidence-based resources

Characteristic	Examples	Health-system receptors and supports	Research-system supports
making at all levels with appropriate data, evidence, and decision-making frameworks	program, organization, regional health authority and government – such as a) patient-targeted evidence-based resources b) patient decision aids c) patient goal-setting supports d) clinical practice guidelines e) clinical decision support systems (including those embedded in electronic health records) f) quality standards g) care pathways h) health technology assessments i) descriptions of how the health system works	help Ontarians aged 65 and over to lead a healthy, active and engaged life • Choosing Wisely Ontario (a collaboration between Health Quality Ontario, Choosing Wisely Canada, and the Ontario College of Family Physicians) has a campaign in the long-term care sector focusing on appropriate prescribing with respect to antipsychotic use, diabetes care, and asymptomatic bacteriuria • HQO's Experiencing Integrated Care examines key touchpoints where patients 55 years and older are in transition from one healthcare provider to another, and where care coordination and communication is needed	to support self-management and shared decision-making • Health TAPESTRY supports goal setting and achievement among older adults in select communities • Ontario Pharmacy Evidence Network (OPEN) produces and supports the implementation of guidelines, often with a focus on older adults (e.g., deprescribing guidelines for the elderly)
Aligned governance, financial and delivery arrangements: 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	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 2) Mandates for preparing, sharing and reporting on quality-improvement plans 3) Mandates for accreditation 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) 5) Value-based innovation-procurement model 6) Funding and active support to spread effective practices across sites 7) Standards for provincial expert groups to involve patients, a methodologist, use existing data and evidence to inform and justify their recommendations 8) Mechanisms to jointly set rapid-learning and improvement priorities 9) Mechanisms to identify and share the 'reproducible building blocks' of a rapid-learning health system	• Councils on Aging Network of Ontario (CANO) is a network of organizations taking leadership in education, advocacy, research and planning that enhance the quality of life of older adults in their communities • Ontario Interdisciplinary Council for Aging & Health seeks to enhance the well-being of older adults by promoting partnerships and collaboration among universities and stakeholders to improve interdisciplinary and interprofessional education, research, policy and practice related to aging • Ontario Ministry for Seniors and Accessibility develops and delivers public services to older adults to improve their quality of life so they can be safe, engaged, active and healthy	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Culture of rapid learning and improvement: Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability	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'	• None identified	• None identified
Competencies for rapid learning and improvement: 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	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)	• Ministry launched a new performance tool to increase transparency in long-term care for families	• Seniors Health Knowledge Network shares evidence-based care practices within all seniors' healthcare venues (particularly among long-term and community-care staff) and informs policy development for service providers and care settings

Table A5: Assets and gaps in mental health and addictions in Ontario

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Engaged patients: 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	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) 2) Engage patients, families and citizens in: a) their own health (e.g., goal setting; self-management and living well with conditions; access to personal health information, including test results) b) their own care (e.g., shared decision-making; use of patient decision aids) 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) 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) 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) f) research (e.g., engaging patients as research partners; eliciting patients' input on research priorities)	• MoHLTC involves people with lived experience in setting direction for the sub-system: e.g., 1) Persons with Lived Experience Reference Panel; 2) Family Reference Panel; and 3) Mental Health and Addictions Leadership Advisory Council • LHINs (e.g., Mississauga Halton) are investing in Peer Support System Leads to help build capacity for peer-support workers in health organizations • Mental health and addictions hospitals are required to have Patient and Family Advisory Councils (PFACs) to help set direction for their organizations and to involve patients in developing their Quality Improvement Plans • Provincial organizations involve people with lived experience in their work: e.g., 1) Ontario Peer Development Initiative; 2) New Mentality (for youth); 3) Family Association for Mental Health; 4) Parents for Children's Mental Health; 5) Mood Disorders Association of Ontario; and 6) Schizophrenia Society of Ontario • Resources, such as 'Strengthening Your Voice,' are available to support people with lived experience to become engaged in the sub-system • Gaps may include: no requirements or incentives for co-design of publicly funded programs and services; no mandated PFACs in community-based organizations or explicit requirements or incentives for them to progressively strengthen their approaches to patient engagement; people with lived experience are not always well prepared to participate confidently in system- and policy-level conversations; no supports for organizations about how to approach or document patient engagement when their client base is comprised of many individuals who are involuntary patients, patients with a substitute decision-maker and patients whose care is under treatment orders from the courts or Ontario Review Board; and no explicit process for reconciliation when the input of people with lived experience conflicts with research evidence, provider perspectives or policy direction	• Evidence Exchange Network (EENet) maintains a panel of people with lived experience to steer its efforts to create and share evidence to build a better sub-system • The 'Ontario Perception of Care Tool for Mental Health and Addictions' provides a standardized way of gathering client feedback on the quality of care received in community and hospital settings across all LHINs • A partnership among Addictions and Mental Health Ontario, Canadian Mental Health Association and HQO (through the Excellence through Quality Improvement Project, EQIP), as well as a DeGroote School of Business research group, have been actively using co-design principles in their work • Many researchers engage people with lived experience as members of their research team or as key partners in their research • Gaps may include: engaging people with lived experience in research is still not consistent (it is often dependent on the values of individual researchers) or systematic (it is often dependent on existing relationships)

Evidence >> Insight >> Action

Characteristic	Examples	Health-system receptors and supports	Research-system supports
	3) Build patient/citizen capacity to engage in all of the above		
Digital capture, linkage and timely sharing of relevant data: 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)	1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing) 2) Capacity to capture patient-reported experiences (for both services and transitions), clinical encounters, outcomes and costs 3) Capacity to capture longitudinal data across time and settings 4) Capacity to link data about health, healthcare, social care, and the social determinants of health 5) Capacity to analyze data (e.g., staff and resources) 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)	• Ontario Mental Health and Addictions Leadership Advisory Council proposed in its final report performance indicators that include patient experience • Mental Health and Addiction Quality Initiative has developed quality indicators for mental health and addictions hospitals (and these hospitals have access to utilization data through the IntelliHEALTH system) • Drug and Alcohol Treatment Information System (DATIS) collects, studies and reports substance abuse and problem gambling demographic and clinical utilization data for more than 170 organizations • Project underway to document wait times for mental health and addictions services, beginning with the four mental health and addictions hospitals and supported by the Centre for Addiction and Mental Health's Provincial System Support Program and Cancer Care Ontario • The Resident Assessment Instrument – Mental Health is increasingly being used across the sub-system (and the Mental Health Clinical Assessment Protocols are increasingly being used for care planning) • HQO's MyPractice reports provide practice-level performance data about opioid prescribing for primary-care providers • Gaps may include: Mental Health and Addiction Quality Initiative is still paper-based and not 'real time' (and other data may only be submitted quarterly); wait-times project is led by an organization outside the sub-system (Cancer Care Ontario) and data are not 'real time' or yet publicly available; no consistent definition of wait times, restraint and other key indicators; no consistent standards for what types of 'people with lived experiences' data to collect and how; data for those obtaining care in community-based organizations (although some are being collected through an ICES pilot), for children (although those for 13 key performance indicators about children and youth services are being aggregated centrally through a pilot) and to support equity analyses are particularly under-developed; many organizations don't have the staff and infrastructure to analyze and present locally contextualized data to support learning and improvement, although this is improving through	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		initiatives like EQIP; and HQO's MyPractice reports are only sent to those who subscribe to them	
Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options and implementation considerations	1) Distributed capacity to produce and share research (including evaluations) in a timely way 2) Distributed research-ethics infrastructure that can support rapid-cycle evaluations 3) Capacity to synthesize research evidence in a timely way 4) One-stop shops for local evaluations and pre-appraised syntheses 5) Capacity to access, adapt and apply research evidence 6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers	• Centre for Addiction and Mental Health's Provincial System Support Program, Evidence Exchange Network (EENet), Centre of Excellence for Child and Youth Mental Health, and School Mental Health Assist each synthesize, curate and share research evidence in their respective areas with individuals at all levels through a variety of mechanisms • Gaps may include: few organizations have explicit arrangements to ensure access to supports for conducting rapid-cycle evaluations or to find and use research evidence; and no distributed research ethics infrastructure to support rapid-cycle evaluations	• ICES recently launched a mental health and addictions sub-system performance scorecard, which provides baseline data on provincial quality indicators (client-centred, timely, safe, effective, efficient and equitable) • Yona Lunsky linked ICES data with data from the Ministry of Community and Social Services to create a more fulsome understanding of the health needs and healthcare use of adults with developmental disabilities • Some mental health and addictions hospitals (e.g., Waypoint) collaborate with local agencies to jointly set research priorities • Gaps may include: lack of timely access to data, lack of centralized patient-experience data and community-based organization data, and limited capacity for linkage of these data limits the ability of researchers to use existing data to answer relevant questions; and limited research in community-based organizations and for children and youth, and lack of a centralized platform for researchers seeking partners for such research
Appropriate decision supports: Systems support informed decision-making at all levels with appropriate data, evidence, and decision-making frameworks	1) Decision supports at all levels – self-management, clinical encounter, program, organization, regional health authority and government – such as a) patient-targeted evidence-based resources b) patient decision aids c) patient goal-setting supports d) clinical practice guidelines e) clinical decision support systems (including those embedded in electronic health records) f) quality standards g) care pathways h) health technology assessments i) descriptions of how the health system works	• Many groups (e.g., HQO) make recommendations to providers about optimal care • All four mental health and addictions hospitals are taking steps to standardize order sets and care pathways • Gaps may include: no individualized feedback is sent to front-line providers about their performance – on its own, in comparison to relevant peers or in comparison to recommendations for optimal care (beyond the opioid prescribing example provided above)	• None identified

Evidence >> Insight >> Action

Characteristic	Examples	Health-system receptors and supports	Research-system supports
Aligned governance, financial and delivery arrangements: 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	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 2) Mandates for preparing, sharing and reporting on quality-improvement plans 3) Mandates for accreditation 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) 5) Value-based innovation-procurement model 6) Funding and active support to spread effective practices across sites 7) Standards for provincial expert groups to involve patients, a methodologist, use existing data and evidence to inform and justify their recommendations 8) Mechanisms to jointly set rapid-learning and improvement priorities 9) Mechanisms to identify and share the 'reproducible building blocks' of a rapid-learning health system	• Mental health and addictions hospitals are now required to prepare, share and report on Quality Improvement Plans • MoHLTC has appointed a special advisor to recommend a governance model for the sub-system • Mental health and addictions hospitals have some joint planning groups that can be harnessed to support rapid learning and improvement (e.g., CEO forum, forensic directors group) • Gaps may include: governance of the sub-system is effectively distributed across the government ministries that fund parts of it (health, child and youth services, education and justice), although lead agencies in 33 geographical service areas are attempting to provide more integration for children and youth services; regulatory colleges do not emphasize competencies for rapid learning and improvement among mental health and addictions professionals; financial arrangements often reinforce silos, which pose challenges for rapid learning and improvement; community-based organizations are not required to prepare, share and report on Quality Improvement Plans; and no mechanism for health and research systems to jointly set learning and improvement priorities or to fund initiatives to address them	• None identified
Culture of rapid learning and improvement: Systems are stewarded at all levels by leaders committed to a culture of teamwork, collaboration and adaptability	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'	• Mental health and addictions hospitals have created the Mental Health and Addictions Quality Initiative, which supports regular meetings of the CEOs to undertake joint initiatives aimed at improving quality • Gaps may include: most mental health and addictions organizations do not have a culture of embedding rapid learning and improvement in their operations (or of supporting collaboration across professions or 'silos' and across data analytics, decision support, quality improvement and research groups); and many mental health and addictions organizations have faced a great deal of change in a short amount of time	• None identified
Competencies for rapid learning and improvement: Systems are	1) Public reporting on rapid learning and improvement	• Addictions and Mental Health Ontario, Canadian Mental Health Association, and Health Quality Ontario have	• Training workshop are offered by many organizations (e.g., Mental Health Council of

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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)	been collaborating on the Excellence through Quality Improvement Project to enhance the ability of community-based organizations to understand and apply quality-improvement methods • Centre for Addiction and Mental Health's Provincial System Support Program and the Centre of Excellence for Child and Youth Mental Health have developed tools, resources and training on effective implementation approaches • Gaps may include: lack of agreement about the competencies needed (e.g., data literacy, co-design, scaling up and leadership) and which are needed in all organizations versus in more centralized support units; and lack of learning collaboratives and other elements of the infrastructure needed to support rapid learning and improvement	Canada and SickKids) to support researchers and knowledge-translation practitioners, often for those in the mental health sub-system or other domains where 'evidence-based programs' are rolled out, to gain competencies in knowledge translation • Many mental health and addictions researchers don't have a sufficient understanding of program, organization, sub-system and government contexts to support rapid learning and improvement at these levels

APPENDICES B

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 (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 rapid-learning health systems. 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 rapid-learning health systems.

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 B1:   **Systematic reviews relevant to Element 1 – Support problem-focused rapid-learning and improvement**

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
Sharing and supporting the adaptation of tools and mechanisms used to support rapid learning and improvement	None identified						
Adapting the Adopting Research and Improve Care (ARTIC) model to better align with the full rapid-learning health system framework and use it to plan for the scale up and widespread adoption of receptors and supports across the province	None identified						
Developing a community of practice across the problem-focused areas	Evaluating how and why communities of practice are established in the healthcare sector (30)	This review included 31 papers examining the rationale and procedure for establishing communities of practice (CoP) in the healthcare sector. As the form and function varies quite greatly between CoPs, the cultivation of CoPs to benefit healthcare organizations requires a flexible framework that will guide rather than prescribe their establishment and facilitation. To this end, CoPs are complex, multifaceted programs that also operate using different models. Additionally, given that CoPs are used in healthcare to influence change in practice, which requires a change in practitioner behaviour, the social and cultural context within which they operate is likely to influence impact. If	2009	3/9	7/31	0/31	0/31

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		CoPs are to be cultivated to benefit healthcare organizations, future research needs to take into consideration this complex and varying nature of CoPs and adopt other methods more suitable for evaluating complex programs in healthcare. In conclusion, CoPs in the healthcare sector vary in form and purpose. While researchers are increasing their efforts to examine the impact of CoPs in healthcare, cultivating CoPs to improve healthcare performance requires a greater understanding of how to establish and support CoPs to maximize their potential to improve healthcare. This review is subject to publication bias as grey literature was excluded from inclusion.					
	Evaluating the effectiveness of communities of practice used in both the health and business sector and to identify whether there is evidence to support their use in the health sector in order to improve the utilization of best practices and as a way to mentor new practitioners (31)	Communities of practice (CoP) were seen to vary significantly in their structure, including differing levels of formality. CoPs were defined by four characteristics including "social interaction among members, knowledge sharing, knowledge creation, and identity building." The appearance of these characteristics in CoPs was inconsistent. More studies are necessary to determine the effectiveness of CoPs in healthcare settings, and more specifically how the defining characteristics are present in teams.	2005	5/10 (AMSTAR rating from Program in Policy Decision-making)	Not reported in detail	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		None of the studies included met the quantitative analysis criteria, so conclusions from this data were limited.					

Appendix B2:   Systematic reviews relevant to Element 2 – Support local area-focused rapid learning and improvement

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
Building local capacity (within local organizations and with front-line staff) and establishing dedicated staff to identify improvement priorities	Examining the processes and impacts of developing, implementing and adopting human-resource information systems (HRIS) in health organizations (32)	Human-resource information systems (HRIS) are a sub-category of administrative systems within health organizations. These systems deal with the management of human resources, including recruitment, teaching, planning and resource allocation. HRIS has potential benefit in healthcare, but further research is needed to identify its usefulness, effectiveness and implementation barriers. The review aimed to assess evidence on HRIS across healthcare organizations, focusing on the methods employed and the focus of interest across studies. This review found that few studies considered the socio-contextual and technological factors that influence the operation of HRIS in this context. These factors are crucial in considering the impact of this system. Many studies applied theoretical frameworks, but these frameworks varied across research. Most research in this area focuses on applied projects – in order to advance theoretical understanding, there must be an emphasis on the theory of HRIS development, implementation and use. The focus of studies varies, with high-income countries largely focusing on smaller-scale projects. Lower-income countries mainly focus on broader systems of decision-making and policymaking. Finally, there are a limited number of studies focusing on the development and outcomes of HRIS projects as most current research emphasizes usage of HRIS. The review explored HRIS in healthcare, and found that there are important gaps in knowledge when it comes to the impact and effectiveness of these systems. As the cost and size of the healthcare system grows, the need for linkage between administrative data and clinical outcomes grows in importance. In order to enhance "learning" health systems, future research should broadly examine the value of information within health systems.	2014	8/9 (AMSTAR rating from McMaster Health Forum)	5/42	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
Determining what resources are available in (and beyond) local organizations and how they can be effectively harnessed to drive improvements	None identified						
Creating mechanisms for local staff to ensure the spread of lessons learned from approaches implemented elsewhere, and to foster cultural change favourable to rapid learning and improvement	Examining the effectiveness of strategies to change organizational culture in order to improve healthcare performance (40)	No studies met the methodological quality criteria used by the Cochrane EPOC Group and evaluated the effectiveness of strategies to change organizational culture to improve healthcare performance. Thus, the authors were unable to draw any conclusions about the effectiveness of strategies to change organizational culture.	2009	5/6 (AMSTAR rating from McMaster Health Forum)	Not applicable (empty review)	Not applicable (empty review)	Not applicable (empty review)
	Identifying quantitative instruments available to health service researchers who want to measure culture and cultural change (41)	The review included 13 instruments to assess organizational culture. For each instrument, the review examined cultural dimensions, the number of items for each questionnaire, the measurement scale adopted, examples of studies, which has used the tools, the scientific properties of the instrument, and any additional comments.

The review divided the instruments into either typological approaches, whereby the instrument assesses one or more types of organizational culture, or dimensional approaches, which describes a culture by its position on a number of continuous variables. The majority of the instruments adopted a dimensional approach and use Likert scales to assess agreement. All of the instruments assess employee perceptions and opinions about their working environment, but only a few, such as the Competing Values Framework and the Organizational Culture Inventory, try to examine the values and beliefs that inform those views. | 2001 | 8/9 (AMSTAR rating from McMaster Health Forum) | Not reported in detail | Not reported in detail | Not reported in detail |

Evidence >> Insight >> Action

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		Ultimately, while a range of instruments is available to measure the culture of health organizations, all have limitations in their scope, ease of use or scientific properties. Ultimately, choosing an ideal instrument depends on the purpose of the investigation and the intended use of the results. In addition, the costs of instrument administration and data analysis are important factors to consider, and some instruments are freely available, while others are sold commercially at varying prices. Even when free instruments are used, the cost of data analysis should always be considered.					
	Assessing how organizational readiness for change has been defined and measured in health services research and other fields (42)	The review defines organizational change as any modification to organization composition, structure or behaviour, while readiness refers to being psychologically and behaviourally prepared to implement organizational change. The review included 106 articles, 34 of which offered only conceptual discussions on organizational readiness for change, with the remainder reporting on empirical research. Little consistency was found around the language used to describe readiness for change, with other terms being used such as change acceptance, change commitment, attitudes toward change, reactions to change, and agent capacity. A number of authors referred to the planned theory of action, whereby readiness would be equivalent to the preparation stage (e.g., take action in the next 30 days). Other authors take a structural approach whereby they emphasize organizational capabilities and resources at their disposal. The review identified 43 instruments for measuring organizational readiness for change that had been used in empirical research and that had close-ended questions with response formats permitting psychometric assessment. However, only half of these	2007	6/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

Evidence >> Insight >> Action

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		have undergone a process for ensuring content validity. Ultimately, only seven tools had undergone a systematic assessment of validity and reliability. Generally, there is a lack of reliable and valid instruments for assessing organizational readiness for change, particularly at the organizational-level, for which none of these instruments can be applied.					
	Examining the use of research evidence by public-health decision-makers in universal health systems (43)	The review included 18 studies that examined: 1) the extent to which research evidence is used by public-health decision-makers; 2) types of research evidence used by public-health decision-makers; 3) the process of using research evidence; 4) factors, other than research, influencing public-health decision-making processes; and 5) barriers and facilitators in the use of research evidence. Relatively little evidence was found that quantified the extent to which research evidence is used in public-health decision-making processes. One study found that 63% of participating Ontario public-health staff reported using at least one systematic review, and one study conducted in Australia found that 28% of public-health policymakers reported using academic research. Two studies explored the types of research evidence used by public-health decision-makers, which included primary research studies, systematic reviews, internal program evaluations, local and provincial best practices, observation studies, household studies, controlled evaluations of interventions, natural policy experiments, and historical evidence. Relatively few studies revealed the process through which research evidence was used in decision-making. Two qualitative studies explored how research evidence was accessed by decision-makers and found senior bureaucrats used experts, technical reports, monographs and bulletins, the internet, statistical data, policymakers in other jurisdictions, academic	2010	9/10 (AMSTAR rating from McMaster Health Forum)	8/18	Not reported in detail	Not reported in detail

Evidence >> Insight >> Action

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		literature, internal expertise, government policy documents, and consultants. One quantitative study found that the most used sources of evidence about chronic-disease prevention and control was printed academic literature followed by websites and provincial health and recreation organizations. Five qualitative studies explored the process through which research evidence was applied to decision-making and found that it was generally used to justify decisions after they had been made. The bulk of the literature found addressed factors that influence public-health decision-making processes. The review found that other factors from studies in the U.K. and Canada include: financial sustainability; local competition; strategic fit; pressure from stakeholders; and public opinion. The studies included in the review also highlighted the influence of key personnel in the decision-making process, either by judgments based on common sense and expert opinion, or by acting as a filter through which evidence is transferred. The majority of qualitative literature explored barriers and facilitators to the use of research evidence. There is a general consensus across the literature on the most important factor limiting the use of research evidence, which is a perceived lack of research evidence. Other barriers included negative perceptions of available research, an undue focus on RCTs, too much scientific uncertainty, poor local applicability, a lack of focus on the social determinants of health, and a lack of complexity to address multi-component health systems. The evidence base on how to overcome these barriers is less extensive, but included: improved communication and sustained dialogue between researchers and end users; establishing trust between researchers and policymakers; capacity building among researchers to effectively disseminate evidence; and capacity building about decision-makers to critically appraise research.					

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		In two studies, it was believed that changing the organizational culture within which policymakers work (in terms of structures, rewards and training) so that more value is placed on the use of research evidence for decisions might encourage its use. While changing the culture towards one that places greater value on research evidence was often cited in the literature, no actionable interventions were suggested to enable this shift.					
	Examining the spread and sustainability of innovations in health-service delivery and organization (45)	This review used 495 articles examining the spread and sustainability of innovations in health-service delivery and organization. Of these studies, 213 were empirical and 282 were non-empirical. This review synthesized research evidence across a number of disciplines, including medical sociology, marketing, health promotion and evidence-based medicine. From the literature, eight broad themes were elucidated on the spread and sustainability of innovations in health service: the innovation; adoption by individuals; assimilation by the system; diffusion and dissemination; system antecedents for innovation; system readiness for innovation; inter-organizational networks and collaboration; and implementation and routinization. This non-systematic review supports the idea that innovations have key attributes, which affect their subsequent adoption. Innovations are more likely to be adopted if they are advantageous, compatible, simple, are able to be experimented with, if their benefits are observable, and if they can be reinvented. These are considered to be the "standard" attributes that are necessary to explain the adoption of innovations, but additional key attributes also contribute to this phenomenon. For instance, the adaptability of the peripheral attributes of an innovation contribute to its adoptability. Further, innovations that are safer, improve task performance,	2003	6/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		are easy to learn to use, and are supported by other products are more likely to be adopted. People actively seek out innovations, and certain personal characteristics can affect the adoption process. Psychological antecedents, such as intellect, motivation and learning style, can affect the adoption of an innovation. The personal meaning of an innovation to a person is an important component of this process, and the final decision to adopt is often dependent on other decisions. Further, a person can have concerns at numerous stages during this process: before the innovation, during early use, and after use has been established. Successful individual adoption of an innovation is only one component of the process; the innovation must also be assimilated by the system. Evidence demonstrates that this process is often messy, with organizations moving between initiation, development and implementation. Various system components work to diffuse and disseminate an innovation. The structure of a network, the homophilous nature of innovation-users, and strong leaders who influence their colleagues, support the innovation, and have ties both in and out of the organization, are all factors that promote the adoption of an innovation. Further, planned and effective dissemination programs that consider the needs of organizations promote adoption of the innovation. Some features of organizations have been shown to influence the assimilation of innovations. The structure of an organization affects innovation adoption; a large, mature, functionally differentiated and specialized organization will take up new innovations more readily. Innovations will be taken up more easily by organizations that are able to					

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		absorb and apply new knowledge, and receive and incorporate change. A system must be ready to adopt an innovation. The elements of system readiness include tension for change, the innovation-system fit, the assessment of the implications for this innovation, support for the innovation, dedication to time and resources, and an organization's capacity to evaluate the innovation. The adoption of an innovation is affected by external influences. Inter-organizational networks, networking initiatives, and policy context are important variables to consider when examining the adoptability of an innovation by an organization. The implementation of innovations depends on the structure of an organization, its leadership, human resources, funding, communication, external networks, feedback during the process, and adaptability of the innovation itself.					
	Identifying guiding principles underlying efforts to stimulate sustained cultural change; the mechanisms by which these principles operate; and the contextual factors influencing the likelihood of these principles being effective (44)	The review included 68 studies that focused on identifying the actionable factors that influence cultural change, and determining what works, for whom and in what contexts. The review identified six guiding principles associated with sustaining organizational culture change: align vision and action; make incremental changes within a comprehensive transformation strategy; foster distributed leadership; promote staff engagement; create collaborative interpersonal relationships; and assess cultural change. The review points out that these guiding principles interact with contextual elements such as local power distributions, pre-existing values and beliefs, and readiness to engage. In addition, a variety of facilitators and barriers influence whether these guiding principles are of use to sustain change, and may include activation of a shared sense of urgency and fostering flexible levels of engagement.	2011	5/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

Evidence >> Insight >> Action

Appendix B3:   Systematic reviews relevant to Element 3 – Coordinate efforts to support rapid learning and improvement across the province

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
Adopting a rapid-learning health systems framework within the ministry and across relevant provincial agencies (within and beyond the health sector)	Examining attempts to adopt the Learning Health System paradigm, with an emphasis on implementations and evaluating the impact on current medical practices (46)	The review examined 32 documents, including 13 studies, in order to examine the attempts to adopt the Learning Health System paradigm. A learning healthcare system is driven to generate and apply the best evidence for collaborative healthcare, while focusing on innovation, quality, safety and value. Patients are a major factor in this model of health provision, given the emphasis on collaboration and collective decision-making. This review examines the attempts to implement this model of medicine. The results of this review indicate that there has been very little action in terms of implementing learning health systems, despite a great deal of interest. It is possible that there is great trust placed in the learning health system without proper assessment of impact. This may have contributed to the low number of studies qualifying for inclusion in the review. A major focus should be placed on assessment and reporting, considering that many attempts to adopt this system of health have been attempted and not reported. Existing frameworks for assessing medicine applications can be used to assess the efficacy of learning health systems. Further, reporting of the evaluation of these systems must be comprehensive. Lack of consistency	2015	3/10 (AMSTAR rating from McMaster Health Forum)	0/13	Not reported in detail	13/13

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		across studies diminishes quality and effectiveness, and makes it difficult to assess outcomes. Taken together, the Learning Health System paradigm must be of central focus to researchers moving forward. While the central tenets of this approach are supported by researchers, there is a lack of assessment. The impact of such a system must be evaluated in order to boost adoption.					
	Examining the spectrum of ethical issues that is raised for stakeholders in a Learning Health System (47)	The review examined 65 studies in order to determine the spectrum of ethical issues raised for stakeholders in a "Learning Health Care System". A Learning Health Care System embodies an approach for integrating clinical research and clinical practice, in order to address problems of effectiveness and efficiency in the healthcare system. In such a system, knowledge generation should be embedded so that health systems can learn and grow. However, this blend of research and practice raises ethical dilemmas such as confidentiality and consent. This review aimed to summarize pertinent ethical issues in order to guide decision-making among healthcare professionals and policymakers. The ethical issues arising in Learning Health Care Systems can be broken down into different phases. In the phase of designing activities, ethical issues include the risk of negative outcomes that may result from activities that are	2015	1/9 (AMSTAR rating from McMaster Health Forum)	Not reported in detail	Not reported in detail	65/65

Evidence >> Insight >> Action

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		not academically rigorous. As well, it is possible that stakeholders will not engage with this stage, which can affect trust and support in a learning activity. In the ethical oversight of activities, confusion surrounding ethical obligations and regulations can hinder progress. In conducting activities, the involvement of participants can lead to ethical difficulties with consent and data management. In implementing learning, main difficulties arise in changing practice efficiently, maintaining transparency, and reducing unintended negative consequences. The distinction between "research" and "practice" often creates ethical confusion, as many learning healthcare activities do not fit this dichotomy. Strategies to cope with these ethical problems include implementing policies and procedures, providing training and guidance for ethical committee members, and streamlining ethical review processes. The rights of individuals must be protected as healthcare quality improves. Future research should focus on clarifying these ethical dilemmas and contribute to improving the quality of healthcare.					
Determining who should be responsible for the coordination of efforts to use this framework	Examining government's role in coordinating large-scale health-system transformations (59)	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	Not reported	3/9 (AMSTAR rating provided by McMaster Health Forum)	Not reported in detail	Not reported in detail	Not reported in detail

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		which were validated and modified during two rounds of merit review with international experts. 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. 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. 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					

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		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. 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 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. 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 healthcare 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					

Sub-element	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on rapid-learning health systems
		that patient engagement is not reduced to patient satisfaction surveys alone.					
Supporting connections among assets at other levels of the health system	None identified						

McMaster University

McMaster
HEALTH FORUM

>> Contact us
1280 Main St. West, MML-417
Hamilton, ON, Canada L8S 4L6
+1.905.525.9140 x 22121
forum@mcmaster.ca

>> Find and follow us
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