Rapid Synthesis

Creating Rapid-learning Health Systems in Canada

Appendix C1: Health system as a whole

10 December 2018

McMaster University | McMaster HEALTH FORUM

EVIDENCE >> INSIGHT >> ACTION

Rapid Synthesis:
Creating Rapid-learning Health Systems in Canada
Appendix C1: Health system as a whole
90-day response

Lavis JN, Gauvin F-P, Mattison CA, Moat KA, Waddell K, Wilson MG, Reid R. Appendix C1: Health system as a whole: Creating rapid-learning health systems in Canada. Hamilton, Canada: McMaster Health Forum, 10 December 2018.

Table 1: Assets and gaps at the level of the federal government and national or pan-Canadian initiatives

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) 1) Build patient/citizen capacity to engage in all of the above	• 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 across Canada • Patients Canada champions healthcare change that matters to patients and the use of patient and caregiver stories in driving change • Patients for Patient Safety Canada – a patient-led program of the Canadian Patient Safety Institute – brings patient safety experiences to efforts to improve patient safety • Many national health charities host patient and family councils, networks and other initiatives • Many advocacy organizations involve patients and families, however, their connections to companies providing the products and services being advocated for are not always disclosed • Gaps may include less programmatic attention to supporting patient-led rapid learning and improvement	• Health Experiences captures patients' first-hand accounts of living with particular conditions • Canadian Foundation for Healthcare Improvement hosts a resource hub to support patient engagement in healthcare • James Lind Alliance supports groups of patients and clinicians in Canada (among other countries) to set research priorities for particular conditions • CIHR's Strategy for Patient-Oriented Research (SPOR), including its national networks and provincial SPOR SUPPORT Units, support patient engagement in all aspects of the research process, as well as build capacity for such engagement • Canadian Aboriginal AIDS Network and its partners builds capacity of Indigenous people with HIV/AIDS to participate in community-based research • Patient and Public Engagement Evaluation Tool (PPEET), and a broader Public Engagement Evaluation Toolkit, can be used to evaluate patient engagement (both in health research and in health-system transformation)
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	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	• Canada Health Infoway supports the development, adoption and effective use of digital health solutions • Canadian Institute for Health Information (CIHI) captures, analyzes and shares data about health systems and health, both through its own site and through 'Your Health System' (and a CIHI project is linking patient satisfaction and utilization data) • Gaps may include limited progress in achieving interoperable electronic health records across the country and less programmatic attention to capturing patient-reported experiences	• A SPOR national data platform will soon be launched to provide a single point of timely access to a broad range of harmonized healthcare data • InterRAI develops measurement instruments to support the collection of data about the characteristics and outcomes of persons served in many health- and social-services settings (outside Quebec) • Many national networks (and international networks with Canadian contributors) have developed platforms (or registries) to provide

Characteristic	Examples	Health-system receptors and supports	Research-system supports
provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)	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)		timely access to harmonized healthcare data about select categories of conditions or treatments, as well as benchmarks – select examples include: o neonatal intensive care o prescription drugs (international pharmacosurveillance network) o surgery o cancers (select) o spinal cord injuries • Commonwealth Fund conducts periodic patient (and physician) surveys to enable cross-country comparisons • Statistics Canada supports Research Data Centres to support the use of its rich data resources
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 uneven capacity – within and across jurisdictions – in decision-makers' capacity to access, adapt and apply research evidence to support rapid learning and improvement	• Canadian Institutes of Health Research (CIHR) Institute of Health Services and Policy Research is in the fourth year of a five-year agenda to provide scientific leadership for rapid-learning health systems, and as part of this effort it has supported 'embedded' clinical researchers (clinician scientists) and health policy and services researchers (Health System Impact Fellows), and will be supporting a new program focused on 'embedded' clinical change leaders • Canadian Health Services and Policy Research Alliance has created a working group to support rapid-learning health systems • CIHR's Strategy for Patient-Oriented Research (SPOR), including its national networks and provincial SPOR SUPPORT Units, support patient-oriented research, and the 'Rewarding Success' program rewards rapid learning and improvement • CIHR-funded researchers (Monica Taljaard & Charles Weijer) are studying the ethical issues in rapid-learning health systems and collaborating with national funding agencies to prepare a guidance document on the topic • CIHR, Natural Sciences and Engineering Research Council (NSERC) and Social Sciences and Humanities Research Council (SSHRC) support the Networks of Centres of Excellence Programs to mobilize research, development

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

			and entrepreneurial expertise to address strategic priorities within and beyond health
			• Three one-stop shops provide free access to pre-appraised research evidence
			  o ACCESSSS for reviews and studies that can inform clinical decisions
			  o Health Evidence for reviews of effects that can inform public-health system decisions
			  o Health Systems Evidence and Social Systems Evidence for reviews and economic evaluations that can inform health- and social-system decisions
			• McMaster Health Forum, Cochrane Canada, SPOR Evidence Alliance and other groups prepare rapid syntheses on health-system priorities
			• National Collaborating Centres for Public Health synthesize and share research on public-health priorities
			• Canadian Institute for Military and Veteran Health Research acts as a focal point for 43 universities working together to address the health research requirements of the military personnel and veterans
			• Correctional Service Canada has staff that prepare research reports to address the needs of prisoners in federal correctional facilities
			• Gaps may include less programmatic attention to build capacity for patient-led 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	• Patented Medicine Prices Review Board conducts analyses to set manufacturers' prices for patented medicines • Gaps may include the lack of patient-targeted sites that provide resources that rate highly in terms of the evidence base underpinning them (based on assessments by the McMaster Optimal Aging Portal)	• 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 national health charities focused on particular categories of health conditions (e.g., arthritis, diabetes and heart and stroke) prepare patient-targeted materials • Public Health Agency of Canada (and its collaborators), Canadian Task Force on Preventive Health Care and many professional bodies (e.g., Registered Nurses' Association of Canada) and research groups prepare guidelines

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			• Canadian groups prepare descriptions of how the health system works, both for Canada as a whole and for each province and territory (e.g., Ontario)
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	• Conferences of Federal/Provincial/Territorial (FPT) ministers and deputy ministers of health, as well as related committees (e.g., Committee on Health Workforce) provide a platform for addressing shared challenges • FPT governments have agreed to improve access in one sector (home and community care) and for one category of conditions (mental health and addictions) and the federal government has committed to 10 years of funding to support these shared health priorities (starting in 2017-18) • 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 • Federal government has agreed to working with Indigenous leaders to address their priorities (articulated in the First Nations Health Transformation Agenda, an Inuit-Specific Approach to the Canadian Health Accord, and the Métis National Health Shared Agenda) • Federal government has devolved the planning, funding, management and delivery of health programs in B.C. from the Government of Canada's First Nations and Inuit Health branch to the B.C. First Nations Health authority, which is governed by First Nations peoples • Advisory Council on the Implementation of National Pharmacare is exploring options for implementing a national pharmacare program	• Gaps may include university incentives to publish in the types of high-profile journals that often don't publish 'negative' or very 'local' findings
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'	• Accreditation Canada uses accreditation and related tools to develop and sustain a culture of improvement in health and social services • Gaps may include the lack of national accreditation standards for rapid-learning health organizations and systems	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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)	• 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, including the 'bridge-to-home spread collaborative') 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 national groups develop competencies and use an array of other approaches to support improvement in select areas o Canadian Home Care Association and HealthcareCAN for select sectors (in this case, home care and specialty care primarily) o Diabetes Canada and Heart & Stroke for select conditions o Canadian Blood Services, Canadian Deprescribing Network and Choosing Wisely Canada for select treatments (in this case, blood and related donations, prescription drugs, and tests and treatments, respectively) o Children's Healthcare Canada for select populations (in this case, children and youth) o Canadian College of Health Leaders, Joule (Canadian Medical Association) for select cadres of health workers • Professional licensing bodies (e.g., College of Family Physicians Canada and Royal College of Physicians and Surgeons of Canada) have begun to include relevant competencies in training, competency assessment, and program accreditation	• None identified

Table 2: Assets and gaps at the level of British Columbia'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) 3) Build patient/citizen capacity to engage in all of the above	• Some patients have access to their health information through a patient portal, such as: o my ehealth for lab results; o Patient access to electronic health records at several sites (BC Cancer Agency, BC Children's and Women's Hospital, Sunny Hill Health Centre for Children); and o MyHealthPortal for access to personal health information for those in the Interior Health Region • Self-management British Columbia provides supports (e.g., the Self-Management Health Coach Program) for people with chronic conditions and their family members, as well as for health professionals, to participate in self-management programs offered throughout B.C. • Decision aids and other tools to support shared decision-making are used to support informed decisions in some clinical areas (e.g., the aid to decision-making made available by the BC Prenatal Genetic Screening Program and web-based advanced care planning through BC Cancer) • All health regions use co-design approaches to some extent • The Patients as Partners Program works with patients, families and caregivers to support their participation in care, decision-making about their care, identifying how they would like to participate in decision-making, as well as in quality improvement and health-system redesign • The Patient Voices Network, which is supported by the BC Patient Safety and Quality Council, engages patient partners throughout the province to shape how care is delivered, and provides training and supports to prepare patients for engagement opportunities throughout the province • The Provincial Health Services Authority (PHSA), with input from its Patient Experience Council, recently published a plan for patient and family involvement throughout care, treatment and follow-up, and how to engage them to improve the health system, as well as a Community Inclusion Policy and toolkit (i.e., how-to-guide) that accompanies the policy to support its implementation	• Several provincial initiatives focus on enhancing how patient-oriented research is conducted, which include the BC SUPPORT Unit, BC Primary Health Care Research Network (see Table 2 for more details about this initiative) and the SPOR Networks in Chronic Disease • Each of the SPOR initiatives listed above include patient advisory structures and capacity building initiatives • Some research groups (e.g., Institute for Community Engaged Research) also conduct citizen-engagement projects on a range of topics

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		• The First Nations Health Authority includes a First Nations Health Governance Structure that enables First Nations in B.C. to participate fully in the design and delivery of services, including a systematic approach to ensure that First Nations are included and engaged in processes for health-system redesign at all levels, and a process for client engagement • At a strategic level, "the Ministry of Health's Patients as Partners Initiative brings together patients, families, caregivers, health care providers, not-for-profits, health authorities, nongovernmental organizations, and universities to work together to include patients' voices, choices and representation in health care improvement" • Possible gaps o Few examples of setting and adjusting patient-relevant targets o There can be a gap between policy directions and frameworks that prioritize patient engagement, the implementation of these approaches and whether patient voices have been heard and used o Access to health records can be inconsistent even when access points to patient portals exist (e.g., after admission to hospital, all ability to get access to records ends) o Some patient engagement efforts only superficially engage patients and their families directly in their healthcare o Some initiatives, such as the First Nations Health Authority are still a work in progress (but remain a valuable approach)	
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	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 –	• The B.C. Ministry of Health (MOH) has been working with a partner since 2007 to build the infrastructure needed for interoperable electronic health records (and the BC SUPPORT Unit is engaged in a project to make more data available from electronic medical records) • The Health Data Coalition supports a network of physicians for collaborative use of data • Clinical Data Exchange provides service to distribute clinical documents between health-to-provider electronic medical record (EMR) systems, and the system allows EMR to EMR exchange • The B.C. MOH provides a data catalogue that indexes data sets about health and safety • The Data Management and Stewardship branch is responsible for processing most of the applications	• Population Data BC is a multi-university, data and education resource, which manages 21 data sets from two federal and six provincial sources, and supports access to individual-level, de-identified longitudinal data about B.C. citizens for research purposes. The data included in it are linkable to each other and to external data sets across many areas (e.g., health, education, early childhood development, workplace and the environment), and training is provided to support access to and use of the data • The BC Academic Health Sciences Network brings together three provincial resources (BC SUPPORT Unit, Clinical Trials BC and Research Ethics BC) to create an environment for sharing health data to support collaborative

Characteristic	Examples	Health-system receptors and supports	Research-system supports
and costs) and outcome indicators (e.g., health status)	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)	submitted by provincial health organizations, other public bodies, or eligible researchers • The BC Patient Safety and Quality Council collects both quantitative and qualitative data to improve quality, with a focus on several priority clinical areas (e.g., critical care, sepsis, substance use, surgery) • Data about patient experience have been collected in some areas (e.g., for acute inpatient care and outpatient cancer care), with laboratory services reporting patient experience data twice per year • Patient experience is captured through several mechanisms o BC is one of the five provinces that submits data to the Canadian Patient Experiences Reporting System, which receives data about patient experiences in acute care inpatient hospital stays from the Canadian Patient Experiences Survey for Inpatient Data (however, data is not yet available for public request) o Some organizations routinely capture patient experience with their programs (e.g., the BC Agency for Pathology and Laboratory Medicine which reports survey results twice per year about patient experiences with lab services, patient needs and expectations and opportunities for improvement, and BC Cancer which conducts program surveys, but with unclear reporting frequency) o Results from B.C.-based patient-experience surveys and in-depth interviews for those who received virtual care are published by Canada Health Infoway • The First Nations Health Authority has one of the richest administrative datasets available, as well as a tripartite data quality sharing agreement with the provincial and federal government, which enables it to be a steward with B.C. First Nations and undertake ethical and safe data linkages that support the visibility of First Nations populations • Possible gaps o Uncertainty regarding data-access policies because transitions in government mean that new directions in this are being shaped o While good there is coordinated data infrastructure regionally, there is limited and/or uncoordinated data infrastructure provincially because of different EMR systems between regions (but a system to reconcile data is being created)	research and analytics, including the Health Data Platform Initiative in the province

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		○ Patient experience data is collected routinely across the province, but not reported on publicly on a routine basis ○ Limited capacity to analyze data in some areas ○ Some efforts, but inconsistent, to share local data in a timely way	
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 patients have developed capacity to act as champions and mentors for the conduct of patient-oriented research through the SPOR initiatives that are based in B.C. (e.g., through the BC SUPPORT Unit, BC Primary Health Care Research Network, and the SPOR Networks in Chronic Disease) • The Provincial Health Services Authority is one of the largest health science organizations in the country and has partnerships across the province • The First Nations Health Authority tripartite data quality sharing agreement also applies for the production of research, has created research chairs (e.g., in First Nations heart health and cancer and wellness) to support the ethical conduct of research with First Nations populations, and has research partnerships in place with the BC Academic Health Sciences Network and the Michael Smith Foundation for Health Research • Possible gaps ○ Potential for a significant amount of data to go unanalyzed because of controls and restrictions for who can access data having been significantly tightened over the last four to five years due to a previous data breach, which has increased the amount of time it takes to access data ○ Results of surveys that analyze patient-related experience and patient-related outcomes have been conducted, but are not always released publicly (which gives the impression that these analyses are not being done) and not provided regularly or updated (which makes it impossible to track changes over time)	• The BC Academic Health Sciences Network is focused on distributed capacity to produce (and to a lesser extent share) research in a timely way with activities focused on: ○ strengthening patient-oriented research and trials in B.C. (through the BC SUPPORT Unit); ○ enhancing capacity and competitiveness for conducting world-class clinical trials (though Clinical Trials BC); and ○ streamlining and improving the research-ethics review processes (though Research Ethics BC) through the provision of "a province-wide, harmonized system for research ethics reviews of studies conducted in multiple geographic areas involving the resources, people, patients or data from more than one BC research institution." • The BC Academic Health Sciences Network also states that it seeks to support research groups to collaborate with one another, with patients, and with stakeholders and decision-makers (e.g., through fostering partnership agreements that leverage and connect provincial resources and expertise). • In addition to supporting patient engagement, the BC SUPPORT Unit provides research methods support and supports for data access and use • The BC SUPPORT Unit also offers a course called Foundations in Patient-Oriented Research, which is designed to provide researchers, patients, healthcare providers and health system decision-makers with the necessary knowledge to work in mutually beneficial partnerships doing patient-oriented research. • The Michael Smith Foundation for Health Research supports several knowledge translation

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			(KT) initiatives, including a KT collaborative (scientists and practitioners from around the province focused on KT who meet every six weeks to advance and accelerate KT across B.C.) and the KT pathways project which identified the needed competencies required, interventions and strategies that can be used to reinforce KT initiatives in the province (a tool to further support this work is currently being prepared) • The Centre for Health Evaluation and Outcome Sciences designs and conducts assessments of programs and systems at all levels of the healthcare sector • The Institute for Health System Transformation and Sustainability (IHSTS) focuses on gathering, developing and sharing evidence about the B.C. health system with the aim of informing decisions that have an impact on care quality, cost and sustainability • Research chair in rural health was created, which focuses on many aspects related to learning health systems • Health Research Institute at the University of Northern British Columbia supports collaborative health-related research • The Centre for Clinical Epidemiology and Evaluation includes a focus on promoting and facilitating evidence-informed clinical, managerial and policy decision-making
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	• A range of patient-targeted evidence-based resources are made available, including: o HealthLinkBC provides patient-targeted evidence-based (what it calls "medically approved") information about more than 5,000 health topics, symptoms, and interactive health tools, as well as tips and a search function that indexes more than 6,100 health services in communities; o the BC HealthGuide Handbook (a self-care manual that provides information about preventing illness, home treatment, emergencies and when to see a healthcare provider); and o HealthLinkBC files (fact sheets about health and safety topics) • BC Cancer prepares practice guidelines for a range of different types of cancer	• BC Guidelines produces clinical practice guidelines and protocols that provide recommendations to practitioners (physicians, nurse practitioners, and medical students) to provide optimal care for a range of conditions • The British Columbia Centre for Excellence in HIV/AIDS produces practice guidelines for different settings (e.g., primary care and acute care), specific populations (e.g., adults, pediatric, pregnant women), conditions (e.g., acute and opportunistic infections) and types of treatments (e.g., pre-exposure prophylaxis)

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

		• In addition to internal evidence synthesis supports, the B.C. MOH provides funding to research groups to respond to pressing policy priorities with synthesized evidence
		• Some decision-support systems exist and are used
		• As noted in the 'data' row, the BC Patient Safety and Quality Council is focused on improving quality in the health system, with a focus on several priority clinical areas (e.g., critical care, sepsis, substance use, surgery)
		• Doctors of BC and the B.C. MOH are developing and implementing an enhanced measurement system for physician quality improvement which includes a process to send reports based on quality indicators back to physicians
		• The Physician Quality Improvement Initiative provides support to physicians to lead quality-improvement projects
		• Several examples of care-pathway supports have been developed and implemented (e.g., Pathways is a web-based directory connecting family doctors and specialists to streamline referrals in Vancouver; and Perinatal Services BC which provides pathways and toolkits supporting evidence-based recommendations for routine care during pregnancy and birth)
		• BC Health Technology Assessment is a joint process between the MOH and the health authorities that is used to make evidence-informed decisions about which health technologies (devices, diagnostics and clinical procedures) should receive public funding
		• Health regions have developed decision-support functions along with centralized support from the MOH (e.g., using the blue matrix)
		• Possible gaps
		  ○ Challenges in ensuring that targets or indicators are meaningful for patients
		  ○ While the BC Patient Safety and Quality Council establishes some quality standards though the quality standards committee, there is no coordinated approach across the province for setting standards
		  ○ While decision-support systems exist, they are typically 'siloed' (rather than part of an integrated decision-support system operating across the health system or across health and social systems)	

Aligned governance, financial and delivery	1) Centralized coordination of efforts to adapt a rapid-learning health system approach,	• The Provincial Health Services Authority focuses on ensuring "that BC residents have access to a coordinated	• In addition to their focus on data and analytics, the BC Academic Health Sciences Network is

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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	provincial network of high-quality specialized health-care services", and collaborates/partners with several agencies across the province (BC Cancer, BC Centre for Disease Control, BC Children's Hospital Sunny Hill Health Centre for Children, BC Emergency Health Services, BC Mental Health & Substance Use Services, BC Renal Agency, BC Transplant, BC Women's Hospital and Health Centre, Cardiac Services BC and Perinatal Services BC) • The BC Patient Safety and Quality Council has a focus on quality improvement in the province (e.g., through education and a range of quality-improvement tools) and supports change management • The BC Medical Quality Initiative focuses on advancing medical quality across the province with a focus on medical-imaging quality improvement, multi-professional quality improvement, physician quality improvement and quality assurance • The Provincial Health Services Authority and its agencies undergo accreditation through Accreditation Canada • The governance structure of the First Nations Health Authority that includes four components (First Nations Health Authority, First Nations Health Council, First Nations Health Directors Association and the Tripartite Committee on First Nations Health) is a possible opportunity for a centralized coordination point for a rapid-learning health system • Health authorities are funded through a needs-based formula, which is reviewed and adjusted (if needed) annually and some examples of pay-for-performance have been used in the province (e.g., for reducing emergency department length-of-stay) • The First Nations Health Authority is creating a shared forum for decision-making (e.g., through the creation of partnership accords and joint health and wellness plans) and, through its integration with the MOH and as a funder of First Nations communities, can rapidly redistribute resources to implement changes in response to sub-optimal outcomes • The recently released British Columbia Procurement Strategy has four goals, which collectively place emphasis on ensuring value through: 1) ensuring value and increased benefits to citizens to improve social and environmental outcomes and to promote innovation; 2) making it easier to do business; 3) creating opportunity for business of all sizes; and 4) building greater capacity	an example of centralized coordinated efforts to adopt a rapid-learning health system approach through its focus on efforts targeted at health-system improvement in five priority areas (team-based primary care, strengthened services for seniors, rural and remote care, mental health and addictions, and surgery) through four activities: ○ "brokering collaboration to leverage processes/resources for knowledge translation, scale up and spread of research and best practices; ○ creating opportunities for development, evaluation, and adoption of innovation; ○ identifying and removing barriers that impede change at the system level; and ○ incorporating and building on patients' voices"

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		for procurement in the public services through enhanced training and support • Joint Collaborative Committees are comprised of equal representation from Doctors of BC and the B.C. government with a focus on improving the health system and the quality of care through four committees: o General Practice Service Committee; o Shared Care Committee; o Specialist Services Committee; and o Joint Standing Committee on Rural Issues • Possible gaps o There are no explicit mandates in place for reporting on quality-improvement plans o Uncertainty about the policy framework for developing and implementing the primary-care networks	
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'	• Putting Our Minds Together: Research and Knowledge Management Strategy affirms the MOH's "commitment to use research evidence in health care policy development, implementation and evaluation. It recognizes that research evidence, increasingly and where appropriate, will be developed by and with researchers in partnership with clinicians, policy makers and patients" • The Research and Knowledge Management Strategy also identified 10 research-related gaps in the province for supporting evidence-informed decision-making, along with strategies for addressing them • The BC Patient Safety and Quality Council supports a culture for rapid learning and improvement (e.g., through the Release Time to Care program, which supports teams to take actions to improve outcomes related to improving patient safety and reliability of care, patient experience, staff well-being and efficiency of care) • The First Nations Health Authority has a framework that supports rapid learning and improvement and is creating a shared forum (as noted in the row above) for decision-making (e.g., through the creation of partnership accords and joint health and wellness plans) • Joint Collaborative Committees (as noted in the previous row) are comprised of equal representation from Doctors of BC and the B.C. government and contribute to a rapid-learning and improvement culture through their focus on improving the health system and the quality of care	• The culture for a rapid-learning health system in B.C. in the research system has been fostered through the BC Health Research Strategy that identified actions to achieve three strategic directions that focus on: 1) developing and enhancing key foundations that support the creation and use of knowledge; 2) creating a culture of inquiry and innovation across sectors that encourages health research and its use; and 3) making B.C. a hub for world-class research that makes a difference • There are several examples of either organizations or initiatives within organizations focused on building a culture of rapid learning and improvement (many of which stem directly from the above research strategy), including: o the BC Academic Health Science Network (as outlined in previous rows it has a focus on supporting a learning health system through a variety of activities related to health-system improvement and data and analytics, including organizations in its network such as the BC SUPPORT Unit); and o the Michael Smith Foundation for Health Research through its focus on knowledge translation, including the KT Collaborative and opportunities to share findings and support collaboration such as the Health Xchange and other conferences/meetings

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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)	• The BC Patient Safety and Quality Council has taken a community-development approach to do the type of work required for rapid learning and improvement where the leadership and ownership is from within regions and then the council focuses on building their capacity • BC Divisions of Family Practice is a key support for some of the activities for competencies for rapid learning and improvement in primary care • Possible gap ○ Lack of public-reporting mechanisms for rapid learning and improvement (including patient-experience surveys that are conducted but not made public)	• The focus and activities of the nascent BC Academic Health Sciences Network are designed to support activities 2-5 under the 'examples' column

Table 3: Assets and gaps at the level of Alberta'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) 3) Build patient/citizen capacity to engage in all of the above	• Alberta Health Services (AHS) supports a number of advisory councils comprised of patients and family members o one Patient and Family Advisory Group that advises on strategic goals and initiatives o four provincial advisory councils that advise on province-wide programs and services (addictions and mental health, cancer, seniors and continuing care, and most recently LGBTQ2S+) o 12 health advisory councils that cover geographical areas o 1 Wisdom council comprised of Indigenous peoples o >100 advisory councils in programs and sites (e.g., in all long-term care and supportive living facilities) • AHS strategic clinical networks each have a 'core committee' that includes patients and family members, as well as a 'patient engagement reference group' • Health Quality Council of Alberta supports a Patient/Family Safety Advisory Council that includes patients and family members • Gaps may include less programmatic attention to supporting patient goal setting, self-management and shared decision-making, and less policy attention to systematically eliciting citizen values to guide decision-making	• Patient and Community Engagement Research (PaCER) provides training for patients who wish to become involved as patient researchers • O'Brien Institute for Public Health provides a distance-learning program in patient-oriented research, and strategic clinical networks can nominate patients for the program • Gaps may include less systematic engagement of patients, especially more vulnerable patients, in setting research priorities (e.g. using a James Lind Alliance-type approach)
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	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	• Connect Care (the province's clinical information system) will launch in Edmonton in 2020 and across the province in 2022 • Alberta Netcare supports and coordinates projects about the province's electronic health record • eCritical Alberta provides a repository of patient-specific critical-care information to support both decision-making at the bedside (MetaVision) and at the unit or system level (TRACER)	• Alberta SPOR data platform provides access to administrative data (except for physician billings) and related database, methods and statistical services • Provincial Health Analytics Network provides a single entry point to health data • VSecondary Use Data Project facilitates the secondary use of patient care, financial, staffing and other administrative data

Characteristic	Examples	Health-system receptors and supports	Research-system supports
provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)	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)	• Alberta Bone and Joint Health Institute pioneered provider-targeted audit and feedback approaches that have now been widely taken up • Data Integration and Management Repository (DIMR) maintains a rich variety of data assets, analytic tools and dashboards that can be accessed by AHS employees (and seeks to acquire and link new data assets each year) • Gaps may include less programmatic attention to managing measurement burden (but a prioritization process is underway), capturing patient-reported experiences, ensuring that the number and distribution of analytical staff match the need, and accelerating learning and improvement processes (as well as Connect Care not including primary-care data in the near term)	
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	• A pRoject Ethics Community Consensus Initiative (ARECCI) identifies and mitigates risks in program evaluations, quality-improvement projects and related areas • Strategic clinical networks work with AHS knowledge-management staff to synthesize data and evidence about clinical problems and options for improvement	• Alberta Innovates funds research and innovation in health • Alberta SPOR SUPPORT Unit supports patient-oriented research • Alberta Clinical Research Consortium supports clinical research • Alberta Partnership for Research and Innovation in the Health System supports research to improve health-system performance • Health Research Ethics Board of Alberta (HREBA) supports three committees (cancer, clinical trials and community health) that work together as one research-ethics board (albeit not with a single-entry model for province-wide research ethics board approval) and that forward approved requests for access to administrative data • Research ethics boards at the University of Alberta (Health Research Ethics Board) and University of Calgary (Conjoint Health Research Ethics Board) are working with HREBA to harmonize research-ethics processes across the province • PolicyWise for Children and Families conducts research to improve practices and policies that affect children and families • W21C (ward of the 21st century) provides a testing site for medical technologies, hospital design, healthcare delivery approaches, and human-factors research

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			• Gaps may include less attention to incentives and requirements for research groups to collaborate with one another, with patients, and with 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	• MyHealth.Alberta.ca provides online health information for patients • Health Link provides health advice 24/7 by telephone (811), health information (see above), and information about how to access healthcare • College of Physicians and Surgeons of Alberta provides a webpage to find a physician • Alberta Wait Times Reporting Website provides wait times by procedure and service area (and Alberta Health Services provides emergency-department wait times) • Alberta Health Advocates helps to connect patients to services and address complaints (both in general, as provided for in the Alberta Health Charter, and for mental health specifically, as provided for in the Mental Health Act) • Strategic clinical networks include clinicians with strong connections to guideline-producing national professional societies • Connect Care (provincial clinical information system) will incorporate clinical decision support to providers • AHS supports quality-management frameworks at multiple levels and has initiatives such as 'Improving Health Outcomes Together' to improve care in measurable ways • AHS strategic clinical networks are developing a standardized approach to care pathways • AHS supports many groups – Innovation, Evidence and Impact team, Evidence Decision Support Program, and Health Systems Evaluation and Evidence team – to support decision-making • Alberta Health's Health Evidence and Policy Unit conducts health technology assessments (called Alberta Health Evidence Reviews) to determine which technologies, services and models of care to adopt across the health system • Gaps may include less attention to patient decision aids and patient goal-setting supports	• Institute of Health Economics prepared health technology assessments, decision analytic modelling and health economics research • Research groups at the University of Alberta and University of Calgary also conduct health technology assessments • Book about how the Alberta health system works is being prepared by John Church
Aligned governance, financial and delivery arrangements: Systems adjust who can make	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	• AHS o delivers most home and community care, specialty care, rehabilitation care and long-term care (with	• Alberta Academic Health Network, Alberta Clinical Research Consortium and master affiliation agreements between AHS and the University of Alberta and University of Calgary

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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	Covenant Health, a Catholic healthcare provider, delivering the rest) o is investing in home- and community-care infrastructure (through 'Enhancing Care in the Community') o administers four provincial programs, two of which share their leader with the corresponding strategic clinical network (seniors and mental health and addictions), one of which will do so in future (population, public and Indigenous health), and one of which does not (primary care) o 'owns and operates' the strategic clinical networks that can scale up effective approaches to prioritized problems at the provincial level • A pan-strategic clinical networks 'transformational road map' was released in December 2017 and will support efforts to improve collaboration (e.g., with operational leads, academic partners and others through core committees), communications (e.g., across networks), and evaluation • Gaps may include the lack of alignment with primary-care arrangements, most of which are beyond the purview of AHS	support alignments between health-system and academic institutions
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'	• AHS supports team-based care through o eSim program, which provides simulation-based training o CoAct program, which supports a more collaborate model of care (involving patients, families and providers) for (now) half of all patients admitted to AHS hospitals o 'just culture' principles, which support everyone to feel safe, encouraged and enabled to discuss quality and safety concerns • Gaps may include the lack of similarly explicit supports to culture at higher levels	• 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	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	• 16 strategic clinical networks bring together communities of interest among front-line providers (many of whom have strong connections to academic departments, the Alberta Medical Association, and national professional societies, among others) and support improvement o for select sectors (primary care; emergency and critical care parts of specialty care), although it has taken longer for the primary care network to launch fully since primary care largely sits outside of AHS's operational responsibilities	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	5) Rapid-learning infrastructure (e.g., learning collaboratives)	○ for select categories of conditions (addictions and mental health; bone and joint conditions; cancer; cardiovascular disease and stroke; diabetes and obesity (and nutrition); digestive conditions; kidney disease; neurosciences, rehabilitation and vision conditions; and respiratory conditions) ○ for select categories of treatment (surgery) ○ for select populations (Indigenous peoples as part of population, public and Indigenous health; pregnant women, newborns, children and youth; seniors) • Alberta Bone and Joint Health Institute supports service improvements for bone and joint conditions • AHS Improvement Way provides continuing professional development to support rapid learning and improvement • Alberta Medical Association's Physician Learning Program supports and advises physicians in all stages of improvement projects • Health Quality Council of Alberta monitors and publicly reports on healthcare quality (as an independent voice in the health system) and supports front-line rapid learning and improvement • Auditor General also publicly reports on health-system topics (e.g., primary-care networks in October 2017) but not with an explicit rapid-learning and improvement lens	

Table 4: Assets and gaps at the level of Saskatchewan'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) 3) Build patient/citizen capacity to engage in all of the above	• The Patients First Review (2009) generated recommendations for improving patient experience and the Saskatchewan government released a report in 2015 to detail progress on patient-relevant targets • The Ministry of Health supports the Patient and Family Advisor program for engagement in development and implementation of health-system policies and programs • The Saskatchewan Health Authority (SHA) supports a number of advisory councils comprised of patients and family members o 20 Patient and Family Advisory Councils to improve patient-centred care and includes a First Nations and Métis council o Co-design with patients as key participants in visioning sessions for health-system and service-delivery planning ▪ Ceremonies, such as sweats, are used when patient engagement includes Indigenous peoples • SHA supports engaging patients in their own health through: o self-management (e.g., LiveWell with Chronic Conditions program); o access to personal health information (e.g., Citizen Health Information Portal will launch across the province in 2019 and include medical history access to laboratory results, vaccines/immunizations, prescriptions, and hospital and acute care visits); o patient decision aids (e.g., Decision Point); o services to help First Nations and Métis peoples navigate the system (e.g., First Nations and Métis Health Service provides 'health navigators', coordination and liaison, traditional supports, facilitation, interpretation and translation, and advocacy); and o establishing a senior administrative role focused on the patient experience of First Nations and Métis patients • Saskatchewan Health Quality Council supports patient engagement in the health system through: o patient and family advisor development o orientation and training o coaching and mentorship o strategy development and deployment	• Saskatchewan Centre for Patient-Oriented Research (SCPOR) provides training patients/caregivers, researchers, health professionals, and policymakers who wish to become involved in patient-oriented research • The Institute for Indigenous Peoples' Health is located at the University of Saskatchewan

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		○ awareness and networking ○ evaluation and reporting ○ coordination of the Care Experience Measurement Working Group (within the Patient-and Family-Centred Guiding Coalition), which supports patient-experience surveys and membership in quality-improvement committees • The organizations that oversee professionals (e.g., College of Physicians and Surgeons of Saskatchewan), quality improvement bodies (e.g., Saskatchewan Health Quality Council) and ombudsman (Ombudsman Saskatchewan) engage patients, families and citizens and provide formal complaint processes • BetterHealthcare.ca shares patient stories of quality improvement (in transition) • Gaps may include less programmatic attention in primary care to supporting patient goal setting, self-management and shared decision-making	
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)	• eHealth Saskatchewan supports and coordinates projects about the province's electronic health records ○ In December 2018, there will be 84 different data systems ○ The administrative information management system (AIMS) launched in October 2018 creates a single operating system for the province (originally 82 different non-integrated data systems) • Saskatchewan Health Quality Council supports the health system in surveying patients about their healthcare experiences (e.g., acute care unit-level, mental health and addictions, outpatient care, primary healthcare survey, and long-term care) by providing support for measurement design (e.g., analyzer tool) ○ Saskatchewan Health Quality Council is working with other ministries to capture health more broadly • Strategic Health Information and Performance Support within the Saskatchewan Health Authority has the capacity to link data about health and the social determinants of health • Gaps may include limitations to broader application of 'hot spotting' abilities (e.g., using data analytics to drill down to neighbourhood levels), which is likely a reflection of restrictions to data-sharing agreements, limitations to data sharing between ministries (e.g., health, education and justice) and limited capacity to analyze data • Gaps may also include limitations to interoperable electronic health records, likely as a result of having two	• eHealth Saskatchewan's Health Data and Analytics portal facilitates the secondary use of data related to electronic health records • Saskatchewan Health Quality Council has advanced analytic capacity for predictive dynamic modelling

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		electronic medical record platforms, which create challenges to linking with electronic health records • Gaps may include collection of health data for certain populations (e.g., creating governance and infrastructure to collect Métis health data, which includes Métis ownership of the data)	
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 appear to be a lack of one-stop shops for local evaluations and pre-appraised syntheses o The production of research evidence is included in the Saskatchewan Health Quality Council's mandate, however, there are limitations in capacity	• Saskatchewan SCPOR supports patient-oriented research • Saskatchewan Health Research Foundation supports independent health research • The Indigenous Peoples' Health Research Centre develops capacity for community-based Indigenous health research • University of Saskatchewan Research Ethics Boards provide ethical review and approval including research involving the Saskatchewan Health Authority (Operational Approval)
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	• HealthLine provides health information for patients (e.g., patient-targeted evidence-based resources, health and fitness quiz, decision tools and symptom tracker) • medSask for evidence-based drug information • Online specialist directory (Saskatchewan surgical initiative) provides information on practising surgeons, procedures they perform, wait time for specialists and surgery • Six evidence-based chronic disease flow sheets are embedded into both electronic medical record systems • 2007 book describing how the health system works (Health Care in Saskatchewan: An Analytical Profile) • Gaps may include lack of oversight for information systems and analysis, however, executive director positions have been created at the Saskatchewan Health Authority for: 1) Informatics; and 2) Clinical Standards	• None identified
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	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	• Continuous quality-improvement initiative with a focus on the patient-first health system, using lean methodology and includes 1,500 continuous-improvement projects o Lean-Improvement Leader Training program was created by the Saskatchewan Health Quality Council and is now offered throughout organizations in the health system • Government of Saskatchewan's First Nation and Métis Policy Consultation Policy Framework is a guiding	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
rapid learning and improvement at all levels	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	framework for ministries, agencies and Crown corporations for decisions that may have an impact on Treaty or Indigenous rights • Development and existing Memorandums of Understandings with tribal councils • Saskatchewan Health Authority's accreditation model applies its core values (e.g., people-centred care, service and excellence) and is based on the life cycle, which is divided into four quadrants (maternal/child, community/primary care, acute care and continuing care) to correspond to the four-year accreditation period • There are new opportunities for a value-based innovation-procurement model now that there is a single authority, which increases buying power • The administrative information management system (AIMS) launched in October 2018 and replaces 82 existing, non-integrated systems • *Health Quality Council Act (2002)* • The Patients First Review (2009) generated recommendations for improving patient experience and the Saskatchewan government released a report in 2015 to detail progress on patient-relevant targets • Chronic Disease Management - Quality Improvement Program is a partnership between the Ministry of Health, Saskatchewan Medical Association and eHealth Saskatchewan, and provides dedicated funding to support physicians to provide continuity of care to their patients with chronic conditions	
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'	• Continuous quality-improvement initiative with a focus on the patient-first health system, using lean methodology and includes 1,500 continuous-improvement projects o Includes a series of quality-improvement modules to build lean tools • Clinical Quality Improvement Program is a 10-month course for health professionals • Indigenous Wellness course was designed using an Indigenous world view and is offered to health professionals as part of Continuing Medical Education	• None identified
Competencies for rapid learning and improvement: Systems are rapidly improved by teams at all levels who have the competencies	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)	• Saskatchewan Health Quality Council co-designs training programs with system partners for building quality-improvement competency, including quality-improvement measurement design (i.e., understanding variation)	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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)	• Daily visual management boards are used to measure outcomes and bring staff together (huddles), and visibility walls are within the public's view • A3 problem solving is a structured process to identify and understand the problem	

Table 5: Assets and gaps at the level of Manitoba'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) 3) Build patient/citizen capacity to engage in all of the above	• Shared Health, a provincial health organization, has been created as part of health system transformation to centralize clinical and business services for the regional health authorities o As part of standards, patients are involved in planning and service delivery, which includes the Internation Association for Public Participation's core values of public participation and tools to support developing patient advisory groups (e.g., Public and Patient Engagement Evaluation Tool) • In partnership with Provincial Health Services Authority (B.C.), a cultural safety training program has been developed for health professionals working with Indigenous peoples (San'yas Indigenous Cultural Safety Training Program) • Some patients have opportunities to be engaged in self-management and focused on living well with their conditions (e.g., TeleCARE-TéléSOINS Manitoba, Dial-a-Dietician, Self and Family Managed Home Care Attendant Program and Pain Self-Management Group Education Classes), and have access to personal health information (e.g., electronic access to laboratory results) • Some patients have opportunities to be engaged in managing their own care (e.g., Manitoba Institute for Patient Safety's "It's Safe to Ask" initiative and the Declaration of Patient and Family Engagement in Patient Safety) and to be volunteers to host information booths and present on the S.A.F.E. Toolkit • Some patients have opportunities to be engaged with organizations that deliver care through patient-experience surveys (e.g., Government of Manitoba's Canadian Patient Experiences Survey – Inpatient Care) • Patient and Family Advisory Councils and Patient and Family Advisory Networks help to set direction for the system (or organizations) at Manitoba Health, Seniors and Active Living, in Regional Health Authorities (e.g., Local Health Involvement Groups) and for select sectors (specialty hospital care; long-term care), conditions (e.g., cancer; mental health and addictions), treatments (e.g., prescription drugs) and populations (e.g., Patient Advocate Units) • The Manitoba Ombudsman provides the opportunity to register a complaint if they feel they have been treated	• The Manitoba Centre for Health Policy conducts population-based research on health services, population and public health, and the social determinants of health • The George & Fay Yee Centre for Healthcare Innovation is a partnership between the University of Manitoba and Winnipeg Regional Health Authority and part of the national network SUPPORT units (Manitoba SPOR SUPPORT unit) o The Centre for Healthcare Innovation engages citizens in governing committees and groups (e.g., the Executive Council, the Scientific Advisory Council, the Patient Engagement Award Review Committee, and the Patient and Public Engagement Lunchtime Learning Planning Committee), and the Patient/Public Advisory Group engages patients in co-developing engagement strategies, policies, resources, tools, services and programs • Chronic disease (e.g., Can -SOLVE CKD and IMAGINE) SPOR Networks are very active in the province • Ongomiizwin– Indigenous Institute of Health and Healing at the University of Manitoba is the largest Indigenous education and health-research unit in Canada, and the work is guided by knowledge keepers and elders o Framework for Research Engagement with First Nation, Métis, and Inuit Peoples

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		unfairly by a provincial government department and agency or regional health authority and the Critical Incident Reporting Line is a no blame critical reporting across the health system • Some regional health authorities have a Patient Experience Coordinator available to receive complaints • Professional regulatory bodies (21) all have formal complaints systems	

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)
		• As part of Manitoba's health-system transformation program, a single provincial information and communications technology service will be created with the aim of supporting quality improvement, administration of provincial data quality standards, and integration of systems, processes and data to be used by clinicians, researchers and decision-makers
		• Manitoba eHealth along with other information and communications technology programs will become Digital Health (under Shared Health)
		  ○ Manitoba eHealth has implemented the following clinical systems:
		  ▪ eChart Manitoba (primary care and hospitals);
		  ▪ electronic patient records (hospitals);
		  ▪ electronic medical records and MBTelehealth (primary and specialty care); and
		  ▪ Radiology Information System and Picture Archiving and Communication System (diagnostics)
		• Home Clinic (for health professionals in primary care and provides patient enrolment data, demographics and links to data from other sources including medical claims and quality indicators)
		• Gaps may include limitations to the timely sharing of relevant data
			• Manitoba Centre for Health Policy conducts population-based research on health services, population and public health, and the social determinants of health (e.g., data linkages to Departments of Families, Education and Training, and Justice)
			• Manitoba Collaborative Data Portal provides neighbourhood and local level data
			• Information Management & Analytics Branch of Manitoba Health, Seniors and Active Living has formal data-sharing agreements and corporate relationships with external provincial and national stakeholder groups (CancerCare Manitoba, Canadian Institute for Health Information, First Nations Health and Social Secretariat of Manitoba, Manitoba Centre for Health Policy, Research Manitoba and Statistics Canada)

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	• As part of Manitoba's health-system transformation, the ministry's (Manitoba Health, Seniors and Active Living) role will focus on policy, funding and oversight, and the production of research evidence will be carried out by the Centre for Healthcare Innovation and the Manitoba Centre for Health Policy • Shared Health has developed standard operating procedures to ensure a consistent approach to research and created a centralized system so that any facility can accommodate a medical research study with a single approval	• Research Improvement Through Harmonization in Manitoba (RITHiM) is an initiative of Research Manitoba to harmonize ethics, privacy, and impact review related to human clinical research and data-intensive health research to establish a single amalgamated health-research review committee • Centre for Healthcare Innovation's knowledge synthesis platform provides rapid reviews for government and decision-makers • Manitoba Centre for Health Policy is under contract to Manitoba Health, Seniors and

Characteristic	Examples	Health-system receptors and supports	Research-system supports
	6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers	• Health Information Privacy Committee is currently responsible for approving health-research projects for government departments or agencies that use personal health information (see RITHiM) • Gaps may include limitations to the systematic collection of data within home and community care and rehabilitation, and most likely is a reflection of fragmentation within these systems	Active Living and the Healthy Child Committee of Cabinet to provide analyses, policy development and services planning o The studies take two to three years to complete and four-to-five deliverables (reports) are published annually • Manitoba's SPOR Network in Primary and Integrated Health Care Innovations (PIHCI) supports patient-oriented 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	• KPMG was retained in 2016 to review the sustainability for the health system, and the report identified inconsistent approaches to clinical standards, quality improvement, practices and levels of care across the system o The report has informed the health-system transformation and initiatives are underway to standardize these approaches • MB Healthcare Providers Network provides supports for health professionals wanting to practise in Manitoba • Some regional health authorities provide patient-targeted evidence-based resources (e.g., Consumer Health Resource Centre) • Many groups provide recommendations to providers about optimal care: o professional colleges including the College of Physicians and Surgeons of Manitoba and the College of Registered Nurses of Manitoba produce and maintain clinical practice guidelines and clinical standards o CancerCare Manitoba's cancer management guidelines • eHealth Manitoba provides supports to health professionals for electronic health records that incorporate decision supports • Gaps may include less attention to patient decision aids and patient goal-setting supports	• None identified
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	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	• As part of Manitoba's health-system transformation program, Shared Health will provide centralized clinical (e.g., strategic planning and the development of clinical standards) and business services for regional health authorities o Initiatives include: development of a provincial quality framework and performance dashboards, as well as revaluating accreditation	• Research Manitoba is a provincial funding agency and includes funding for health and social sciences research and plays in role in the integration and alignment between government and universities

Characteristic	Examples	Health-system receptors and supports	Research-system supports
rapid learning and improvement at all levels	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	• A new Regulated Health Professions Act will expand the role of some health professions (e.g., pharmacists' ability to prescribe and order tests) • Adopted the LEADS in a Caring Environment leadership framework to connect health leadership programming across Manitoba Health, Seniors and Active Living, regional health authorities, CancerCare Manitoba, Shared Health and the University of Manitoba's Rady Faculty of Health Sciences • The College of Physicians and Surgeons of Manitoba's Quality Improvement Program reviews physician practices • New financial arrangements are beginning to or have the potential to incentivize rapid learning and improvement (e.g., Quality Based Incentive Funding to engage physicians in Physician Integrated Networks) and to focus attention on care quality indicators • Gaps may include limitations in financial arrangements to appropriately reflect changes to scope of practice for some professions with the new Regulated Health Professions Act	
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'	• Embedded within Manitoba's health-system transformation program is a focus on change management with project leads meeting every two weeks (interdependencies are tracked to foster learning between projects) and key stakeholders are engaged to support the projects	• 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	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)	• Manitoba, Health, Seniors and Active Living's Health Services monitors and publicly reports on: o wait times for diagnostic, surgical and cancer services; o weekly statistics for emergency/urgent care statistics by site and personal home-care clients; and o population-based annual statistics (population, mortality, disease and injury, prevalence of mental illness, physician and hospital services, use of home care and personal care homes, preventative services and prescription drug use)	• Community Health Assessments (Winnipeg Regional Health Authority) identify health assets and issues and monitor progress towards meeting the objectives o Centre for Healthcare Innovation's Research and Evaluation Unit leads this work

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

Table 6: 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) 3) Build patient/citizen capacity to engage in all of the above	• 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
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	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	• 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	• 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

Characteristic	Examples	Health-system receptors and supports	Research-system supports
provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)	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)	○ 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'	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
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

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			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 provide supports 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 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	• Ottawa Hospital Research Institute (OHRI) Patient Decision Aids provide pre-appraised patient decision aids (which are also included in the 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
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	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	• 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	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
and aligned to support rapid learning and improvement at all levels	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	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)	
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	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	• 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

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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		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	Institute) either contribute to or complement this laboratory

Table 7: Assets and gaps at the level of Quebec'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) 3) Build patient/citizen capacity to engage in all of the above	• Carnet Santé Québec (launched in May 2018) allows patients to access their health information online (including medication, medical imaging tests, and lab tests) • Ministry of Health and Social Services (MSSS) and other healthcare organizations are regularly consulting user committees and resident committees about quality-improvement initiatives • The Act Respecting Health Services and Social Services indicates that boards of directors of integrated health and social-services centres, as well as boards of unamalgamated institutions must include one person designated by and among the members of the institution's users' committee • Some organizations use co-design and patient-partnership approaches in designing and evaluating policies, programs and services • The Partnership School led by the Centre of Excellence on Partnership with Patients and the Public (CEPPP), Direction collaboration et partenariat patient at the Faculty of Medicine at the Université de Montréal, or Université des patients à l'Université du Québec à Rimouski aim to build the capacity of patients and professionals to foster greater partnership • CEPPP has a growing database of patients who have signed up to act as patient partners in health-system initiatives • The MSSS produced guidelines for implementing patient partnership at all levels of the health system • Gaps may include the limited attention to engage citizens in policymaking and in the organizations that deliver care due to centralization reforms of the past decade (including shutting down the Commissaire à la santé et au bien-être du Québec which had a mandate to assess health-system performance and inform public debates based on citizens' values and concerns)	• Unité SOUTIEN SRAP du Québec and the CEPPP support masterclasses on the conduct and use of patient-oriented research (for patients as well as providers, policymakers and researchers), as well as patient-partnership projects and training workshops, and the national SPOR networks • Canada Research Chair in Shared Decision Making and Knowledge Translation, Canada Research Chair in Patient and Public Partnership, and Chaire de recherche sur l'engagement des citoyens et des patients dans la transformation des organisations et du système de santé are actively studying patient engagement • CEPPP has a growing database of individuals who have signed up to act as patient partners in research • CEPPP leads efforts to create a community of practice focused on the science and practice of patient partnership • Alliance Santé Québec aims to promote public- and patient-engagement mechanisms in research and innovation • Gaps may include the limited engagement of patients in setting research priorities, and the limited requirements or incentives for research groups to act on lessons learned about robust patient-engagement processes
Digital capture, linkage and timely sharing of relevant data: Systems capture, link and share (with individuals at all levels)	1) Data infrastructure (e.g., interoperable electronic health records; immunization or condition-specific registries; privacy policies that enable data sharing)	• Dossier Santé Québec is the province's clinical information system (launched across the province in 2013) • Tripartite agreement between the ministry, the Régie de l'assurance maladie du Québec, and the Institut national	• Plateforme apprenante pour la recherche en santé et services sociaux (PARS^3) (a project by Unité SOUTIEN SRAP Québec) aims to implement strategies and infrastructures to facilitate the access and use of administrative

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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)	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)	d'excellence en santé et en services sociaux allowing access and analysis of clinical administrative data • Institut de la statistique du Québec (ISQ) and the MSSS developed a survey program to evaluate care experiences, the quality of services and met/unmet healthcare needs • Bureau d'information et d'études en santé des populations (BIESP), hosted by the Institut national de santé publique du Québec (INSPQ), brings together multidisciplinary professionals dedicated to the surveillance and epidemiological analysis of population health • The province has been participating in the Commonwealth Fund's International Health Policy Survey documenting adults' perception of the health system and their care experiences • Gaps may include the lack of requirements and incentives to document diagnostic codes; many clinics still using paper-based systems; the limited data being collected about patient-reported experiences and outcomes, about caregivers or about the broader social determinants of their health; the lack of consistent standards for what types of patient experience data to collect and how across sectors, conditions, treatments and populations (and the management, linkage, analysis and presentation of data are particularly under-developed in some of these areas, such as in the primary-care sector); and the limited staff and infrastructure to analyze and present locally contextualized data to support learning and improvement.	and clinical data from electronic medical records, with the goal of generating research focused on patients and promoting reflective practice • Université de Montreal is a hub of research on artificial intelligence, which could be leveraged to create rapid-learning health systems • Gaps may include barriers to the timely access of data to conduct research (including the need for researchers to go through ethics committees and relevance committees, and the Commission d'accès à l'information du Québec tightening rules to access data even more in response to recent news that electronic medical record service providers were selling or cross-linking data)
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	• INESSS, INSPQ, Units for evaluating health technologies and intervention methods (UETMIS) in university hospitals, and other organizations have developed in-house capacity to conduct research syntheses (including systematic reviews and rapid reviews), as well as rapid-cycle evaluations • Gaps may include the limited access to clinical and administrative data, which impedes the timely production of research evidence	• Fonds de recherche du Québec – Santé (FRQS) provides financial support for the timely production of research evidence, as well as support to create partnerships with universities, colleges and healthcare institutions, and the various governmental departments and bodies • Unité SOUTIEN SRAP Québec is working through the ethical issues involved in rapid-learning health systems • Cochrane Canada Francophone is hosted by the Centre hospitalier universitaire de Québec-Université Laval and promotes the production and use of high-quality systematic reviews • PULSAR is a new a collaborative research and innovation space (hosted by Université Laval) bringing together actors from various backgrounds to improve people's health and well-being through concrete, meaningful actions

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			• Gaps may include the legal and cultural shift necessary to facilitate the timely access to valid and reliable data; the challenges of maintaining long-term and meaningful research-policy partnerships; the limited capacity to use data from electronic health records to support reflexive learning (and value-based decision-making); and the challenges of recruiting clinician-scientists
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 make recommendations to patients and providers about optimal care, for example: o INESSS and INSPQ produce guidelines; and o Decision Box at Université Laval is a one-stop shop of decision aids for professionals and patients • Some initiatives underway to ensure that electronic health records incorporate decision supports (e.g., Concerto in primary care, decision aids in prostate cancer) • INESSS and INSPQ have a formal role, and many other government-supported groups play an informal role, in providing data 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) • Québec Medical Association is coordinating Choosing Wisely Quebec to optimize clinical practice in partnership with the Direction collaboration et partenariat patient at the Faculty of Medicine at the Université de Montréal, the Alliance des patients pour la santé, and the faculties of Medicine at Université Laval and McGill University • INESSS and Units for evaluating health technologies and intervention methods (UETMIS) in university hospitals conduct health technology assessments to support decisions at all levels • Gaps may include a lack of easy-to-use tools to understand the added value of services (e.g., home care for the elderly), as well as the end of the Commissaire à la santé et au bien-être du Québec which produced health-system performance reports	• Unité SOUTIEN SRAP Québec funds several research groups to provide support in the areas of health systems, knowledge translation and implementation • Gaps may include the limited use of systematic-review and clinical-guidelines expertise to support decisions at all levels.
Aligned governance, financial and delivery arrangements: Systems adjust who can make what decisions (e.g., about joint learning priorities), how money	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	• Stratégie de soutien à l'exercice de la responsabilité populationnelle (the population-based responsibility approach adopted in 2003) helps to guide health-system transformations • MSSS is providing guidance and mandating hospitals, long-term care homes and interprofessional team-based primary-care organizations to produce and share quality	• Quebec's Chief Scientist supports greater alignment by advising the Minister of Economic, Science and Innovation on matters pertaining to the development of science and research; directing the three Fonds in collaboration with their scientific directors, and

Characteristic	Examples	Health-system receptors and supports	Research-system supports
flows and how the systems are organized and aligned to support rapid learning and improvement at all levels	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	improvement plans (and to incorporate equity considerations in these plans) • Stratégie nationale 2018-2020 pour prévenir les surdoses d'opioïdes et y répondre is a comprehensive plan to align health-system strategies to address the opioid crisis and mobilize key stakeholders (monitoring and surveillance; interventions for overdose prevention and response and harm reduction; information and awareness activities; optimizing medical and pharmaceutical practices for opioids and pain management; access to integrated and responsive services for individuals requiring treatment for an opioid use disorder; training; research and evaluation) • COMPAS (Collectif pour les Meilleures Pratiques et l'Amélioration des Soins et Services), TRAUMA and other problem-focused initiatives addressing recent or current health-system priorities contribute to greater concertation and alignment • Gaps may include the centralization reforms of the last decade, which created a disconnect between the macro, meso and micro levels and larger organizations that are more difficult to coordinate (e.g., very large Centre intégré universitaire de santé et de services sociaux – CIUSSS - with multiple missions), and the challenge of coordinating clinical governance beyond healthcare organizations	chair their boards; and fostering inter-sectoral research.
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'	• Director of Innovation in Health and Social Services within the MSSS (appointed in April 2018) has the mandate to coordinate efforts to accelerate the adoption of relevant and effective innovations • Gaps may include the current culture focusing on performance, as opposed to a culture promoting the use of reflexive data and partnership to improve the quality of care, and the lack of mechanisms that could foster such culture among health-system leaders	• Academic Health Centers in Canada: Prospects and Challenges for Learning Health Systems, a new research project funded by the Canadian Institutes of Health Research led by Jean-Louis Denis (principal researcher) aims to examine the conditions for implementing innovation in health systems
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,	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)	• Gaps may include the limited capacity to link and transform current data into reflexive data; the challenge of identifying the core competencies required to support a rapid-learning health system (including new competencies such as data visualization); the limited resources of many organizations to develop in-house capacities; and the need to engage colleges and universities to develop 21st-century professionals who will have the skills necessary to develop and implement a rapid-learning health system	• Réseaux Universitaire Intégré de Santé (RUIS) assigned to each of the province's four Faculties of Medicine (McGill University, Université de Montréal, Université de Sherbrooke and Université Laval) facilitates specialized care, medical education, and medical research across the province • Fonds de recherche du Québec – Santé (FRQS) provides financial support for the training of researchers through merit scholarships for graduate and postgraduate students and persons who engage in postdoctoral research, and

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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			through professional development scholarships for persons who wish to re-enter the research community • Unité SOUTIEN SRAP Québec offers various training that could support the development of rapid-learning health systems (e.g., training in systematic reviews, rapid reviews, economic evaluations, KT strategies, etc.)

Table 8: Assets and gaps at the level of New Brunswick'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) 3) Build patient/citizen capacity to engage in all of the above	• New Brunswick's Ombudsman provides patients the opportunity to register a complaint if they feel they have been treated unfairly by a provincial body • Psychiatric Patient Advocate Services specifically defends the rights of mental health patients • New Brunswick Health Council has the mandate of engaging citizens and reporting on health system performance • Horizon Health Network has a Patient Representative Services providing information, support, encouragement and assistance to patients, families and staff in all our facilities during a patient's care experience • Horizon Health Network is transforming itself into a patient and family-centred care organization where healthcare staff, patients and families work together to meet the individual healthcare needs of patients • Horizon Patient and Family Advisory Council aims to create a partnership to provide advice and guidance to improve patient- and family-centred care experiences and the culture of care throughout Horizon Health Network • Horizon Health Network integrates Patient/Family Advisors across the health network in key committees and program groups • Vitalité Health Network is engaging patient-experience partners with managers and staff to help create a patient- and family-centred care environment • Vitalité Health Network is conducting inpatient and outpatient satisfaction surveys • Strategic clinical units and networks engage patients and community members to identify priorities and in their working groups	• Maritime SPOR SUPPORT Unit engages volunteers as patient advisors for research into priority health-system issues (e.g., unnecessarily long hospital stays), and provides support for researchers looking to engage patients by connecting them with patients, providing resources and tools for patient engagement, and providing training in patient engagement • A Cure is on the Horizon, a new online research registry launched by Horizon Health Network in collaboration with the Maritime SPOR SUPPORT Unit, provides an opportunity for patients interested in research to provide their contact information as well as the areas of research that are of interest to them - whether it is to participate in a clinical trial or collaborate with a research team to develop and conduct a new study
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	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	• New Brunswick Health Council has systems in place to capture, link and share data, including: o Primary Health Surveys; o 33 community profiles empower individuals with information about their region to stimulate interest in building healthier communities; and o Hospital Patient Care Experience • New Brunswick Health System Report Card measures the quality of health services delivered in the province (including report cards focused on home care in 2018, acute-care survey in 2019, primary care in 2020)	• New Brunswick Institute for Research, Data and Training (NB-IRDT) offers administrative data access services for qualified researchers through the Maritime SPOR SUPPORT Unit, which is linking clinical data to secure, anonymized administrative data (such as Vital Statistics or Canadian Institute for Health Information's Hospital Discharge Abstracts)

Characteristic	Examples	Health-system receptors and supports	Research-system supports
provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)	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)	• New partnership in 2018 between the provincial government and the New Brunswick Medical Society to support and accelerate the adoption of the Provincial Electronic Medical Record system by doctors • Community Health Needs Assessments (CHNA) produced in collaboration between Horizon Health Network, Vitalité Health Network, New Brunswick Health Council and community members (process being standardized in collaboration with the Department of Health) • Unités et réseaux cliniques apprenants ('clinical learning units and networks') proposed by Vitalité Health Network and Horizon Health Network to support the optimization and continuous improvement of health services through the sharing and systematic analysis of relevant data throughout the patient's care path (units will be implemented at the regional level and networks will be implemented at the provincial level) • Gaps may include the lack of tools and systems to collect/analyze/share data about the needs/priorities of the population, particularly to assess the determinants of health, the quality of care, and the workforce; lack of consensus about key indicators; the lack of emphasis on self-reported indicators; the lack of interoperability across existing systems; and Community Health Needs Assessments were mostly based on the views of community members and not much on data (difficult for community members to distinguish needs and wants)	
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	• Research-ethics boards at Horizon Health Network and Vitalité Health Network • Infrastructures to build research capacity with Horizon's Research Services Team and Vitalité's Research Support Office (e.g., support new and experienced investigators conducting research; develop research protocols and provide statistical analysis; assist with research-ethics board submissions; negotiate clinical trial and confidentiality agreements; support the management of research funds; help identify sources of research funding; provide customized education and training opportunities; and provide support to clinician-researchers) • Support Opportunities and Assistance for Research (SOAR) program at Horizon aims to improve patient care through research that will produce the highest level of evidence for development and testing of care guidelines; accurate and timely diagnoses; and best treatment options and rapid recovery	• New Brunswick Health Research Foundation has a mandate to coordinate, support and promote health research in the province • The province is developing its research capacities and infrastructures (e.g., Atlantic Cancer Research Institute)

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		• Gaps may include the limited capacity of the province and regions to steer a research agenda that meets the population needs (but greater efforts and capacity to structure clinical research at the regional level)	
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	• New Brunswick Health Council offers useful data and information to support decisions at the regional and provincial level • Canadian Agency for Drugs and Technologies in Health's rapid-response service sometimes used by managers and policymakers in New Brunswick • Gaps may include the lack of tools to support decisions at the clinical level	• VMaritime SPOR SUPPORT Unit runs a weekly Lunch & Learn series focused on using information to support research and decision-making
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	• Many organizations seek accreditation from Accreditation Canada which could include rapid-learning efforts as a focus for its accreditation efforts • Provincial Health Plan articulates goals in a number of important areas: o cost control/reduction o performance excellence o evidence-based decision-making o better primary healthcare o chronic-disease management o better access to necessary medications o more services, including palliative care, at home o more long-term care facilities o population health initiatives o benchmarking o equitable delivery of services o investments in technology • Priority Delivery Units have been established in recent years to drive performance improvements and increase accountability with respect to New Brunswick's priorities • VBalanced Scorecard Report is a strategic planning and management tool that allows Horizon Health Network to monitor the implementation of its strategic plan • Gaps may include the current decentralization of the system (while the two regions have the same legal framework, they operationalize their systems differently);	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		the global budgeting model which remains predominant; and the lack of consensus on indicators that should be part of a comprehensive dashboard to monitor and assess health-system performance	
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'	• Horizon Health Network and Vitalité Health Network have initiatives to foster a culture of rapid learning and improvement (e.g., establishment of clinical learning networks on aging, cancer, mental health) • Gaps may include the predominant culture of the solo practitioner which may be difficult to change	• 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)	• Consortium national de formation en santé is a pan-Canadian group of 11 university and college institutions offering French-language programs in various health disciplines, and regional partners to improve access to French-language health training programs across the country • New Brunswick is home to two medical training programs, Dalhousie Medicine New Brunswick based in Saint John and the Centre de formation médicale du Nouveau-Brunswick based in Moncton, providing students with the opportunity to study medicine in their home province • The government also sponsors medical school seats at Memorial University of Newfoundland, Université Laval, and Université de Montréal • Horizon Health Network and Vitalité Health Network offer off-the-shelf certifications/training programs • Gaps may include the absence of provincial training programs to develop competencies for rapid learning and improvement	• None identified

Table 9: Assets and gaps at the level of Nova Scotia'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) 3) Build patient/citizen capacity to engage in all of the above	• Provincial patient experience survey is run by the Nova Scotia Health Authority across inpatient, primary care and rehabilitation patients with predefined targets across a number of domains • Chronic Pain Self-Management Program and other condition specific self-management programs provide some patients with the opportunity to be engaged in their own care (e.g., Chronic Pain Self-Management Program) • Engage4Health is a discussion board for patients run by the Nova Scotia Health Authority to provide patients with the opportunity to contribute to conversations of interest • Nova Scotia Office of the Ombudsman provides patients the opportunity to register a complaint if they feel they have been treated unfairly by a provincial or municipal government body • Community Health Boards have been established in 37 communities across the province, which provide opportunities for patients to be involved at a local level • 22 professional regulatory bodies all have established formal complaint systems • Patient Family Advisors have been established at hospitals and throughout health regions to support priority setting and decision-making in the health system • Gaps include less attention to engaging patients in their own health and care, and relatively less attention to meaningful engagement of patients in policymaking processes	• Patient Advisors for the Maritime SPOR SUPPORT volunteer to advise research into priority health -system issues (e.g., unnecessarily long hospital stays) ○ Patient Advisors are also closely involved in the governance of the Maritime SPOR SUPPORT Unit • The Maritime SPOR SUPPORT Unit provides support for researchers looking to engage patients by connecting them with patients, providing resources and tools for patient engagement, and providing training in patient engagement. • Nova Scotia Health Research Foundation grant competition requires patient engagement in the research application
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	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	• MyHealthNS allows family physicians or nurse practitioners to share personal health information with any Nova Scotian with a valid health card • Condition-specific registries (e.g., diabetes, cancer) as well as a provincial trauma registry have been established and are maintained by individual organizations, except for the trauma registry which is maintained by the provincial government • Patient-reported experience survey data is collected at a provincial level (see engaged patients row) • Nova Scotia Health Authority publicly shares data and	• Open Data Portal holds data sets from across government departments (e.g., health, social and social determinants of health), which supports the potential to link data sets, however the extent to which this is occurring is unknown

Characteristic	Examples	Health-system receptors and supports	Research-system supports
provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)	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)	reporting about a wide variety of health programs, however this information is not available at the point of care for providers or through a centralized platform to support decision-making • Gaps include slow progress on achieving electronic health records, and limited effort to build system-wide analytic capacity to analyze data and to share it in a meaningful way with patients, providers and decision-makers	
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 include a lack of distributed capacity across the health-system to access, adapt and apply research evidence, and less programmatic attention to providing incentives for research groups to collaborate with one another, with patients and with decision-makers	• REAL Evaluation Services Program operated by the Nova Scotia Health Research Foundation designed to provide rapid evaluations to help meet decision-makers' time constraints • Evidence Synthesis Community of Practice is run by the Maritime SPOR Support Unit and Nova Scotia Site of Cochrane Canada for academics and researchers • The REAL Evaluation Fellowship provides education and practical experience to build evaluation capacity among health-system stakeholders • REAL innovation program has been established by the Nova Scotia Health Research Foundation which works to develop new partnerships with potential funders, coordinates new research opportunities, and ensures they match with public and governmental priorities. • Provincial Research Ethics Board provides ethics approval for all research projects conducted within the Nova Scotia Health Authority, however some additional distributed capacity for ethics is associated with Dalhousie University o Board membership includes representation from each zone who meet on a weekly basis • Nova Scotia Health Research Foundation is undergoing a transition to Research Nova Scotia, which will act as a cross-government coordinator for research potentially providing the opportunity to collaborate across research groups, however whether this will continue remains to be seen • Gaps include a lack of distributed capacity across the system to produce and share research

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			in a timely way
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 provide recommendations to providers about optimal care, including: o Nova Scotia Health Authority issues a number of clinical guidelines for the blood coordination program o professional colleges including the College of Physicians and Surgeons and the College of Registered Nurses of Nova Scotia produce and maintain clinical practice guidelines and clinical standards o Nova Scotia Health Authority has established care pathways for select clinical areas (e.g., Quick Response Program; Home Again Program; and Care by Design) • Nova Scotia Electronic Health Program provides decision-making supports through clinical decision support systems to health professionals through electronic health records, where these have been implemented • Drug Evaluation Alliance of Nova Scotia supports decision-makers, practitioners and consumers to make informed choices about what drugs to fund, to prescribe and how to use them effectively • Gaps include less programmatic attention to the fulsome use of patient decision aids and patient goal-setting supports as well as the use of decision supports for decision-makers	• Weekly Lunch & Learn series run by the Maritime SPOR SUPPORT unit focuses on using information to support research and decision-making • The Discovery and Innovation Branch of the Nova Scotia Health Authority provides health economics consulting services including health technology assessments
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	• Research Nova Scotia Corporation Act was recently passed to support the amalgamation of research entities in the province, including the Nova Scotia Research and Innovation Trust and the Nova Scotia Health Research Foundation • Quality-improvement Information Protection Act supports the Department of Health and Wellness to facilitate system-wide provincial planning and improvements in patient safety • *Improving Patient Safety and Health System Accountability Act* requires Nova Scotia Health Authority and IWK Health Centre to report publicly on patient safety indicators • Quality Framework for a High Performing Health and Wellness System acts as a guide for all organizations to have consistency in their approaches to quality improvement • Some use of alternative payment mechanisms for	• Nova Scotia Health Research Foundation funds research projects in a comparable way to Canadian Institute of Health Research's four pillars including health policy, health services, and health outcomes research on priority issues • Knowledge Sharing Support Award funds the dissemination of completed research that benefits decision-makers within the health system

Characteristic	Examples	Health-system receptors and supports	Research-system supports
	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	physicians to incentivize value is in place, however this is not widespread across the system as a whole • Gaps include little widespread use of innovative funding and remuneration models to incentivize rapid learning and improvement, as well as a lack of mechanisms to support rapid-learning and improvement priorities or to identify reproducible building blocks	
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)	• The Health System Quality Branch of the Nova Scotia Department of Health and Wellness publicly reports results related to wait times, patient-safety indicators and serious reportable events, however this reporting does not include expected changes or lessons learned • Quality-improvement toolkit has been developed by the Nova Scotia Health Authority to provide organizations with the tools needed to establish quality and patient-safety teams • All organizations operating in the acute-care sector have quality-improvement initiatives and staff working to support internal learning • Experts in use of evidence and rapid learning have been brought in to present to the IWK Centre as well as the Regional Health Authorities on an ad hoc basis • Gaps may include less programmatic efforts to establish widespread competencies and a lack of centralized expertise in supporting rapid learning and improvement	• See "timely production of research evidence" for information on community of practice • Gaps include a lack of distributed competencies beyond the Nova Scotia Health Research Foundation and Nova Scotia Health Authority to support rapid learning and improvement

Table 10: Assets and gaps at the level of Prince Edward Island'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) 3) Build patient/citizen capacity to engage in all of the above	• Self-management pilot project for patients in need of cardiac rehabilitation • Public-engagement surveys are used on an ad hoc basis to gauge concern about priority areas for the health system • Public-engagement opportunities through Health PEI with patient/family member volunteers, including participating in: o long-term committees o short-term working groups o speaking at conferences and healthcare events o giving feedback about facilities and communications planning o being members of councils and review teams o help educate others by talking about their own health experiences o become a patient and community-engagement researcher • Patient-engagement toolkit developed by the Centre of Excellence on Partnership with Patients and the Public trains health-system stakeholder to engage patients at all levels • Patients may lodge formal complaints with o professional colleges o individual organizations o Health PEI • Gaps include missing programmatic effort to engage patients in their own care and widespread engagement of patients and citizens in organizations and policymaking	• Maritime SPOR SUPPORT Unit requires explicit patient engagement and participation with any funded project • Gaps may include limited health-systems research capacity and as a result less effort to engage patients and citizens in defining research priorities beyond those funded by the SPOR SUPPORT Unit
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	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	• Drug Information System provides an electronic record of all prescription medications dispensed to residents • Clinical Information System (included in electronic health records) provides real-time exchange of clinical information between hospitals • Computerized Provider Order Entry allows clinicians to electronically process various types of orders • Patient Registry Program provides client demographic and administrative information and shares this information with the other components of the electronic health record	• Open Data Portal provides access to select government raw data sets to be used by researchers • Ongoing work with the University of New Brunswick to develop a secure island data repository • Gaps include the ability to capture longitudinal data across time and settings

Characteristic	Examples	Health-system receptors and supports	Research-system supports
provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)	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)	• Health PEI has a sharing agreement with Maritime SPOR SUPPORT Unit and is in the process of creating a memorandum of understanding that would allow for data sharing with the Department of Education, Early Learning and Culture to track related social determinants of health • Gaps include capacity and use of patient-reported experiences, capacity to link data about health and social care, and the capacity to share local data through a centralized platform	
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 include distributed capacity to undertake health-systems research and limited capacity to produce and share evaluations, synthesize research evidence in a timely way and collaborate with decision-makers	• Emphasis through patient-engagement strategy and Maritime SPOR SUPPORT Unit on involving patients and citizens in health-system research • Select training of patients and citizens on engaging and conducting patient-oriented research • Master of Applied Health Services Research, delivered in partnership with the Atlantic Regional Training Centre to develop local capacity to produce and share research evidence • Primary and Integrated Healthcare Innovation Network supporting collaborative research projects on a wide range of health system topics • VCentre for Health and Community Research is a collaborative research group based in the School of Business at the University of Prince Edward Island that has connections with broader Canadian health and biotechnology sectors • Gaps include a limited capacity to synthesize research evidence in a timely way and no one-stop shops for local evaluations and pre-appraised synthesis
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)	• Patient navigator in the province helps patients and families to access services, choose services, and answer questions about the health system • Health PEI publishes practice guidelines for select conditions • Care pathways have been established for select conditions (e.g., COPD, pneumonia, heart failure, diabetes, stroke and more recently pulmonary rehabilitation) • Gaps include the lack of widespread use of patient-targeted resources, patient decision aids, clinical decision support systems and system-level decisions supports	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
	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 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	• Health PEI prepares a business plan every year that defines key milestones, deliverables and performance targets that link to strategic plans • Maintains a strategic priority dashboard which reports on annual organizational priorities and objectives and the Health PEI business plan • Adoption of quality matrix by Health PEI outlined in Accreditation Canada • Accreditation status granted to Health PEI by Accreditation Canada • Gaps include no centralized coordination of efforts to adopt a rapid-learning approach, limited use of funding and remuneration models that could incentivize rapid learning, and no existing mechanism to jointly set rapid-learning priorities	• 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'	• Shift required to realize the vision of the One Island Health System includes many of the requirements of creating a culture of rapid learning and improvement, including: o collaboration and teamwork across agencies and stakeholder o development of strategic plans o monitoring, evaluation, and feedback of priorities outlined in the strategic plan o learning and adjusting plans based on monitoring and evaluation	• None identified
Competencies for rapid learning and improvement: Systems are rapidly improved by teams at all levels who have the competencies	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)	• None identified	• None identified

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

Table 11: Assets and gaps at the level of Newfoundland and Labrador'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) 3) Build patient/citizen capacity to engage in all of the above	• Department of Health and Community Services supports a number of self-management initiatives, including: o Improving Health: My Way, which is a chronic disease self-management program to help individuals with challenges of living with chronic conditions o The Better Project which is a cross-provincial pilot program to support patients to engage in self-care for chronic conditions • Quality of Care Newfoundland develops messaging for the general public to empower patients to become more active decision-makers in their own healthcare • *Mental Health and Treatment Act* has established rights advisors to offer advice and assistance to patients and their representatives • The province operates a number of different initiatives to allow patient complaints to be aired, including: o Office of the Citizen's Representative o Department of Health and Community Services also maintains a formal complaints system for patients, records for which are all held electronically and distributed to the relevant regional health authorities when received o Client relations offices within each of the four regional health authorities o Professional colleges have all established formal complaint mechanisms for patients • Quality of Care Newfoundland has a patient panels program which engages patients four times a year on specific health-system questions • Regional health authorities support a number of advisory committees comprised of patient and family members:	• Newfoundland and Labrador (N.L.) SPOR SUPPORT Unit has supported training on conducting and using patient-oriented research as well as on smaller patient-engagement projects • NL SPOR SUPPORT Unit has implemented an inclusive priority-setting approach by soliciting citizen views about their priorities for health research and translating these into funding calls for applications • NL SPOR SUPPORT Unit peer review processes for research grant application in 2016 included methodological support for implementing patient engagement after submitting an expression of interest • Research exchange groups hosted by the Centre for Applied Health Research have citizen and patient members that meet regularly to discuss research projects, health services, initiate collaborative partnerships and to discover potential funding and partnership opportunities • Gaps include limited capacity for researchers to engage patients in research

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		○ Regional health authorities host patient and family-centred advisory committees that advise on strategic goals and initiatives ○ quality and safety committees regularly invite patients to board meetings to share their stories ○ many of the major programs at each of the regional health authorities host their own advisory councils to advise on clinical initiatives • Gaps include less programmatic attention to supporting patient goal-setting, decision-making and access to their own health information, and system-wide attention to building patient/citizen capacity to engage in advisory roles	
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)	• The *Access to Information and Protection of Privacy Act and the Personal health Information Act* are in place to respect the privacy of personal health information while also permitting sharing among relevant providers • HEALTHe NL is the provincial electronic health record which once fully implemented has been designed to support data collection and sharing of this data across the system to facilitate decision-making • Client registry is used to accurately identify individuals registering at hospitals, community health centres and connected pharmacies • LABS, a component of the HEALTHe initiative allows clinicians to view laboratory results regardless of where providers or patients are located • The Pharmacy Network gives health professionals access to patient medication profiles to prevent harmful drug interactions • Centre for Health Information provides a wide variety of analytic services including data extraction, linkages and analysis to be used in academic research as well as by the Department of Health and Community Services and Regional Health Authorities	• The Centre for Health Informatics and Analytics (CHIA) has been established to provide researchers in the province with fast, accurate linkages and analysis of patient data sets • Data Lab is in the process of being established by the Centre for Health Information, which provides access to de-identified patient data from across regional health authorities, and supports researchers and innovators to evaluate ongoing programs and services in the province

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		• Newfoundland and Labrador's Centre for Health Information hosts health analytics and evaluation services to provide meaningful information to the Department of Health and Community Services and regional Health Authorities, for the purposes of program development and performance monitoring and to support provincial health-policy planning • Centre for Health Information has a long-term vision to take over responsibility for all information in the province, which would better enable the sharing of data across all government programs and services • Disease reports are produced by Department of Health and Community Services annually on notifiable diseases to advance the promotion and protection of individuals in the province • Gaps include limited provincial capacity to capture patient-reported experiences, and limited capacity to share local data in a timely way that would support 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	• Research exchange groups hosted by Newfoundland and Labrador Centre for Applied Health Research where researchers, health professionals, decision-makers, community groups and members of the public are brought together to contribute towards a shared topic • Benefits evaluations are produced by the Centre for Health Information on information systems and government policy/program evaluation to support various provincial and national initiatives • Eastern Health is the only Regional Health Authority that hosts a research unit to enable some internal capacity for clinical trials and program evaluation • Gaps include little analytic capacity within the Department of Health and Community Services and in three of the four Regional Health Authorities to produce and share research in a timely way, or to synthesize existing research, as well as missing incentives and requirements for research groups to collaborate with one another and with patients	• Newfoundland SPOR Support Unit provides research training for the following six functions: data platforms and services; methods support and services; applied health-systems research, knowledge translation and implementation; real-world clinical trials; career development and training in methods and health-systems research; and consultation and research services • Health Research Ethics Authority of Newfoundland is a central body for ethics approval, and while it does not have distributed capacity, it does have representation from Regional Health Authorities, Memorial University, Department of Health and Community Services, and a member of the public • Centre for Applied Health Research was developed to help build capacity and organizational resources to undertake and

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			support high-quality applied health research and to facilitate the more effective and efficient use of research evidence in the province's health and community services system • Contextualized Health Research Synthesis Program run by the Centre for Applied Health Research synthesizes and contextualizes research evidence on health-system topics prioritized by executives at the Department of Health and Community Services, Department of Children, Seniors and Social Development and the four Regional Health Authorities
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	• Patient information resources are produced by Quality of Care Newfoundland on blocked leg arteries, stroke prevention and antibiotic use • Professional resources and practice points are produced by Quality of Care Newfoundland for physicians and nurse practitioners to provide information on best practices and tools to enable conversations between patients and providers on a wide variety of clinical topics • National and provincial standards for electronic health records, management information systems, and clinical care are disseminated by the Centre for Health Information • Overview of health services available in each of the Regional Health Authorities is produced by the Department of Health and Community Services • Rapid reports and snapshots produced by the Centre for Applied Health Research are used by decision-makers to inform policy development • Gaps include limited progress towards widespread use of patient aids and patient goal-setting supports and few system-level decision supports	• Newfoundland SPOR SUPPORT unit funds several research projects to provide research supports in the areas of health systems, knowledge translation, patient engagement, and implementation
Aligned governance, financial and delivery arrangements:	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	• Regular meetings between executives in the four regional health authorities, Centre for Health Information and senior leadership in the Department of Health and Community Services	• Ongoing discussions about the development of an academic health sciences network, which would provide a more formal effort to connect researchers with clinical leadership

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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	provide an opportunity for policy discussions and consider opportunities for rapid learning • Quality objectives and performance indicators are developed by each Regional Health Authority as part of its operational planning • The *Public Procurement Act* was recently passed to modernize procurement by provincial public bodies and includes new rules regarding open call for bid thresholds, group purchasing, and value-based purchases • Gaps include no centralized coordination of efforts to adapt a rapid-learning health system approach and incrementally join up assets, limited use of funding and remuneration models to incentivize rapid learning and improvement, and share reproducible building blocks of a rapid-learning health system	• Annual priority planning is undertaken for Contextualized Health Research Synthesis Program with executives from the Department of Health and Community Services, Department for Children, Seniors and Social Development, and each of the four Regional Health Authorities, which provides a mechanism to consider opportunities for rapid-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'	• Development and gradual implementation of Eastern Health's Innovation strategy is acting as an opportunity to unite stakeholders and work towards improvement. • Clinical Leaders program at Quality of Care NL works with providers to act as spokespeople for quality improvement, host clinical sessions to review the latest evidence-based research results and outcomes, and encourage physicians to use best practices for healthcare • Gaps include no explicit supports throughout the health system to develop a culture to support rapid learning and improvement	• Alignment between the SPOR SUPPORT Unit and the Government of Newfoundland and Labrador to refocus healthcare providers and researchers on realizing outcomes and incorporating input from system users, supports a culture of rapid learning and improvement, however most research groups (with the Centre for Applied Health Research being a notable exception) do not actively engage decision-makers at all levels to support rapid learning and improvement
Competencies for rapid learning and improvement: Systems are rapidly improved by teams at all levels who have the competencies	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)	• Some public reporting on select health-system priorities (e.g., wait times for priority conditions) • Eastern Health (one Regional Health Authority) has brought in LEAN methodology experts to support learning and process improvement • Regional Health Authorities each maintain a performance improvement unit and quality and	

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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)	patient safety department which focus on supporting on-going learning • Regional Health Authorities take part in both Atlantic specific and national learning collaboratives including one around psychological health and safety through the Mental Health Commission of Canada and the Canadian Patient Safety Institute's Atlantic collaboration for patient safety	

Table 12: Assets and gaps at the level of Yukon'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) 3) Build patient/citizen capacity to engage in all of the above	• The Health and Social Services Performance Measure Framework provides an approach for Yukon to track and measure performance with an emphasis on the implementation being a learning process where adjustments to the measures collected, analyses conducted and conclusions are anticipated • The 2016 Health Information Privacy and Management Act (HIPMA) established standards for accessing health information, including a maximum length of time care providers can provide patients with copies of health records • The Chronic Conditions Support Program (CCSP) engages patients in self-support and collaborative care models for COPD, diabetes and high blood pressure • Home health monitoring programs for chronic disease patients, namely those with COPD, aim to improve access to care, reduce transportation costs for rural patients, decrease the number and frequency of hospital visits and improve patients' awareness of their conditions • The Yukon Drug Formulary makes payment schedules and insured drugs/services available online with feedback mechanisms for patient input • The Council of Yukon First Nation acts as a convenor for engaging with self-governing First Nations where First Nations groups meet collectively and with government • The Health & Social Development department in the Council of Yukon First Nations focuses on issues related to physical and mental health for First Nations, and acts as a regional and national advocate and advises and assists with the development, implementation and evaluation of health and social programs in the communities of Yukon First Nations governments • Yukon Health and Social Services and the Yukon Hospital Foundation are collaborating with the Canadian Foundation for Healthcare Improvement (CFHI) to support learning about patient/citizen engagement and involving people with lived experience to build a framework for patient/citizen engagement, and the implementation of the framework is supported through territorial funds • Possible gaps o The Health and Social Services Performance Measure Framework and the 2016 Health Information Privacy	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		and Management Act were not developed with citizen/patient engagement o Organizations do not have robust practices in place for patient engagement. but (as noted above) this is currently being addressed through the development of a framework with CFHI	
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)	• As the main source for data infrastructure, eHealth Yukon provides the capacity to collect data about community health needs and share local information between care providers and regional health centres, including through the Yukon Health Information Network (YHIN), which includes the: o Client Registry System, which stores patient demographic information and makes the information available to authorized healthcare providers o Laboratory Information System, which allows nurses and other providers to connect electronically with the Whitehorse General Hospital's Meditech Hospital Information System, and order lab tests, track lab orders and view lab test results o Drug Information System, which provides a single, comprehensive repository of all drugs that are dispensed by community pharmacies across the territory, and which ensures that care providers can access complete, current medication profiles for individual patients • Yukon implemented Panorama in partnership with British Columbia in order to manage patient records on immunization and communicable diseases • Possible gaps o Lack of ability to link data o Limited integration of electronic medical records across the territory (although this is the focus of current work) o Limited data about social services	• 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	• The Health and Social Services Performance Measure Framework (see row 1) provides an approach for Yukon to track and measure performance with the framework being grounded in learning approach, and with objectives (increased alignment between workforce and departmental goals, improved matching of identified needs with available services, increased patient access to a range of health options and approaches) identified with appropriate clinical and systems-level indicators and tracked with baseline measurements every five years to	• The Yukon Research Centre is part of the Canadian Network of Northern Research Operators, but it does not seem to have a focus on health-system topics. • A possible gap is the lack of a university (although Yukon College is becoming a university), which makes data analysis and conducting research in a timely manner difficult

Characteristic	Examples	Health-system receptors and supports	Research-system supports
	6) Incentives and requirements for research groups to collaborate with one another, with patients, and with decision-makers	identify changes in population health status, healthcare utilization, and e-health supports, among other factors • Possible gaps o Infrequent measurement of indicators (every five years) o Lack of analytic capacity within government, which significantly limits the ability to identify, assess or apply research evidence	
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	• Activities of the Health Promotion Unit in Yukon Department of Health and Social Services include increasing public awareness and supporting healthier decision-making and lifestyles • The Yukon Medical Council, the regulatory body for physicians in the territory, sets evidence-based clinical practice guidelines, as well as administration, collaboration, practice and physician-patient relationship clinical standards • The Clinical Services Plan for Yukon territory (2014) advocates for the incorporation of evidence-based patient supports and clinical guideline development • The Skin and Wound Community of Practice collaborates with Yukon's Chronic Disease Management Advisory Committee in adopting and implementing a model of best practices for evidence-based wound management, which includes the integration of evidence-based guidelines using synthesized and appraised evidence in collaboration with the B.C. Ministry of Health, distribution of product information sheets between various care providers and patients, and continuous review of best practices • The policy and program development branch of the Department of Health and Social Services provides managerial and policy expertise within the department, manages its legislative agenda and supports the federal/provincial/territorial agenda at the minister's, deputy minister's and other official levels • The Social Inclusion and Poverty Reduction Strategy collaborates in establishing evidence-informed strategies with the Department of Health and Social Services and the Yukon Bureau of Statistics (YBS) to gather research and evidence on the extent of social exclusion and poverty in Yukon	• None identified
Aligned governance, financial and delivery arrangements: Systems adjust who can make	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	• The Yukon Physician Specialist Service Committee, made up of physicians and Department of Health staff, assesses wait times, volume of services, medical travel costs and	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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	determines the required number of specialist physicians in Yukon • The Health and Social Services Performance Measure Framework could be drawn on as a centralized and coordinated effort to adopt a rapid-learning health system approach as the framework. It is grounded in a learning process and has a focus on identifying measures to inform and guide financial and delivery arrangements to meet evolving care needs using four domains of performance measurement (optimal physical and mental well-being, safety and well-being for vulnerable or hard-to-reach population, access to integrated quality services, and recruitment of talented people to provide high-quality care). • The Procurement Improvement Framework has prioritized a plan for value-based procurement • A possible gap is that funding does not flow in a manner that is flexible enough for enabling rapid learning	
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'	• Yukon Department of Health and Social Services operates as a combined department which enables collaboration for the health system and across services to support the determinants of health • Yukon Health and Social Services also has close connections to service providers, which creates the potential for more rapid learning because front-line staff also work within the department • The Summit on Aging in Yukon is a key component of creating a rapid learning culture given the extensive public engagement and commitment to the process across the territory • The Yukon Mental Wellness Strategy provides a 10-year plan with a focus on system response and improvement, and through collaborations between the Department of Health and Social Services and First Nations partners it seeks to develop a comprehensive continuum of services based on communities' strengths and through capacity building	• 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	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	• The Minister and the Department of Health and Social Services have undertaken studies and evaluations (e.g., the Clinical Services Plan), and developed strategic plans (e.g., the Health and Social Services Strategic Plan from 2014-2019 and a Performance Measure Framework), with each prioritizing the need for competencies for different components of rapid learning and improvement	• None identified

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	4) Centralized specialized expertise in supporting rapid learning and improvement 5) Rapid-learning infrastructure (e.g., learning collaboratives)	• Yukon Health and Social Services send staff for education and training, as well as bring in organizations (e.g., Canadian Institute for Health Information) for capacity building.	

Table 12: Assets and gaps at the level of the Northwest Territories' 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) 3) Build patient/citizen capacity to engage in all of the above	• Department of Health and Social Services: 1) regularly conducts the Patient Experience Questionnaire to inform health-system improvement efforts; 2) provides citizens with access to their own health information through an online application system; 3) provides information to citizens and patients about managing their own health (e.g., information about preventing sexually-transmitted infections) as well as about the range of health and social services available to them (e.g., applying for extended benefits for eligible conditions), which can be browsed by topic area • Health and Social Services System Navigator established to support patients with information about how to provide feedback, file complaints about the system with complaints officers and registrars • Patient representatives established at the level of each Health and Social Services Authority to respond to and resolve patient complaints • Department of Health and Social Services Public Consultations and Engagement initiatives engage citizens to inform policy decision-making on priority topics (e.g., regulating naturopathic practitioners, developing a mental health framework for the territory) • Regional Wellness Councils established to engage communities in setting priorities for regional program development and tailoring, with chairs from each council serving on regional boards to help guide decision-making • Indigenous Advisory Body established by the ministry which collaborates to provide advice on behalf of Indigenous governments (staff-to-staff means without having to go through intergovernmental arrangements) about improving its responsiveness to Indigenous health issues • Mental Health Quality Assurance Committee established within the mental health and addictions strategic plan to engage patients in the oversight and planning of services • Choosing Wisely Northwest Territories actively seeks to engage patients as advisors • Registered Nurses Association of the Northwest Territories and Nunavut has a mandate to include patient/public representatives on their board of directors and public representation on the Registered Nurses Association	• Northwest Territories SPOR SUPPORT Unit (Hotii ts'eeda) supports patient and community engagement and ensures Inuvialuit and Metis knowledge is integrated into all aspects of the research process, as well as build capacity for such engagement • Aurora Research Institute ensures patients and citizens are engaged in research, and will not issue licences/ethics approval to researchers unless they have engaged with communities and have a plan for communicating the findings • Gaps may include the fact that many patient-engagement initiatives in the health research space are still undergoing developments as a result of shifting dynamics between Indigenous communities, researchers and governments

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		• Gaps may include less programmatic attention to engaging patients in decision-making about their own health, particularly living well with their conditions (with most emphasis placed on providing information about conditions), in their own care, in organizational and policy decision-making ○ These areas are also under-developed in the context of engaging Indigenous communities, which require nuanced approaches that are not yet fully formed	

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)
		• NWT HealthNet supports an interoperable electronic health record that enables capture, linkage and sharing of patient and clinical data, and now covers 90% of the population
		• Patient Experience Questionnaire occasionally administered by the Department of Health and Social Services to capture patient-experience data with aggregate results publicly disseminated
		• Health Information Act introduced in 2015 to ensure privacy and security of patient information collected by providers and organizations (although in some cases may act as a barrier to timely data sharing)
		• NWT Health and Social Services Performance Measurement Framework requires that the Department of Health and Social Services regularly collects and reports on key health-system performance outcomes (which is disseminated through an annual report), and also increasingly develops and disseminates infographics on a resources page to share data about the health of the population in Northwest Territories with the public, healthcare providers and system decision-makers
		• Some hospitals (like Stanton Territorial as part of its renewal project) are in the planning phases of establishing a Territorial Clinical (hospital) Information System (CIS) to support healthcare professionals with access to patient health record information in hospital setting, and to facilitate a better infrastructure for administrative data collection (e.g., for billing and quality indicators) and for disease surveillance and reporting
		• Connections to national assets (e.g., Canadian Institute for Health Information, Canadian Partnership Against Cancer, Public Health Agency of Canada), and some other jurisdictions (such as Alberta) available to provide additional support for capturing, analyzing, linking and sharing data relevant to priority health issues
			• Aurora Research Institute provides infrastructure and training to support data collection and management, through:
			  ○ three research centres that provide researchers with facilities and a number of logistical supports
			  ○ the Research Support Fund that promotes the development of capacity for conducting research in the territory
			• The Institute for Circumpolar Health Research collaborates with a number of agencies to build data collection and management capacity in the region, including the Canadian High Arctic Research Station, Statistics Canada, SPOR support unit, Department of Health and Social Services, the regional health authorities, Canadian Primary Care Sentinel Surveillance Network and Queen's University
			• Gaps may include less progress in prioritizing data capture, linkage and sharing that supports health- and social-systems research

Characteristic	Examples	Health-system receptors and supports	Research-system supports
		• Gaps may include less progress in establishing capacity for collecting longitudinal data about the full range of health, healthcare, social care and social determinants that matter for decision-making (particularly data that reflects the realities of Indigenous communities), linking, analyzing and sharing these data across the system	
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	• Government of Northwest Territories Health and Social Services Research Agenda launched in order to identify and address known knowledge gaps and promote health and social services research priorities • Health and Social Services Performance Measurement Framework creates an imperative for the Department of Health and Social Services to continuously evaluate and report on system-level performance and progress towards stated objectives • Research coordination unit in the Department of Health and Social Services helps to facilitate research production in the territory by providing access to health data and information, and through direct support to researchers (letters, in-kind, knowledge-translation partnerships and access to data) • Aurora College Research Ethics Committee provides ethics oversight for all health and social services research conducted in the territory, with the Aurora Research Institute providing licences required by the government to consider requests for information and data • Connections to national assets (e.g., Canadian Agency for Drugs and Technologies in Health) provide opportunities to leverage capacity for synthesizing evidence when needed • Gaps may include less progress in establishing capacity to synthesize research evidence in a timely way (although Institute for Circumpolar Health Research indicates research synthesis and engaging a full range of health system stakeholders is within their mandate), for conducting rapid-cycle evaluations (although some program evaluations can be conducted without a licence), and for providing timely access to a one-stop shop of local evaluations and pre-appraised syntheses (although there have been conversations about establishing a clearinghouse for local data and evidence)	• Northwest Territories SPOR SUPPORT Unit (Hotii ts'eeda) has established a one-stop shop to disseminate all locally produced research funded or facilitated by SPOR, or that relate to community priorities • Eletsehdee Gathering facilitates the translation of local knowledge and research evidence that emerges from the SPOR initiative and about insights that relate to health research in the Northwest Territories more generally • Northwest Territories Indigenous Governments increasingly playing more prominent role in setting research priorities and commissioning research to address local needs • Aurora Research Institute and Aurora College Research Ethics Committee have a well-established ethics and licensing infrastructure (which they will not issue unless project proposals are explicitly engaging communities, and have a plan to disseminate results to them) ○ Medical Registry Committee established to review and approve Medical Research Permits for physicians licensed to practise in the Northwest Territories • Aurora Research Institute Library, resource clearinghouse and regional logistics support established to support researchers with required infrastructure and facilities to conduct research in the territory • NWT Research Database established to provide a one-stop shop for all projects licensed in the territory since 1974, including key project outputs when available • Institute for Circumpolar Health Research has a mandate, as outlined in their strategic plan, to produce, synthesize and disseminate health research for use in decision-making in Northwest Territories, including creating networks and partnerships for collaboration

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			with universities, Indigenous governments and territorial decision-makers • Gaps may include limited attention given to incentivizing and developing capacity for synthesizing research evidence in a timely way, and for establishing capacity for supporting the use of research evidence in decision-making processes
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 and Social Services System Navigator established to help patients with questions or concerns, and provide guidance to support access to services provided by the Northwest Territories health and social services system (e.g., providing information about the system, connecting patients with service providers and helping patients find commonly used forms) • Electronic Medical Record aims to support a stable and consistent platform for sharing practice standards to inform clinical care • System Transformation Implementation project (and the move towards an integrated Northwest Territories Health and Social Services Authority), has emphasized the collaborative and integrated development of clinical practice standards – which is also reflected in each annual report • Legislative Assembly maintains a public clearinghouse of policy documents (including those relevant to the Department of Health and Social Services) to aid those involved in the monitoring and oversight of system progress towards achieving stated objectives • Gaps may include limited progress in establishing patient-targeted decision supports for self-management and clinical encounters, and the establishment of a centre of gravity for the production and/or dissemination of decision supports for health-system policymakers and stakeholders (e.g., clinical practice guidelines, quality standards, care pathways, health technology assessments and health-system descriptions)	• Aurora Research Institute research clearinghouse provides access to local research outputs for potential knowledge users • Gaps may include limited progress in same areas identified in adjacent column
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	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	• Hospital Insurance and Health and Social Services Act (HIHSSA) restructured health and social services to a 'One-System Approach' in which six regional Health and Social Services Authorities were consolidated into the Northwest Territories Health and Social Services Authority (NTHSSA) and along with Hay River HSS Authority and Tłı̨chǫ Community Services Agency now function under a single governance model, which has led	• Gaps may include limited progress in same areas identified in adjacent column

Characteristic	Examples	Health-system receptors and supports	Research-system supports
and aligned to support rapid learning and improvement at all levels	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	to a streamlining of the accreditation process across communities and regions, and increased sharing of expertise and resources (eventually this may lead to increased data sharing across multiple service-delivery partners to enhance services to clients, improve client outcomes and monitor system outcomes) • NWT Health and Social Services Performance Measurement Framework established to ensure accountability of government for achieving stated health-system goals • Northwest Territories Indigenous Governments specifically, and increasing move towards Indigenous self-governance more generally. may enhance support for localized decision-making in ways that reflect Indigenous values and ways of knowing, and can help to inform the development of rapid learning and improvement • Majority of health workers, including physicians, remunerated by salary which provides opportunities for them to be engaged in system initiatives, research and other strategic system-strengthening efforts (including rapid learning) • Gaps may include limited emphasis on leveraging existing governance, financial and delivery arrangements to support efforts conducive to 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'	• The NTHSSA has established clinical leads in a number of priority domains (e.g., mental health and addictions, primary care) who are working as champions for continuous quality improvement and collaboration through clinical networks • Department of Health and Social Services has established the Division of Planning, Reporting and Evaluation, which shows dedication and allocated resources for conducting research, doing evaluation and reporting to inform decision-making • Gaps may include limited progress in sustained and targeted efforts to evaluate innovations to support rapid learning and drive system improvement	• Building a Path for Northern Science was established by the government as the territory's research agenda, and signals its commitment to using evidence in policymaking through the identification of priority areas which will guide funding for future research and science integration, pointing researchers to those areas that will yield information relevant and valuable to residents and decision-makers • Gaps may include limited commitment by government to establish mechanisms that ensure researchers and decision-makers at all levels are aligned in their efforts to support the use of data and research evidence for rapid learning and improvement
Competencies for rapid learning and improvement: Systems are rapidly improved by teams at all levels who	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)	• Some evaluations of priority initiatives (e.g., Building Stronger Families Action Plan) are conducted to assess and report on progress made, which feeds in to cycles of	• Aurora Research Institute Outreach promotes awareness of and capacity for research through youth programming and community outreach across the territory

Characteristic	Examples	Health-system receptors and supports	Research-system supports
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	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)	learning and efforts to adjust for sustained health- and social-system improvements • Gaps may include limited attention paid to many competencies that can be established to support rapid learning (e.g., occasional rather than frequent efforts to publicly report on rapid learning and improvement, few distributed competencies for rapid learning and improvement, little in-house capacity or centralized expertise and little infrastructure) which is compounded by high staff turnover which makes it a challenge to establish and sustain capacities if they do exist	• Institute for Circumpolar Health Research has a mandate to support research education and training in the Northwest Territories (as well as among other partners involved in research in the north) • Northern Scientific Training Program provides federal funding for students conducting research in the north to support the development of capacity for research – including in the health sciences

Table 14: Assets and gaps at the level of Nunavut'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) 3) Build patient/citizen capacity to engage in all of the above	• Community Health Committees have been established to work with local healthcare teams, regional public health specialists and with staff at the Department of Health to set local health priorities and to drive the development, implementation and evaluation of health programs based on these priorities • Community Health Representatives engaged to work with a variety of health professionals (e.g., Health Promotion Team, other Community Program Staff such as Nurses and Social Workers) in the prevention of disease and maintenance of health in their communities while ensuring cultural values are observed • Office of Patient Relations established by Department of Health to receive complaints, investigate and resolve conflicts between patients and providers • Gaps may include less formal emphasis on engaging patients to help shape system priorities and targets based on their inputs, and a need for more explicit effort to support them to make decisions about their own health, their own care, or the organizations and systems that are responsible for delivering services to them	• Government of Nunavut, Nunavut Tunnngavik Inc., and Qaujigiartiit Health Research Centre in the process of assessing feasibility of developing a Strategy for Patient-Oriented Research (SPOR) and a SPOR SUPPORT (Support for People and Patient Oriented Research and Trials) Unit • Qaujigiartiit Health Research Centre has a mandate to facilitate community-driven health research projects • Nunavut Research Institute has established strong relationships with communities to support their engagement in research • Inuit Tapiriit Kanatami and similar organizations ensure that research conducted in the north, including in Nunavut, is anchored on the needs of Inuit communities, through advocacy and engagement campaigns, as well as through the release of research strategies focused on Inuit communities • Gaps may include limited progress in setting up supports for the production and use of patient- and community-oriented research
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	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	• Department of Health is in the process of implementing a system-wide, integrated electronic health record that is available at most points of care, and provides access to a repository of clinical reports, individual patient information, laboratory results, diagnostic imaging orders and results, communicable disease information, inpatient and outpatient diagnoses, drug profiles and immunizations • Office of Patient Relations regularly captures patient experience through complaints management service, reports complaints by issue (e.g., access to services,	• Nunavut Bureau of Statistics collects, records, analyzes and distributes statistical data on Nunavut to Nunavummiut and across Canada • Canadian High Arctic Research Station has been established in Cambridge Bay to support capacity to collect and manage data in Canada's Arctic region • Gaps may include similar capacity constraints identified for the health system, which includes nascent efforts in developing capacity for capturing, linking, analyzing, sharing and reporting on a range of data (e.g., patient-

Characteristic	Examples	Health-system receptors and supports	Research-system supports
provider engagement alongside data about other process indicators (e.g., clinical encounters and costs) and outcome indicators (e.g., health status)	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)	attitude of professionals), and uses this to inform system improvement for improving patient experiences • Population Health Information unit in the Department of Health collects, manages and reports information related to health-system utilization and health conditions both within and outside the territory • Nunavut Bureau of Statistics collects some data on disease burden and determinants of health, and the Department of Health uses these data to report on population health statistics that outline disease burden for a number of conditions • Annual report for 2017-18 outlined a number of efforts underway, including: o development of a framework for identifying health-system data needs at regional and territorial level o development of a Health Information System to build capacity for routinely capturing important health-system data that can be used to monitor progress towards achieving strategic aims o increasing role played by the Population Health Information Unit in data analysis and sharing both locally and with external partners across the country (e.g., Canadian Council of Cancer Registries, the Canadian Chronic Disease Surveillance System, and the Canadian Congenital Anomalies Surveillance System for additional support) • Gaps may include limited progress in establishing Nunavut-specific legislation that would cover privacy of information contained in electronic health records, given the inter-jurisdictional nature of care provided in the territory (e.g., providers from multiple jurisdictions contributing to the delivery of services), and more generally nascent efforts in developing capacity for capturing, linking, analyzing, sharing and reporting on a range of data (e.g., patient-reported experiences, longitudinal data related to health, healthcare, social care and determinants of health)	reported experiences, longitudinal data related to health, healthcare, social care and determinants of health)
Timely production of research evidence: Systems produce, synthesize, curate and share (with individuals at all levels) research about problems, improvement options	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	• The Population Health Information Unit is a resource for health, providing consultation on research design and methodology, data standards, and reporting of health indicators (as indicated in 2017-2018 annual report) • The Department of Health actively supports researchers to help identify community-based research needs; partners with researchers on projects of interest to the department; and undertakes long-term planning to fill research voids	• Interagency Human Health Research Review Board is a tri-partite group of Nunavut organizations (Government of Nunavut Department of Health, Nunavut Tunngavik Inc., and Qaujigiartiit Health Research Centre) that reviews and discusses health research proposals that are applying for research licences in Nunavut • Qaujigiartiit Health Research Centre:

Characteristic	Examples	Health-system receptors and supports	Research-system supports
and implementation considerations	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 limited progress in establishing many core capacities and supports for facilitating the timely production, synthesis and use of research evidence to inform health-system decision-making processes	○ works to identify Inuit and community perspectives on ethics in order to inform the work of the centre and to promote ethical practice in Nunavut from the perspective of Community members ○ supports the sharing of knowledge from community-led research projects among community members, researchers and health workers ○ maintains an online clearinghouse for data and research evidence generated in Nunavut • Nunavut Research Institute established to administer scientific research licensing in Nunavut, in accordance with Nunavut's Scientists Act, and also has a mandate to: ○ facilitate collaborative research to address Nunavut's needs and priorities ○ promote the development and application of new technology to improve the quality of life of Nunavummiut ○ provide advice on matters related to scientific research in Nunavut ○ provide a clearinghouse of information on scientific research conducted in Nunavut ○ coordinate Nunavut Arctic College's Environmental Technology Program ○ prepare and disseminate annual research compendia, detailing all research projects licensed by the territory each year • Research Field Support Units also maintained by Nunavut Research Institute to ensure adequate research infrastructure (e.g., accommodations, laboratories) is in place to support research and teaching activities in the territory • Nunavut Tunngavik Incorporated occasionally engages with research partners from the territory and across the country to better understand the health and well-being of Inuit in Nunavut, and to develop approaches and strategies for addressing priority problems (e.g. youth suicide) • Gaps may include limited progress in establishing many core capacities and supports for facilitating the timely production, synthesis

Characteristic	Examples	Health-system receptors and supports	Research-system supports
			and use of research evidence to inform health-system decision-making processes
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…	• Fact sheets and infographics about various priority health topics (e.g., nutrition and tuberculosis) for citizens prepared and disseminated by the Department of Health • Clinical practice guidelines, manuals and a number of other resources produced and disseminated by Department of Health and updated on an as needed basis (with input from experts) • Gaps may include limited progress in establishing support for the development of the full range of decision supports for patients (e.g., self-management supports, decision aids, goal-setting supports), providers (e.g., quality standards and care pathways) and health-system decision-makers	• Gaps may include few efforts to provide decision supports, although some efforts to provide access to online clearinghouses for research (see Qaujigiartiit Health Research Centre above) signal a possible shift towards the establishment of more decision supports in future
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	• Very close link between clinical health care and public health planning and delivery, which helps to ensure coordination in decision-making across a range of sectors and conditions, which centralizes and creates a 'hub' for rapid learning and improvement • Gaps may include limited progress in adjusting governance, financial and delivery arrangements to support rapid learning and improvement at all levels	
Culture of rapid learning and improvement: Systems are stewarded at all	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	• Efforts to further develop a framework for data capture, and the Population Health Information Unit (see above) signal a willingness in the Department of Health to	• Nunavut Research Institute has a mandate to actively identify research needs, broker research partnerships, and facilitate dialogue and collaboration among Nunavut communities,

Characteristic	Examples	Health-system receptors and supports	Research-system supports
levels by leaders committed to a culture of teamwork, collaboration and adaptability	needed to support rapid learning and improvement, and to acknowledge, learn from and move on from 'failure'	develop mechanisms that will help promote a culture of rapid learning and improvement • Gaps may include limited progress in establishing explicit mechanisms to develop a culture of rapid learning and improvement, given most health organizations do not have the capacity to support a culture of rapid learning and improvement	academic research scientists, government agencies, and the private sector (which can help to foster a greater culture of rapid learning in the territory) • Cooperative governance for human health research ethics (outlined above) may have helped to solidify a culture of teamwork and collaboration within the research ethics space, which could be built upon in future commitments to support the establishment of a culture that is conducive to similar culture for rapid learning and improvement • Gaps may include similar areas same as adjacent column
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)	• Gaps may include limited attention paid to many competencies that can be established to support rapid learning (e.g., efforts to publicly report on rapid learning and improvement, distributed competencies for rapid learning and improvement, in-house capacity or centralized expertise and infrastructure)	• Nunavut Research Institute supports capacity development for research through a wide range of outreach, training and communication initiatives • Qaujigiartiit Health Research Centre supports capacity development for community research • Northern Scientific Training Program provides federal funding for students conducting research in the north to support the development of capacity for research – including in the health sciences

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