Canada Health Infoway

Shared Pan-Canadian Interoperability Roadmap

May 2023

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Executive Summary

The Canadian health system has faced unprecedented strain during the global pandemic, which exacerbated existing systemic challenges and issues. Consequently, there has been accelerated urgency to alleviate underlying pain points to continue to build a health system that is connected, equitable and sustainable. Numerous issues continue to challenge our health system, including inequitable access to care; insatiable demand across the system, most acutely at emergency departments; the ongoing health human resources crisis and the notable exodus of many health care professionals along with a shortage of information technology/informatics/interoperability experts. It is more imperative than ever that we build a more efficient health system within the resources available to us.

There is growing recognition that timely exchange and access to consistent and reliable health information can significantly improve care and drive positive health outcomes. While there has been immense digitization of health information over the past two decades, the pandemic further catalyzed the adoption of virtual care solutions. We are at a critical inflection point to ensure a sustainable health system, in which we must focus our efforts on creating the world-class interoperable system that Canadians deserve — one which puts them in control of how they receive care and empowers them to access and use their health record as they deem appropriate. The quintessential characteristic of an interoperable health system is person-centric care, in which standardized data can follow the patient across all care settings and geographies to enable more informed care provision, leading to better health outcomes.

As we look ahead, we must continue to modernize our health system through the premise of, "Connected Care to Enable a Healthier Canada," whereby all care sectors, organizations and providers are linked through health technology and standardized data. Digital health systems need to interact with each other across all care settings so that Canadians' health information moves with them through the system, ensuring no patients fall through the cracks. For clinicians and care providers, technology must support effective and efficient communications, and improve care delivery and the patient experience. Beyond accessing information for the provision of care, health systems need to be able to access and analyze large data sets to inform health system planning and performance, analytics, research and population health management to protect and optimize a learning health system for the generations to come. Similarly, health data needs to continue to support Canada's reputation of world-class research (e.g., biotechnology), medical breakthroughs (e.g., genomics) and innovation.

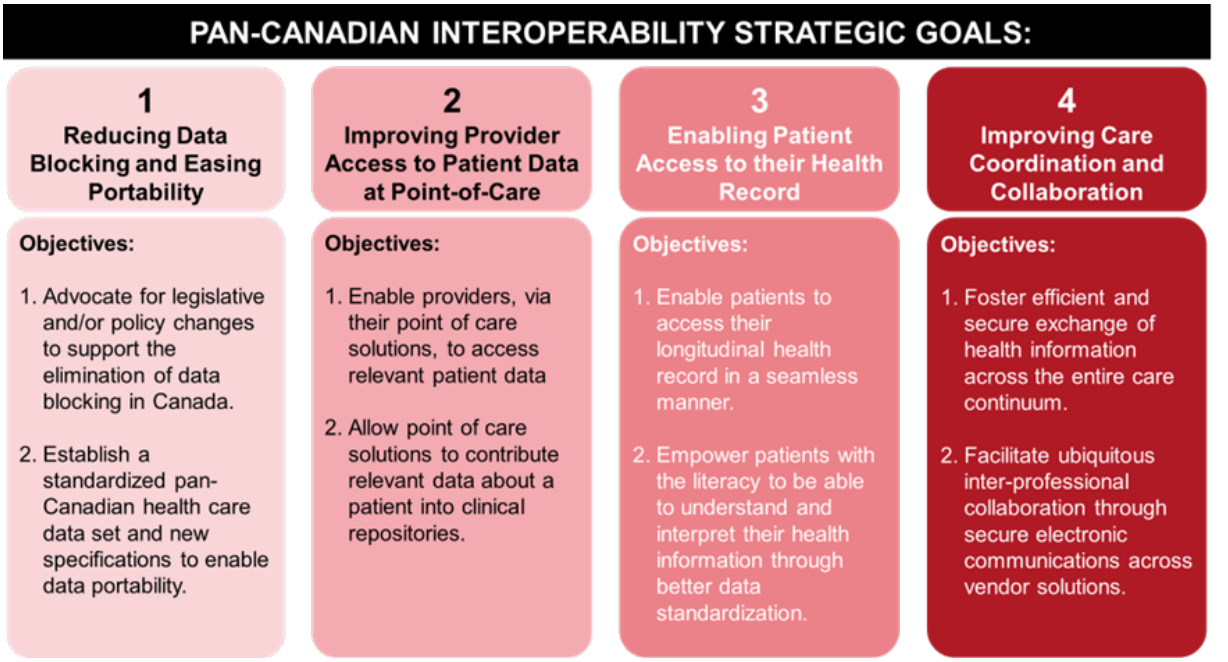
Canada Health Infoway (Infoway) is committed to achieving a more connected health system and will leverage more than two decades of progress and experience to guide this journey. Infoway's commitment means assuming roles from convenor to standards developer to strategic investor in order to effectively support all stakeholders across the health system in making this goal a reality.

Leveraging learnings from leading countries (e.g., the United States, Switzerland, Australia, New Zealand, etc.) that have significantly advanced interoperability, we recognize a set of common building blocks that substantially drive progress. These building blocks represent a bottom-up approach that typically takes time to materialize and unlock value for the health system, unless catalyzed by investment, legislative levers and policy changes.

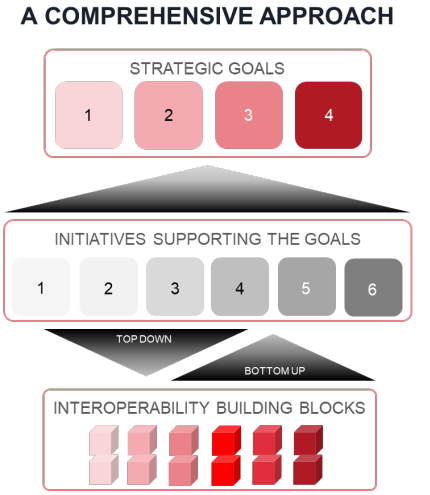
A pan-Canadian interoperability roadmap must leverage related work that has been planned or already initiated within Canadian jurisdictions, unlock value and address immediate pain points. To that end, health system leaders across the country have agreed on four key challenges that must be addressed:

1. Systems are not able to easily share electronic health information.
2. Providers have limited ability to make the most informed clinical decisions since health information is siloed across multiple systems and repositories, and is often inaccessible to them.
3. Patients have limited ability to access, manage, and consensually share their full health record.
4. Care coordination and collaboration is not currently supported by integrated and interoperable tools and systems that support efficient care delivery as patients progress through the system.

To address these systemic issues, stakeholders all agree that we must focus our collective efforts on four (4) strategic goals.



Combining a Top-Down and Bottom-Up Approach



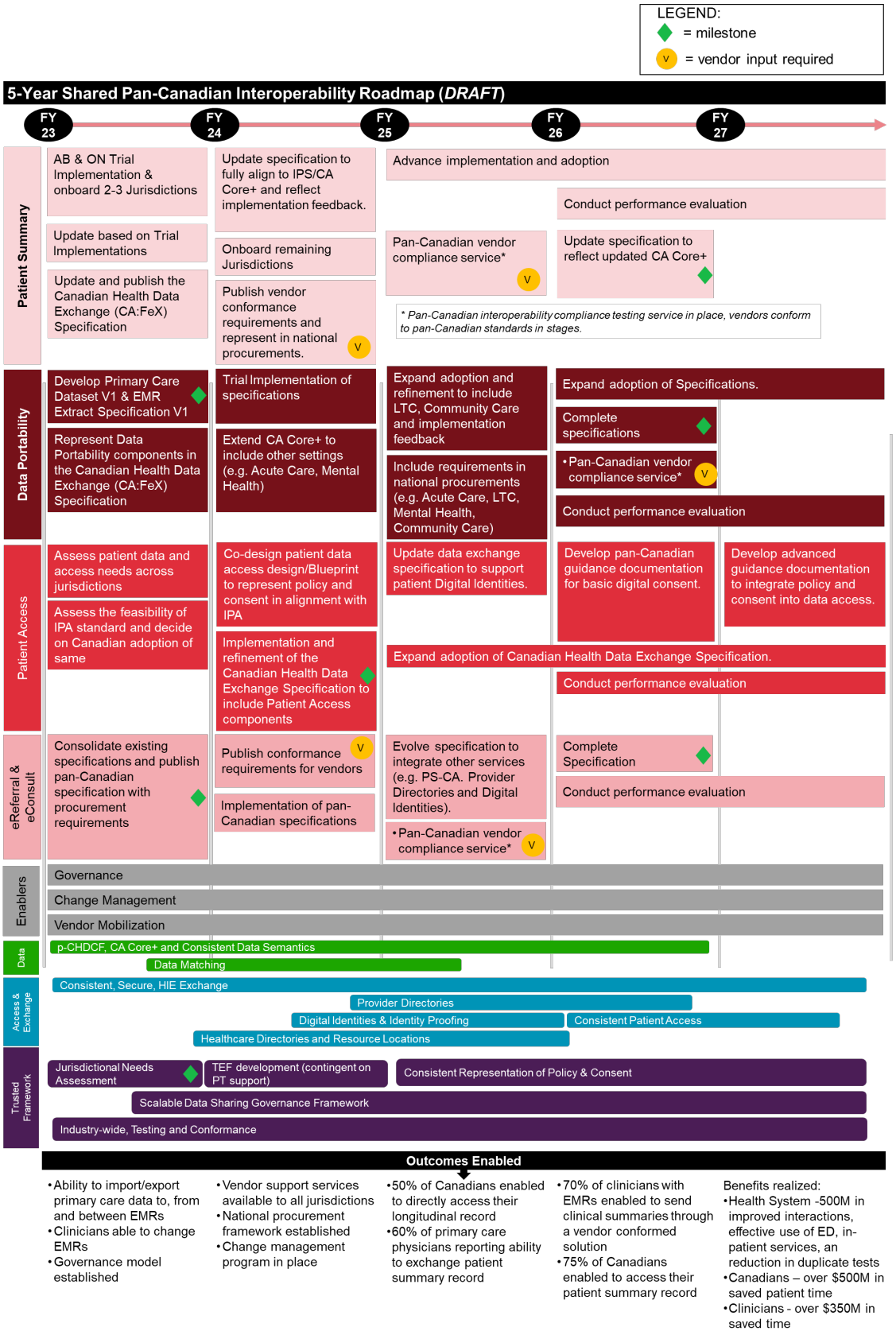
These strategic goals represent a top-down approach, in which initiatives/programs, based on jurisdictional priorities across the country, will be identified over time. As these initiatives/ programs progress, they will naturally require various interoperability building blocks (the bottom-up approach) that will be designed and developed to enable successful implementation of the initiatives. This approach will enable the creation of core capabilities and drive the maturation of each building block over time. Collective progression of these building blocks will substantively advance interoperability in Canada, and by the end of the next five (5) years, all core capabilities for each building block will be significantly advanced.

The Shared Pan-Canadian Interoperability Roadmap (on the next page) marries the top-down and bottom-up approaches to achieve our overarching goal of advancing pan-Canadian interoperability, while unlocking incremental value for the provincial and territorial health systems every step along the way. In the diagram below, the top level depicts the initial set of initiatives that have been identified by jurisdictions as supporting the strategic goals, while the subsequent layers depict the building blocks that will be enabled as the work unfolds.

Note that the deployment schedule for the areas outlined on the Roadmap will be finalized with the provinces and territories, recognizing that some jurisdictions are in the process of finalizing their individual roadmaps and respecting the resource capacity of participating stakeholders.

It is also important to note that this roadmap will serve as a responsive, living document that will continuously iterate with new interoperability initiatives and programs that drive value in the four strategic goals and help address systemic issues that continue to challenge our health system.

Additionally, we recognize that end-to-end interoperability is a continuous journey, as evidenced by various international roadmaps, and its advancement is a multi-year initiative. Infoway will continue to engage with all stewards and stakeholders of the Canadian health system to elicit calls to action and work collaboratively to advance interoperability.


LEGEND:
= milestone
V = vendor input required
5-Year Shared Pan-Canadian Interoperability Roadmap (DRAFT)
FY 23
FY 24
FY 25
FY 26
FY 27
Patient Summary
AB & ON Trial Implementation & onboard 2-3 Jurisdictions
Update specification to fully align to IPS/CA Core+ and reflect implementation feedback.
Advance implementation and adoption
Conduct performance evaluation
Update based on Trial Implementations
Onboard remaining Jurisdictions
Pan-Canadian vendor compliance service*
Update specification to reflect updated CA Core+
Update and publish the Canadian Health Data Exchange (CA:FeX) Specification
Publish vendor conformance requirements and represent in national procurements.
* Pan-Canadian interoperability compliance testing service in place, vendors conform to pan-Canadian standards in stages.
Data Portability
Develop Primary Care Dataset V1 & EMR Extract Specification V1
Trial Implementation of specifications
Expand adoption and refinement to include LTC, Community Care and implementation feedback
Expand adoption of Specifications.
Complete specifications
Represent Data Portability components in the Canadian Health Data Exchange (CA:FeX) Specification
Extend CA Core+ to include other settings (e.g. Acute Care, Mental Health)
Include requirements in national procurements (e.g. Acute Care, LTC, Mental Health, Community Care)
• Pan-Canadian vendor compliance service*
Conduct performance evaluation
Patient Access
Assess patient data and access needs across jurisdictions
Co-design patient data access design/Blueprint to represent policy and consent in alignment with IPA
Update data exchange specification to support patient Digital Identities.
Develop pan-Canadian guidance documentation for basic digital consent.
Develop advanced guidance documentation to integrate policy and consent into data access.
Assess the feasibility of IPA standard and decide on Canadian adoption of same
Implementation and refinement of the Canadian Health Data Exchange Specification to include Patient Access components
Expand adoption of Canadian Health Data Exchange Specification.
Conduct performance evaluation
eReferral & eConsult
Consolidate existing specifications and publish pan-Canadian specification with procurement requirements
Publish conformance requirements for vendors
Evolve specification to integrate other services (e.g. PS-CA. Provider Directories and Digital Identities).
Complete Specification
Conduct performance evaluation
Implementation of pan-Canadian specifications
• Pan-Canadian vendor compliance service*
Enablers
Governance
Change Management
Vendor Mobilization
Data
p-CHDCF, CA Core+ and Consistent Data Semantics
Data Matching
Access & Exchange
Consistent, Secure, HIE Exchange
Provider Directories
Digital Identities & Identity Proofing
Consistent Patient Access
Healthcare Directories and Resource Locations
Trusted Framework
Jurisdictional Needs Assessment
TEF development (contingent on PT support)
Consistent Representation of Policy & Consent
Scalable Data Sharing Governance Framework
Industry-wide, Testing and Conformance
Outcomes Enabled
• Ability to import/export primary care data to, from and between EMRs
• Clinicians able to change EMRs
• Governance model established
• Vendor support services available to all jurisdictions
• National procurement framework established
• Change management program in place
• 50% of Canadians enabled to directly access their longitudinal record
• 60% of primary care physicians reporting ability to exchange patient summary record
• 70% of clinicians with EMRs enabled to send clinical summaries through a vendor conformed solution
• 75% of Canadians enabled to access their patient summary record
Benefits realized:
• Health System -500M in improved interactions, effective use of ED, in-patient services, an reduction in duplicate tests
• Canadians – over $500M in saved patient time
• Clinicians - over $350M in saved time

To successfully advance pan-Canadian interoperability through the execution of this roadmap, a series of critical success factors are required, with two notable ones being:

1) **Adequate funding**
   Sufficient funding will enable Infoway to facilitate the development of essential data and technology standards that will support the creation of interoperable systems across the country. In addition, it will help establish the necessary incentives and foundational supports for the following stakeholder groups:

   - **Jurisdictions** – Funding is required to address resource capacity issues, as well as training and skills development. Jurisdictions need to be able to acquire and/or backfill current resources to ensure sufficient bench strength to follow through on implementation efforts. The health human resources crisis will also need to be addressed to ensure long-term sustainability.
   - **Providers/Clinicians** – Recognizing the time and effort required to accommodate new workflows and other adjustments, busy clinicians will need to be incentivized to adopt the changes that come with practicing in an interoperable system and be supported by change management strategies and resources.
   - **Industry** – Industry stakeholders, such as vendors, need to be incentivized to participate and conform their solutions and practices to those proposed in an interoperable health system.
   - **Indigenous Nations/Organizations** - Where mutually desired, resourcing and capacity-building will support Indigenous Nations and organizations in advancing their self-determined interoperability priorities.
   - **Federal Stakeholders –** Systems used for federal programs will also require support to meet their interoperability needs. These include the Correctional Service of Canada (CSC); Innovation, Science and Economic Development (ISED); National Defense and Canadian Armed Forces (CAF); Veterans Affairs Canada (VAC); Indigenous Services Canada (ISC); Royal Canadian Mounted Police (RCMP) and Global Affairs Canada (GAC).

2) **Legislative Enablement**
   To help promote pan-Canadian interoperability, opportunities for legislative and regulatory accelerators to advance this work should be explored, while respecting federal and provincial scopes of authority. One example of legislative enablement is “anti-blocking,” as evidenced by the United States’ 21st Century Cures Act (Cures Act), which included provisions to promote health information interoperability and prohibit information blocking, and in Denmark, where a legal framework mandates the electronic capturing, access and exchange of health data. Similar legislative enablement would prevent vendors from “blocking” data, making it impossible to share health information across systems.

To support the harmonization of data and technology standards, Infoway is committed to providing the necessary support to all provinces and territories, providers/clinicians, Indigenous Peoples, rural and remote populations, and all patients, particularly in the areas of change management, trust, governance and vendor mobilization. Additionally, French-language supports needs to be accounted for across all provinces and territories.

In closing, it is important to recognize that this roadmap will support strategic federal commitments in advancing data interoperability and virtual care adoption in Canada (as highlighted in the Mandate

Letter and Budget 2022). Moreover, this interoperability roadmap is aligned to ongoing FPT collaborations, including the FPT Action Plan and the Pan-Canadian Health Data Strategy (PCHDS). Looking beyond jurisdictional endorsement of the roadmap, Infoway will continue to engage with Health Canada to secure funding for this important work.

Infoway will work with jurisdictions to conduct current/gap analyses to identify existing assets, solutions, and standards that can be leveraged to accelerate progress while addressing the intricacies of aligning this Roadmap with jurisdictional implementation plans. As we move to the subsequent phases of scoping out and co-designing the four priority initiatives, strategic partnerships with meaningful engagement will be critical to advance interoperability.

Infoway is appreciative of the ongoing opportunity to assume a leadership role in guiding the transformation of our Canadian health system but cannot complete this work alone. Advancing pan-Canadian interoperability requires partnership, collaboration and alignment with provinces, territories, pan-Canadian health organizations (e.g., the Canadian Institute for Health Information [CIHI]), Statistics Canada (StatCan), Public Health Agency of Canada (PHAC), Indigenous Peoples, the private sector, data and standards experts, and, of course, clinical leaders and patients.

1 – Introduction

The Canadian health system faced unprecedented strain during the global pandemic which exacerbated existing systemic challenges and issues. Consequently, there has been accelerated urgency to alleviate underlying pain points and continue building a health system that is connected, equitable and sustainable. Numerous issues continue to challenge our health system, including inequitable access to care; insatiable demand across the system, most acutely at emergency departments; and the ongoing health human resources crisis that is being accompanied by the notable exodus of many health care professionals. It is more imperative than ever that we build a more efficient health system within the resources available to us.

From a digital health perspective, the Canadian health system has undergone tremendous transformation through the digitization of health information, which has changed the way people in Canada experience the health system, over the past two decades. The pandemic accelerated the adoption of virtual care tools at a time when clinicians wanted to prioritize the health and safety of Canadians by limiting in-person care to Canada's most vulnerable.

Through this experience, it was affirmed that access to health data is not as simple and seamless as it should be. Considerable amounts of patient health information are siloed and not readily accessible or exchangeable at the point of care, or to the patients themselves. This inaccessibility not only causes inefficiencies but also creates a cost to the health system (e.g., when tests are duplicated) and, most importantly, impacts patient outcomes when treatment is uncoordinated and/or delayed.

Moving forward, an interoperability roadmap is required to help focus and guide our work in standardizing data, enabling greater information exchange, and facilitating seamless access to health information for all Canadians.

What is an interoperability roadmap?

Many leading countries (e.g., the United States, Australia, Switzerland, New Zealand, etc.) have been publishing national digital health interoperability roadmaps to signal to the market the strategic direction towards which their digital health ecosystems are evolving. These roadmaps usually have a timeframe of five to 10 years, with a long-term vision balanced by a focus on near-term wins. Moreover, they undertake a multi-stage approach as digital transformation is not a singular event and requires alignment, coordination and collaboration between public and private sector players to achieve progressive levels of maturity.

The roadmaps generally focus on articulating:

1. Common targeted initiatives that help to advance health system interoperability and achieve outcomes
2. Core interoperability building blocks that are necessary to advance interoperability (e.g., reference architectures, data standards, trusted exchange frameworks, digital identity, patient/provider access)
3. The health system, business, and clinical benefits and outcomes that will be derived

Canada's current state — and why we need a shared interoperability roadmap

Tools for patients to access their information are available but limited in their scope and functionality. In 2021, approximately one third of Canadians reported that they had accessed at least some of their health information[1], but only 10 per cent have used one of the more data-rich solutions.

With nine in 10 clinicians now using electronic records, health data is largely digitized today, but not sufficiently standardized or connected[2]. Diagnostic results and immunizations are almost completely standards-based and being shared. The majority of clinicians across Canada (approximately 418,000) have access to at least some patient information electronically. Most have diagnostic results, and many have medication history and procedures, like hospital discharge summaries, which are delivered in HL7 v2 messages. Some have electronic records that are able to integrate external data sources with their patient charts, but few can ingest multiple components of the patient summaries into their systems.

There are a variety of terminologies in use across Canada in various clinical applications, such as LOINC (Logical Observation Identifiers Names and Codes) for laboratory testing, ICD (International Classification of Diseases) for capturing mortality and morbidity information, CCI (Canadian Classification of Health Interventions) for capturing procedures and interventions, and SNOMED CT (Systematized Nomenclature of Medicine Clinical Terms) for capturing a variety of clinical information from health concerns to the latest immunization administered. Electronic exchange occurring today is largely HL7 v2, with more limited deployment of HL7 v3, CDA and FHIR.

As such, Canada requires a shared roadmap that articulates how interoperability will be advanced over the next five years. In Canada, each jurisdiction is currently at a different level of digital health maturity ***[see 1.*** Interoperability in Canada: Current State Snapshot ***for current state snapshot]***. A shared pan-Canadian interoperability roadmap will inform and guide all jurisdictions to progress towards the

[1] Canada Health Infoway, *Canadian Digital Health Survey 2021: What Canadians Think* (2021). https://www.infoway-inforoute.ca/en/component/edocman/4011-canadian-digital-health-survey-2021-what-canadians-think/view-document

[2] Ibid., *2022 Canadian Interoperability Landscape: A Survey of Clinicians* (2022). https://www.infoway-inforoute.ca/en/component/edocman/6409-2022-canadian-interoperability-landscape-a-survey-of-clinicians/view-document

same standards, allowing each to do so at its own pace, while first establishing the necessary and critical capabilities. The roadmap will help align, support and complement jurisdictional digital health roadmaps by providing common pan-Canadian data, technical and policy standards.

Advancing pan-Canadian interoperability through FPT collaboration and strategic partnerships

Conference of Deputy Ministers (CDM) Endorsement

The roadmap (a living document) presented here is a reflection of significant collaboration between Canada's federal, provincial, and territorial governments responding to a pressing need for health system modernization through standardized health data and digital tools. The COVID-19 pandemic served as a catalyst for pushing Canadian health systems to innovate quickly and address the significant disruption the pandemic caused to the delivery of in-person health services. Throughout this time, Canadian governments came together, working in partnership to put in a range of digital supports to help Canadians get the information, resources, and care they needed.

These efforts have been driven by Canada's federal, provincial, and territorial table on virtual care and digital health. On March 30, 2023, the Conference of Deputy Ministers of Health endorsed the Shared Pan-Canadian Interoperability Roadmap, setting a path forward for Canada's digital health system transformation (with the exception of Quebec[3]).

Driving progress *through sustained collaboration and strategic partnerships*

Strategic partnerships with meaningful engagement are a key enabler for the advancement of interoperability. Infoway cannot complete this work alone and requires ongoing partnership, meaningful collaboration and alignment with provinces, territories, pan-Canadian health organizations (e.g., CIHI), Statistics Canada (StatCan), Public Health Agency of Canada (PHAC), Indigenous Peoples, the private sector, data and standard experts and, of course, clinical leaders and patients.

In addition, engagement with broader key stakeholders to help iterate the roadmap and ensure the collective needs and interests of all stakeholders are accounted for, enabling a roadmap that is logical, practical and value driven. These stakeholders include, but are not limited to:

1. Pan-Canadian Health Organizations (PCHOs)
2. Federal stakeholders, including Health Canada, Correctional Service of Canada (CSC), Innovation, Science and Economic Development (ISED), National Defense and Canadian Armed Forces (CAF), Veterans Affairs Canada (VAC), Indigenous Services Canada (ISC) and Global Affairs Canada (GAC)
3. Indigenous Nations, organizations and communities
4. Patients, families and caregivers
5. Clinicians and their respective colleges and associations
6. Private sector
7. Data and standards experts (including the Expert Advisory Group)

[3] Quebec has not subscribed to this document and intends to continue its collaboration with Canada Health Infoway in accordance with its agreement concluded in January 2004, which specifies that it is up to Quebec to decide the terms of deployment of the health infrastructure on its territory and that this deployment must be carried out according to its orientations and priorities. However, Quebec is quite interested in meeting with Canada Health Infoway to participate in the RFP process for interoperable solution providers for its own data management systems.

2 – A Common Vision

The Current Landscape: Shared Interoperability Challenges

Canada aspires toward a person-centric, connected learning health system that can drive outcomes for individuals based on their own data and improve the overall system with easy, low-barrier aggregation of data. Access to health data in a manner that is timely and relevant, but controlled, has been seen as a critical tool for enabling this goal and driving connected care across health care settings.

The key barrier to achieving this desired end state is the sub-optimal state of interoperability at the pan-Canadian, jurisdictional, and local levels. As such, insufficient interoperability continues to be a key contributor to the following:

1. **Care Coordination**

   Care coordination often involves a variety of stakeholders in the management of a patient's health, including patients, caregivers and care teams across settings. This is a dynamic process that requires data movement across platforms and among service providers in real time to successfully manage care.

2. **Provider Burnout**

   Despite the potential to improve care and allow providers to spend more time with patients, digitization and the implementation of various technology solutions have contributed to record-breaking levels of burnout that have been exacerbated by the pandemic. Moreover, duplicative data entry, poor data integrity, siloed systems, multiple sign-in points and the persistence use of fax to exchange information drive an unsustainable level of administrative burden. A survey

completed by the Ontario Medical Association (OMA) reported that 73 per cent of its members feel at least one symptom of burnout as of March 2021[3].

3. **Poor Patient Access & Experience**

   Patient experience is also significantly impacted by the current state of interoperability. In the current state, patients have very little access to, or control over, their health information. Often, patients are asked to recall their medical history each time they interact with a new part of the health system. When information is made available, it is siloed in multiple patient portals and systems that are often outdated and only provide a partial story. The recurring burden of recollecting and restating personal health information is stressful for patients, limits their ability to participate in shared decision-making, and hinders providers from providing efficient care.

4. **Risks to Patient Safety**

   Connected to the patient experience, poor interoperability also puts patient safety at risk. Dispersed or inaccessible patient data may result in providers making decisions in the absence of complete information that can lead to inappropriate decisions pertaining to testing, medication, diagnoses, etc.

   Furthermore, the reliance on fax as a method of communication poses a significant risk to both patient safety and privacy. Faxing (i) trusts that a provider will see and act on the information sent, with little confirmation for the sender that the information has been successfully received and acted upon; (ii) is prone to privacy breaches, as it is not a secure way to share information; and (iii) often requires double-data entry into clinical systems, which increases likelihood of transcription and transposition errors and inaccurate patient records.

5. **Inefficient & Costly Care**

   Poorly organized data, siloed systems and manual information flows not only result in provider burnout, but also leads to inefficient and costly care. For instance, providers may order duplicate tests because they are unaware of previous results. These redundancies increase service utilization, wait times for all patients seeking those services and inappropriate use of health care resources. Further, manual workflows and workarounds require higher levels of administrative support and extend the length of time spent on each patient (e.g., searching for health records). This time could be better allocated elsewhere when the presence of interoperability enables easy access to data.

6. **Disconnected Care**

   Unattached patients (representing more than 15 per cent of Canadians aged 12 and over) often have multiple providers, as do patients requiring specialized care. Without interoperability, increasingly fragmented records of care and poor communication tools regularly limit the ability for providers within the patient's circle of care to jointly deliver care in a coordinated manner. In the absence of interoperability and appropriate infrastructure, providers often make siloed decisions, limiting the ability to include patients as an active participant in their own care.

7. **Limited Secondary Decision Making in Providing Value-Based Care**

   Health systems must make choices based on the needs of their population. Unfortunately, poor interoperability limits access to comparable and standardized data that can be queried and analyzed to make this possible. A significant amount of time is spent on cleaning, linking and

[3] Ontario Medical Association, *Healing the Healers: System-Level Solutions to Physician Burnout* (2021). https://www.oma.org/uploadedfiles/oma/media/pagetree/advocacy/health-policy-recommendations/burnout-paper.pdf

aggregating data and subsequently maintaining patient and population data sets. Without access to needed health data and information, health systems struggle to make evidence-based decisions on their populations and policies (e.g., appropriate compensation for value-based care events). Effectively, limited interoperability limits the ability to create a connected, learning health system.

With the shift to value-based care and the incorporation of non-traditional health data such as social determinants of health (e.g., food security status, housing stability and access to reliable transportation) into patient records, this data can be leveraged by health systems to proactively identify health risks within a specific population group and intervene to work towards positive outcomes. The availability of this information can also help health systems improve health equity by better understanding sociodemographic factors that influence access to care and health status.

With such substantive barriers preventing our health system from achieving its full potential, there is a collective desire to transform the way all health system stakeholders interact with data. It is increasingly recognized that timely access to and exchange of information can enable more informed and efficient care delivery that supports the Quintuple Aim for health care improvement[4]. Over the past decade, we have seen a significant rise in the digitization of health information across the country and, over the course of the COVID-19 pandemic, immense adoption of virtual care solutions. These experiences have increased awareness of health system potential beyond the status quo and recognition that improved interoperability can help realize this connected care vision.

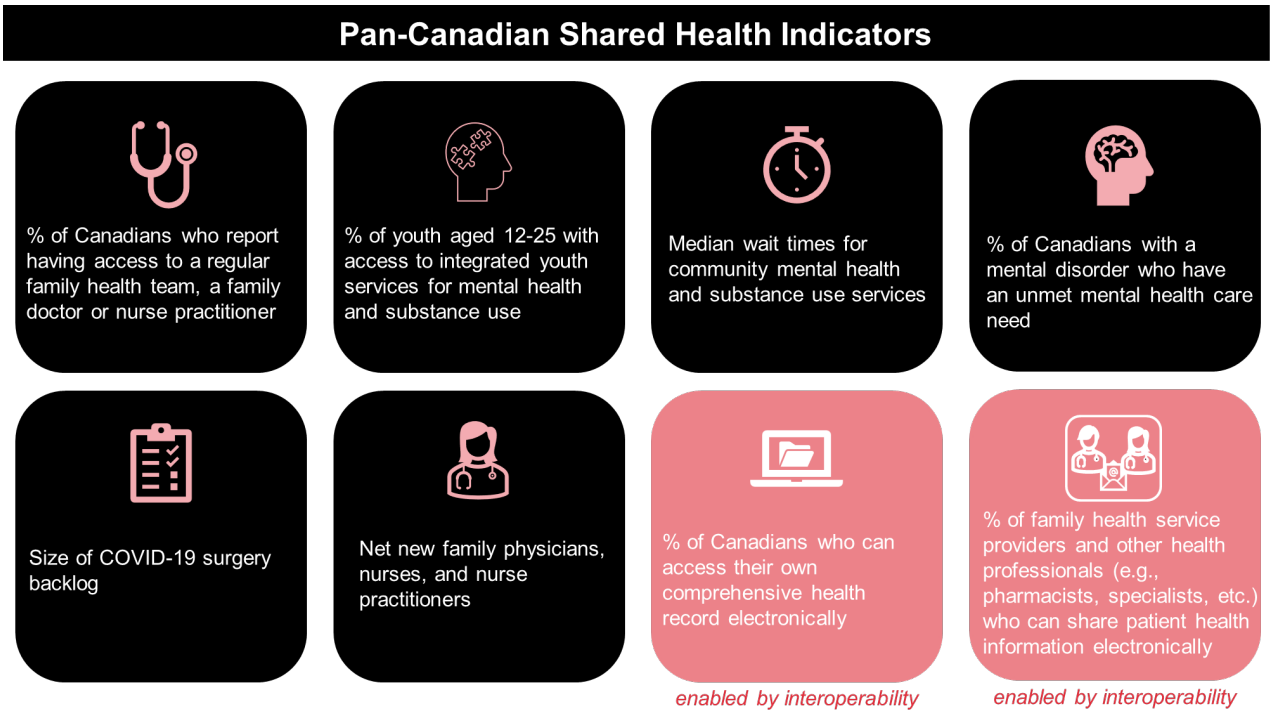
Investing in a Healthier Canada

On February 7, 2023, the Government of Canada announced an investment of $196.1 billion over 10 years, including $46.2 billion in new funding for provinces and territories to improve health care services for Canadians[5]. The funding will be distributed partly through the Canada Health Transfer (CHT) and partly through tailored bilateral agreements with provinces and territories that allow flexibility for jurisdictional health system needs.

[4] Itchhaporia D. The Evolution of the Quintuple Aim: Health Equity, Health Outcomes, and the Economy. J Am Coll Cardiol. 2021;78(22):2262-2264. doi:10.1016/j.jacc.2021.10.018. Accessed online: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8608191/pdf/main.pdf

[5] Government of Canada, *Working together to improve health care for Canadians*. https://www.canada.ca/en/health-canada/news/2023/02/working-together-to-improve-health-care-for-canadians.html

To ensure we collectively work towards modernizing Canada's health system, a set of shared health indicators has been established to measure the progress on health priorities that matter to Canadians:

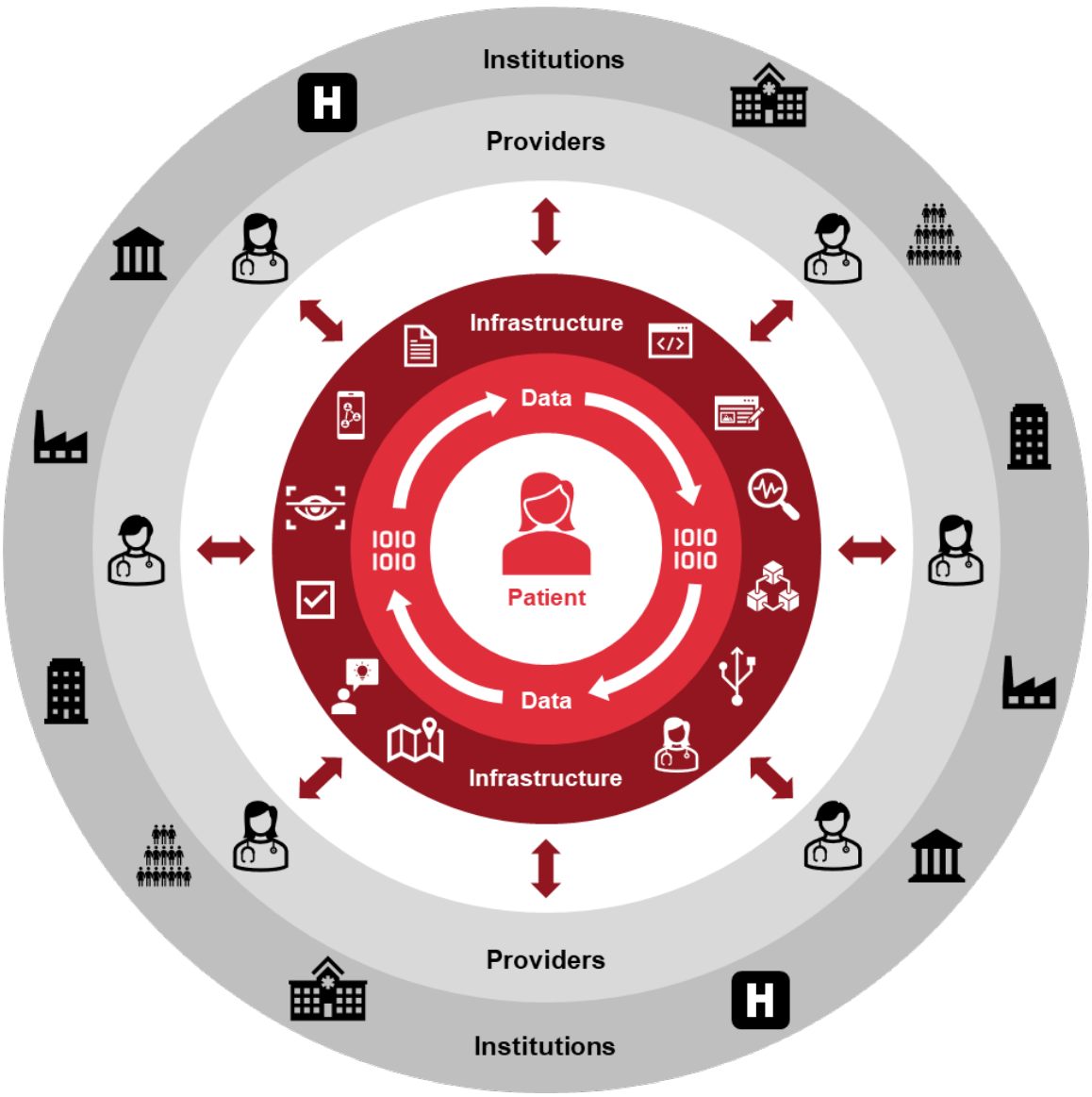


Two of the eight indicators are directly enabled by digital health interoperability and are squarely aligned to the vision and strategic priorities of this interoperability roadmap. By working collaboratively with all federal, provincial, and territorial (FPT) stakeholders, we will be able to help all Canadians access their comprehensive health record, as well as enable providers to share and exchange health information with other providers electronically.

A Common 10-Year+ Vision: Connected Care to Enable a Healthier Canada

As evidenced above, we are at a critical inflection point. We must focus our efforts on creating a world class interoperable system that Canadians deserve — one which puts them in control of how they receive care and empowers them to access and use their health record as they deem appropriate.

The quintessential characteristic of an interoperable health system is one in which standardized data follows the patient across all care settings and geographies to enable more informed care provision, leading to better health outcomes.


Institutions
Providers
Infrastructure
Data
1010
1010
Patient
1010
1010
Data
Infrastructure
Providers
Institutions

As we work towards this longer-term vision, Infoway will be committed over the next five years to driving value for all Canadians through:

- A modernized health system built on connected care
- Access to health information for all Canadians
- Digital health innovation by and for Canadians

A modernized health system built on connected care

Moving forward, we must continue to modernize our health system through the premise of "Connected Care to Enable a Healthier Canada," whereby all care sectors, organizations and providers are linked through health technology and standardized data. Digital health systems must interact with each other across all care settings (from primary care to hospitals to long-term care) so that Canadians' health information will move with them through the system, ensuring no patients fall through the cracks. Technology should enhance providers' ability to deliver care. It should not be intrusive or distract from care delivery, and instead should help automate repetitive and administrative tasks, allowing care providers to dedicate more time to direct patient care.

The data captured by and required for clinical care of individuals can be combined to enable data analysts in the health systems to have access to and analyze the large data sets they need to support public health interventions and surveillance; and accelerate improvements in health care, health system performance and population health across the continuum of care. Standardized health data will enable pan-Canadian comparability, informing resource allocation, benchmarking and health outcomes by health system planners and policy makers. Appropriate processes and controls need to be in place to enable the sharing and use of this data, while still protecting the privacy and confidentiality of individual patients (e.g., de-identification and anonymization routines), to ensure the data has sufficient quality to be used for these purposes; and data and resulting information are interpreted and used correctly and ethically.

Similarly, health data needs to continue to support Canada's reputation of world-class research (e.g., biotechnology), medical breakthroughs (e.g., genomics) and innovation. Ease of access to standardized, structured data will allow for better critical analysis and foresight to ensure our health system continues to drive improved outcomes, greater efficiencies and value for money.

Access to health information for all Canadians

As we look towards the future, all Canadians should be able to access, manage and share their personal health record in a simple and seamless manner from anywhere in the world. Ideally, the ability to access, manage and share information should be complemented by a suite of tools and services to help Canadians navigate their data and interactions within the health system. This includes Canadians living in remote, underserved and vulnerable communities, as our health system needs to ensure equity for all. It also includes Indigenous Peoples' inherent rights to data sovereignty and ownership (as articulated through the First Nations Principles of OCAP®, as one example).

For clinicians and care providers, technology must support effective and efficient communications and not hinder care delivery or the patient experience. Data and technology should help "fill in the gaps," to ensure seamless transitions of care across the system, which means that patient health information follows the patient through their care journey.

Digital health innovation by and for Canadians

As we collectively work together to transform and futureproof our health system, we must continue to modernize and refresh its underlying infrastructure. For Canadians, this means assurance that personal health information is properly safeguarded and that our health system enforces the use of verified digital health tools. When replacing or purchasing new technology, we should take a streamlined approach by extending participation to all jurisdictions to increase purchasing power and maximize value for money. Finally, we should work towards setting a foundation that enables the use of innovative and emerging technologies (e.g., artificial intelligence, synthetic data, spatial computing) at the discretion of each jurisdiction.

As we forge ahead to address current challenges and enable the advancement of pan-Canadian interoperability, we must continue to remind ourselves that the driving force is to support connected care in order to enable a healthier Canada and healthier Canadians.

3 – Understanding Interoperability

Interoperability refers to the secure and timely exchange of health information between systems (e.g., health technology solutions, devices, consumer apps) and the common interpretation of that information devoid of additional action from users. While this sounds straightforward, there are many moving pieces that must fall into place across the health technology ecosystem for interoperability to be achieved. These pieces can range from consensus on the technical execution of sending, processing and rendering information; to the development, interpretation and representation of the policies and frameworks that allow these actions to take place.

Within the context of the Shared pan-Canadian Interoperability Roadmap, interoperability pertains to a wide array of data types, formats and uses. While we traditionally think about interoperability in the context of an individual's care, it applies to a much broader array of use cases, which will only continue to expand as technology advances. For instance, as the availability of consumer-generated data (geolocation data, wearables data, etc.) continues to grow, interoperability will be required to enable use of the data effectively for care provisioning and secondary use (e.g., population health, research).

The Significance of Interoperability

When different parts of the health system are interoperable, they "speak the same language." Effective information flow improves continuity of care and communication between health care providers and facilitates patient access to their health information.

Connection, collaboration and communication have never been more important for the health system. Increased use of virtual care has highlighted the need for secure and efficient electronic sharing of information across the circle of care. Continuing to improve Canadian health care will require sustained focus — connected systems are healthier systems.

Interoperability benefits patients, providers, the health system and industry[6].

How does interoperability benefit patients?

Improved access and information flow from interoperability can:

- Improve access to their health information, including their ability to manage and share it
- Reduce time to diagnosis and treatment
- Reduce medication errors that might lead to patient harm
- Result in fewer emergency visits and shorter hospital stays (e.g., through more efficient and timely information and communication)
- Facilitate better transitions of care

How does interoperability benefit providers?

- Time savings as a result of having the ability to access more complete and comprehensive information in one place
- Improve communication with care teams across the health system
- Improve confidence in decision-making
- Increase available time that can be spent with patients and their families (e.g., on direct care)

How does interoperability benefit the health system?

- Increase system capacity and productivity (e.g., by reducing duplication of work, streamlining care pathways)
- More effective systems planning and evaluation by leveraging data
- Improve morale of health workers by reducing frustrations caused by inefficient workflows and lack of information
- Cost savings and greater value for money

How does interoperability benefit industry?

- Faster time to market by building to a single pan-Canadian, service-oriented Reference Architecture representing building blocks that support programs and data exchange (e.g., PS-CA, CA:FeX, eReferral and eConsult)
- More rapid entrance for new market participants through clear and defined technology requirements that enable compliance with variation in legislative requirements across the country
- Time and expense savings through the requirement to build to a single codebase for implementation across multiple jurisdictions
- Diminished frustration as vendors seek to understand and respond to variable requirements, and the ability for more resource effort to be allocated to innovation, rather than base compliance

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[6]Canada Health Infoway, *Connecting the Health System: Connected Care. A Healthier Canada* (2022). https://www.infoway-inforoute.ca/en/component/edocman/6413-connecting-the-health-system-connected-care-a-healthier-canada/view-document

4 – Approach to Roadmap Development

Given the current state of our health system, it is important that initiatives produce value, including near-term wins that provide incremental value with regular frequency, as opposed to undertaking transformational initiatives in which benefits are not accrued until significant time has elapsed. Advancing interoperability is a complex matter which requires coordinated participation and a collective desire to converge on a set of standards spanning data, technology and policy over time to improve the health ecosystem for all stakeholders. Beyond strategic alignment, it requires all actors in the digital health ecosystem to put boots on the ground. As such, it is imperative that efforts are focused. As a result, this roadmap was developed based on an iterative approach to advancing interoperability and ensuring incremental benefits are realized at every step for all stakeholders.

Guiding Principles

The roadmap development process was grounded in the following guiding principles, many of which were gleaned from the United States' Office of the National Coordinator for Health Information Technology's (ONC) interoperability roadmap[7]:

1. **Consider the current health care landscape**

   It is critical that all health system stakeholders recognize today's challenging operating environment and work to optimize output within the available capacity.

2. **Leverage international standards and approaches**

[7] The Office of the National Coordinator for Health Information Technology, *Connecting Health and Care for the Nation: A 10-Year Vision to Achieve an Interoperable Health IT Infrastructure* (2014). https://www.healthit.gov/sites/default/files/ONC10yearInteroperabilityConceptPaper.pdf

Canada is not the only nation endeavoring to advance interoperability. There is no need to "reinvent the wheel" and therefore, we should leverage knowledge and lessons from other countries instead of developing "a unique made-in-Canada approach." This includes the adoption and use of international standards and specifications such as the International Patient Summary and interRAI, and IHE profiles.

3. **Avoid duplication of efforts**

   Instead of each jurisdiction creating their own standards, all stakeholders should collaborate to co-develop standards that can be pan-Canadian and available to all. It is recognized that there may be instances of appropriate localization of the pan-Canadian standards. In addition, in the near term (i.e., during the development process) deviations from the desired future state might be inevitable where significant gaps exist; however, these will be closed over time using deviation remediation processes.

4. **Build upon existing investments and infrastructure**

   Significant digital health investments have been made over the past twenty years. To the extent possible, stakeholders should leverage existing infrastructure and systems and optimize them for information exchange.

5. **Focus on driving incremental value**

   In the context of today's constrained health system, focus should be on maximizing near-term value, instead of investing in lengthy projects that have high time-to-value.

6. **Ease of adoption**

   Interoperability is a complex problem. Adoption of pan-Canadian standards and specifications should be simple.

7. **Empower patients, families and caregivers**

   In order to achieve a truly person-centric health system, those it serves need to be included and empowered as full participants.

8. **Leverage the market**

   Demand for interoperability is a powerful driver to advance our connected care vision. Leveraging demand and market forces can accelerate our progress.

9. **Maintain modularity**

   Since technology and medicine continuously advance, systems must maintain the ability to evolve and take advantage of the best technology and care delivery. Modularity helps ensure flexibility that does not hinder innovation and the adoption of new and more efficient approaches to care over time.

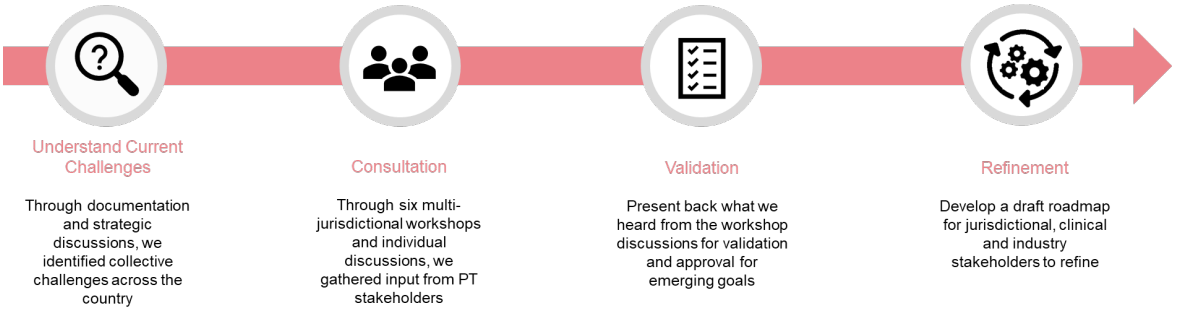
10. **Protect privacy and security**

    It is imperative to maintain public trust that personal health information is safe and secure. To continue to maintain that trust, we will strive to ensure robust and effective safeguards are in place as interoperability advances across the industry.

Process and Methodology

This Roadmap was developed in close collaboration with all thirteen provinces and territories, pan-Canadian health organizations (PCHOs) including CIHI and federal agencies including StatCan, the private sector, as well as learning from other leading countries and their interoperability roadmaps.

Through a series of stakeholder consultations, workshops and meetings, a comprehensive list of current challenges was developed and validated with jurisdictions. Based on this work, a draft Roadmap with a common set of goals was developed and further refined and socialized.



Initial consultation focused on understanding the current interoperability challenges that provinces and territories are experiencing which are making it difficult to achieve Quintuple Aim goals (i.e., health equity, clinician well-being, pursuit of better health, improved outcomes and lower costs). Through extensive literature reviews, consultations and strategic discussions, challenges were identified. Subsequently, areas of potential focus were established, and draft solutions were developed and presented to the jurisdictions through a series of workshops to seek feedback, which formed the basis of this Roadmap.

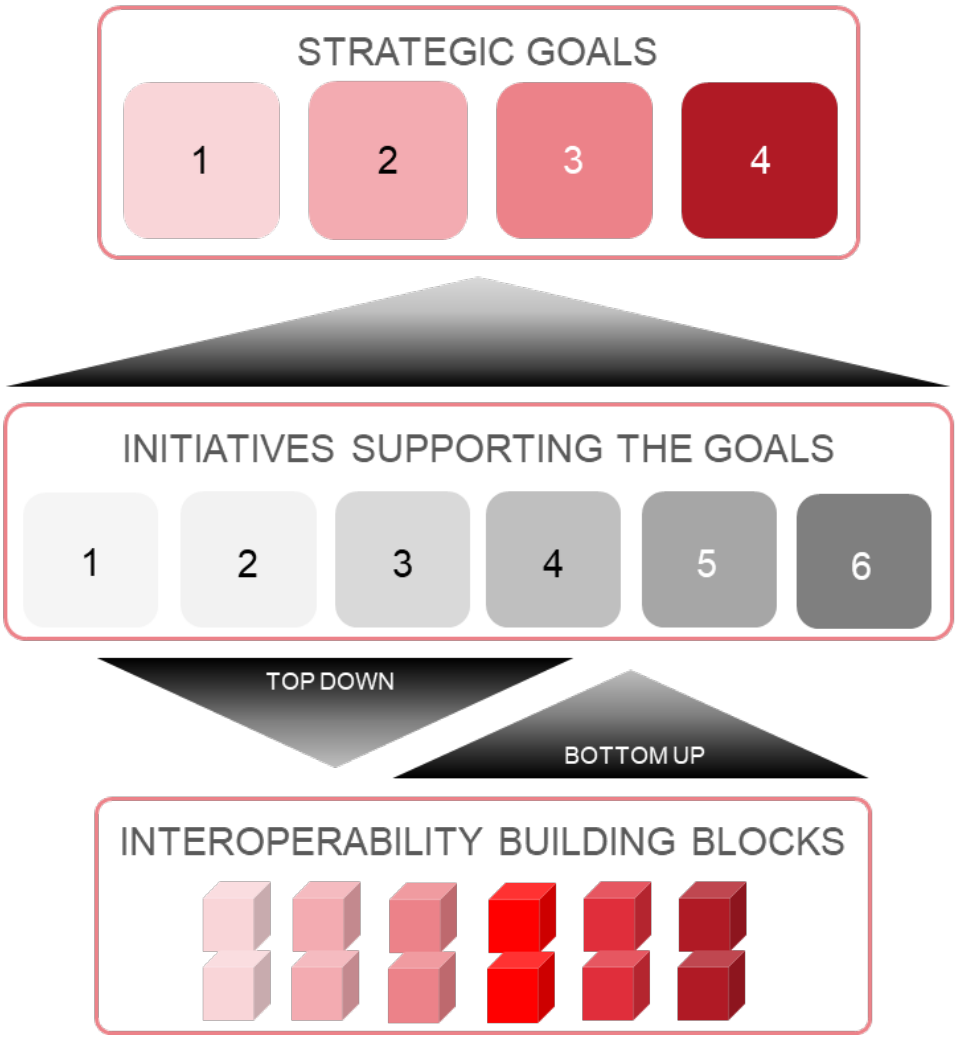
A Comprehensive Approach to Roadmap Development (i.e., Combining Top-Down and Bottom-Up)

When advancing interoperability, many countries, especially those that have less mature digital health ecosystems, will often employ a bottom-up approach that focuses on foundational interoperability building blocks (e.g., single patient identifier, trust framework, data and exchange standards). They take this approach because they need to establish foundational interoperability capabilities to solve the existing complexities of systems and unstandardized data that is already in place.

In Canada, jurisdictions have differing levels of digital health adoption and maturity, along with notable differences in the number of systems in play, data repositories and age of infrastructure. As such, the approach described above would not be conducive to consistent or rapid progress.

The graphic below illustrates this top-down/bottom-up approach. The next two sections of the report describe both approaches in greater detail.

A COMPREHENSIVE APPROACH



5 – The Big Picture: Giving Purpose to Interoperability (Top-Down Approach)

The Four Common Pan-Canadian Interoperability Challenges

To effectively advance interoperability in Canada, we must first determine what problems we are trying to solve. This was the first step in the Roadmap development process. By engaging health system leaders, stewards and front-line workers from across the country, several key interoperability challenges surfaced, with the following four identified as the highest priorities.

Challenge #1: Data Blocking and Lack of Data Portability

Electronic health information from electronic medical record-keeping systems cannot be easily extracted, ported or migrated across different systems. As physicians/clinicians retire and/or switch to new electronic medical records (EMRs), their patients' health records need to be extracted and migrated to a new system or another provider's EMR. Currently, no clear standardized data portability specification that would facilitate data migration exists. As a result, consistent and efficient extraction of relevant clinical data to support migration of patient information across clinical solutions is a significant challenge.

Challenge #2: Inability of Providers to Access Relevant Patient Data at the Point of Care

Similarly, health information siloed across multiple systems and repositories may not be accessible to all providers in a patient's circle of care. This may negatively impact clinical decisions due to unavailable information; or result in duplication of medical histories and tests that may delay care. In an ideal future state, providers have seamless access to all relevant information from a patient's longitudinal record in real time. Recent surveys suggest that clinicians spend on average almost 40

additional minutes per day[8] searching for patient information from other settings — this should not happen. Nor should providers have to rely on patients to provide their health information and records. Our health systems need to support the timely exchange of information to enable more informed care.

Challenge #3: Patients' Inability to Access their Health Information

Patient health information exists across many systems spanning the entire care continuum (primary care, acute care, long-term care, etc.) and a single longitudinal health record does not exist. Furthermore, there is limited ability for patients to access and manage their health information or actively contribute to their care without better integration.

Although patients' ability to access their health information has improved in recent years, health information still mostly exists in silos, often requiring patients to have multiple login credentials for multiple portals. All Canadians should be able to access their health information through their preferred channel, with the ability for their information to be integrated in a simple and seamless manner therein. Over time, patients should be further enabled to contribute self-generated data (e.g., data tracked in wearables or an app) in an appropriate manner.

Challenge #4: Lack of Care Coordination and Collaboration

As patients progress through the health system, care coordination is not currently supported by tools and systems that support efficient care delivery. Clinicians note that systems designed for them are often not consistent with their workflow or overwhelm them with unnecessary alerts and notifications. They would prefer simple/straightforward, intuitive tools in context (i.e., in their core system within their clinical workflows) to engage with their peers and patients on care related matters.

Strategic Goals

To address these challenges, four strategic goals have been developed. These goals identify specific areas of focus that will enable us to collectively advance pan-Canadian interoperability through targeted initiatives/programs while providing business and clinical value to each jurisdiction.

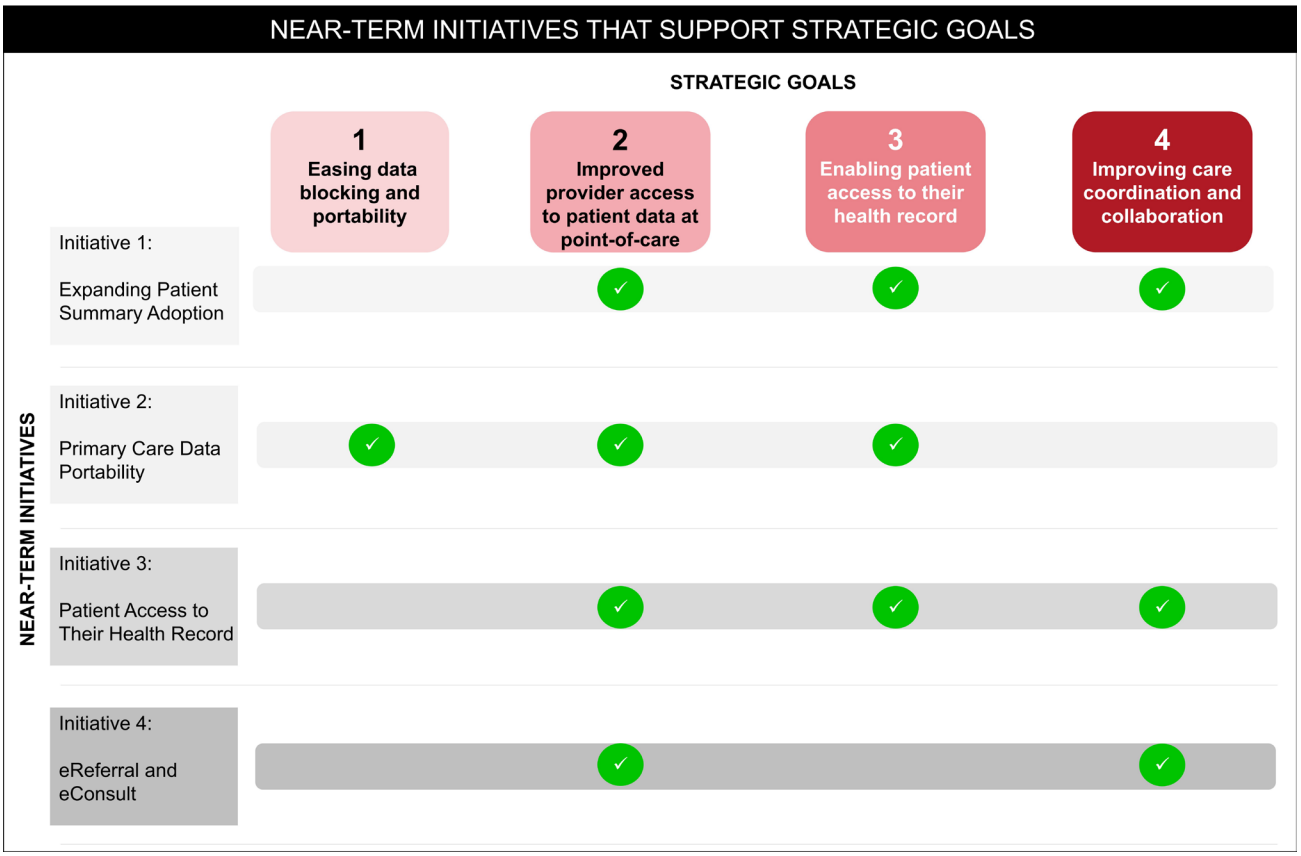
PAN-CANADIAN INTEROPERABILITY STRATEGIC GOALS:

1 Reducing Data Blocking and Easing Portability	2 Improving Provider Access to Patient Data at Point-of-Care	3 Enabling Patient Access to their Health Record	4 Improving Care Coordination and Collaboration
Objectives: 1. Advocate for legislative and/or policy changes to support the elimination of data blocking in Canada. 2. Establish a standardized pan-Canadian health care data set and new specifications to enable data portability.	**Objectives:** 1. Enable providers, via their point of care solutions, to access relevant patient data 2. Allow point of care solutions to contribute relevant data about a patient into clinical repositories.	**Objectives:** 1. Enable patients to access their longitudinal health record in a seamless manner. 2. Empower patients with the literacy to be able to understand and interpret their health information through better data standardization.	**Objectives:** 1. Foster efficient and secure exchange of health information across the entire care continuum. 2. Facilitate ubiquitous inter-professional collaboration through secure electronic communications across vendor solutions.

[8] Canada Health Infoway, *2022 Canadian Interoperability Landscape: A Survey of Clinicians* (2022). https://www.infoway-inforoute.ca/en/component/edocman/6409-2022-canadian-interoperability-landscape-a-survey-of-clinicians/view-document

Near-Term (Next 24 Months) Initiatives in Support of Strategic Goals

To achieve these strategic goals, the first set of initiatives have been identified for completion in the near term. Infoway will work collaboratively with jurisdictions and other key stakeholders to develop the key interoperability assets and capabilities that will enable higher quality data, greater patient access to their data, more efficient data sharing between providers, and ultimately, better health outcomes for Canadians.



Initiative 1: Expanding Patient Summary Adoption

The pan-Canadian Patient Summary Specification (PS-CA), will allow care solutions to contribute pertinent patient health information into clinical repositories (e.g., provincial/regional EHR, CDR, PHR, etc.) to improve health outcomes, and reduce administrative burden for clinicians.

In October 2022, the first iteration of the pan-Canadian Patient Summary Specification (PS-CA), based on the IHE International Patient Summary (IPS) specification and the HL7 IPS Implementation Guide, was reviewed and approved. This specification identifies the most relevant patient health information clinicians indicated they require for the continued provision and improvement of care, the common data standards to ensure the data is understood at each point and the method to exchange the data. PS-CA will allow care solutions to contribute pertinent patient health information into clinical repositories, such as provincial/regional electronic health records (EHRs), clinical data repositories (CDRs), personal health record (PHRs), to improve health outcomes and reduce administrative burden for clinicians.

The overarching principle adopted for the PS-CA is to maintain as close of an alignment to the IPS profiles as possible, while creating the instruments to allow jurisdictions to properly represent their desired clinical workflows. Two jurisdictions have already begun their Patient Summary implementation journey. Several others have informally expressed interest in PS-CA or are exploring adoption of PS-CA with the goal of being able to exchange patient summaries both within and across jurisdictional borders.

Proposed Roadmap Items

As patient data represents the vast amount of information exchanged in the health system, this program will focus on supporting the expansion, implementation and adoption, completion, and ongoing maintenance of the Patient Summary specification. Key deliverables and activities include:

- Completing PS-CA alignment to IPS
- Onboarding remaining jurisdictions that have not adopted the PS-CA
- Change management support for jurisdictional implementation and adoption

Initiative 2: Primary Care Data Portability

The primary care data portability initiative will initially focus on developing a primary care data set (part of the broader pan-Canadian health care data set) that represents the standardized set of health data classes and constituent data elements for interoperable health information exchange. These concepts will be reflected in a set of FHIR profiles (CA Core+) that will continue to expand into new clinical care settings and workflows to support data portability across the continuum of care. Concurrently, an open specification will be developed to enable migration/export of EMR data to support clinicians when they need to migrate EMR system data.

Data is an invaluable asset used to support clinical decision making and health system planning, yet it is often inaccessible and not standardized. To take advantage of its intrinsic value, open specifications can help provide a consistent way to migrate/export data, thereby enabling its access for a myriad of uses including clinical care, health system planning and research. All Roadmap elements will be built using controlled releases of the FHIR standard and support proper version controls. The Roadmap implementations will start at FHIR version 4.0.1 and consider upgrades to balloted future versions as they become available.

The primary care data portability initiative will initially focus on developing a primary care data set (part of the broader pan-Canadian health care data set) that represents the standardized set of health data classes and constituent data elements for interoperable health information exchange. These concepts will be reflected in a set of FHIR R4 profiles (CA Core+) that will progressively, fully support this care setting and continue to expand into additional clinical care settings (e.g., acute care, long-term care, mental health, community care, etc.,) and workflows to support data portability across the continuum of care. Concurrently, an open specification will be developed to enable migration/export of EMR data to support clinicians when they need to migrate EMR system data.

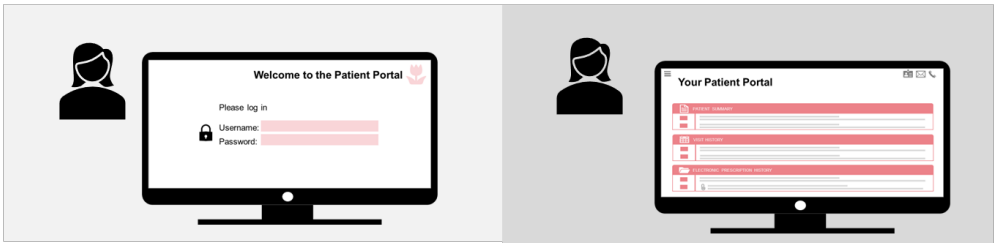
Proposed Roadmap Items

This program will focus on unlocking, sharing and providing access to data to address key challenges and opportunities for patients, clinicians and the health system. Key deliverables and workstreams include:

- Begin standardization of data sets for priority areas and continue supporting the Roadmap over time to include all care settings
- Build out the Canadian Health Data Exchange (CA:FeX) to guide the method of data exchange
- Develop data migration and import/export specifications from EMR systems

Initiative 3: Patient Access to their Health Information

Many jurisdictions are already enabling patient access to their patient record, mostly through provincial, hospital and private care portals. Through this Patient Access initiative, we will work towards enriching the information available to patients, aspiring to enable access to the patient's full longitudinal health record.



Patient access to their health information is a right in some countries, and a handful of Canadian jurisdictions have begun to implement legislation to support this right. Patients' ability to access their own records at any time and in any place is fundamental to person-centric care in Canada.

Enabling patients to access their health information also helps to address a core challenge in the Canadian health system: unattached patients. Until the health ecosystem is fully connected, unattached patients (those without a primary care provider) who have the ability to access their health information will be able to share it with care providers as required. Patients that visit multiple providers, such as those with chronic conditions and/or comorbidities, will also be able to share their own health history, including prescribed medications and test results. This serves to improve treatment and alleviate clinician burden in retrieving such information, as well as patient burden in recalling and restating it. This also applies to patients that receive care across jurisdictional and international borders.

Patients should also have the ability to access information regarding the use of their health data, and they should also have access to evidence-based insights based on their longitudinal health record. Over time, this should also include supporting standards and interoperability for patient management tools (e.g., online appointment booking) to enable more meaningful patient-provider engagement, as well as supporting the notion of a single digital front door for patients (i.e., one-stop shop).

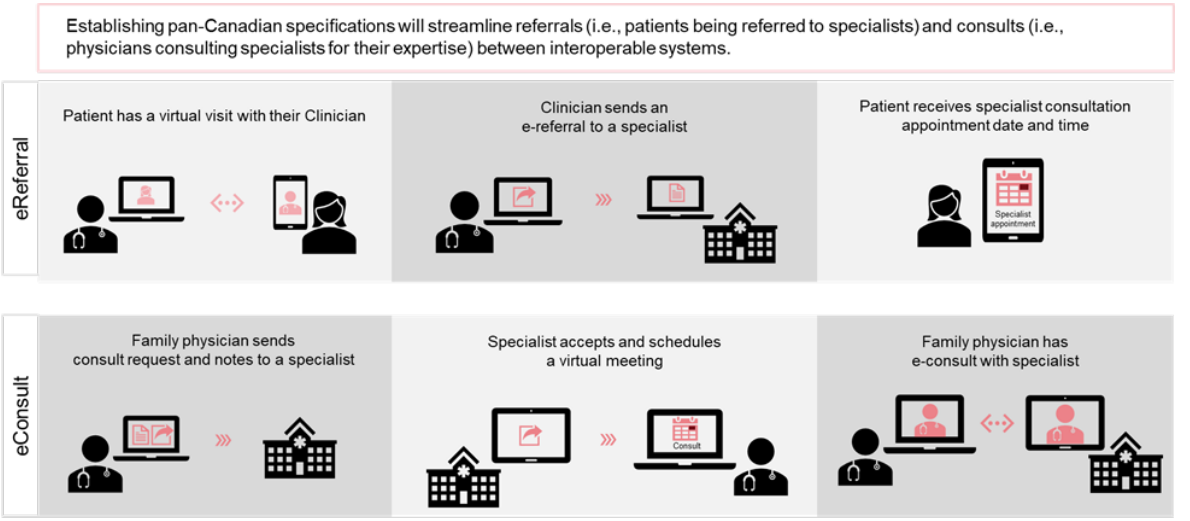
Jurisdictions are working hard to enable patient access to their information, primarily through provincial, hospital and private patient portals.

Proposed Roadmap Items:

Person-centricity is a core guiding principle across the pan-Canadian landscape. To support efforts to provide patients with access to their health information in a way that supports the patient experience, both now and in the future, this program must focus on providing guidance for access that considers all the avenues by which patients receive care and health data. Key deliverables and workstreams include:

- Assessment of patient data and access channels across jurisdictions
- Extension of longitudinal records available to patients through access channels, including smart apps
- Co-design patient data access to represent policy and consent
- Co-design of a digital identity approach and specifications

Initiative 4: eReferral and eConsult



While eReferral and eConsult initiatives have been a priority in some jurisdictions for quite some time, they have often resulted in solutions being established in localized instances with few existing jurisdiction-wide solutions. Referrals are an essential element of health care in Canada, with complex requirements due to the multiple integration points and the need for an effective identity solution.

Multiple jurisdictions are in the planning stages of implementing eReferral solutions. Establishing a pan-Canadian specification in this domain will extend the capability to include inter-provincial/territorial eReferrals, supporting cross-border care. This referral pattern is an important part of clinical practices in many jurisdictions; for example, patients in remote areas and in jurisdictions where specialized services are unavailable and require referral to an academic health sciences centre.

Similarly for provider consultations, establishing a pan-Canadian specification will streamline how providers collaborate and consult with their peers, focusing on care delivery instead of the current administrative and workflow challenges.

Proposed Roadmap Items

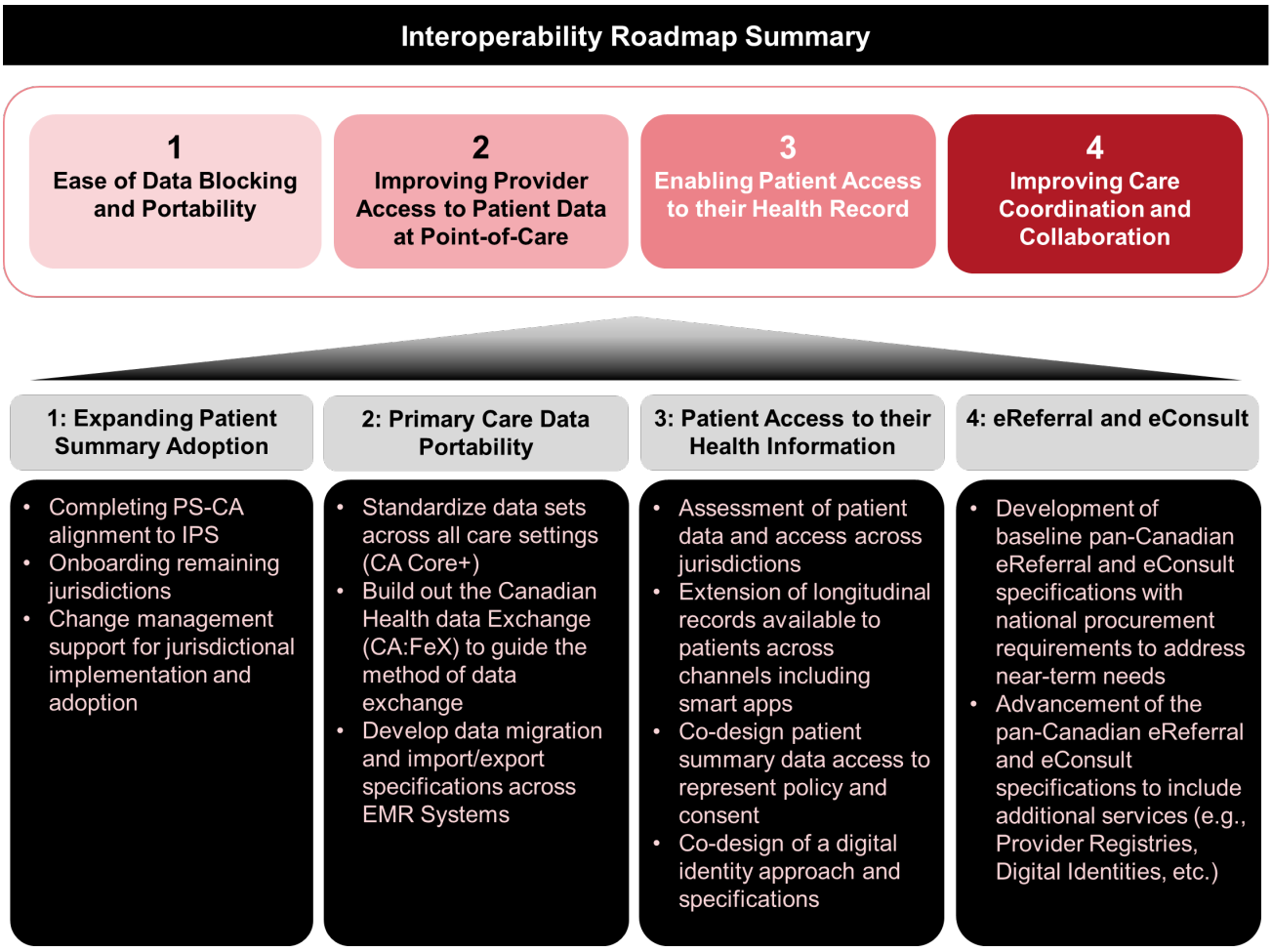
eReferral and eConsult are in progress today, with many jurisdictional initiatives already on the horizon. eReferral and eConsult solutions have inherent dependencies on many of the foundational building blocks required for a connected system. Therefore, the standardization of eReferral and eConsult will drive the development and maturity of these building blocks (e.g., Health Care Directories and Resource Location), establishing a foundation that future solutions and initiatives can leverage and build upon. Key deliverables and workstreams include:

- Development of an eReferral and eConsult specifications with a desire for closed-loop referrals and advice, where both the patient and referring provider are kept in the loop at all times, and consult results are posted to patient and provider portals
- Development of baseline pan-Canadian eReferral and eConsult specifications with requirements to support national procurements for vendor products playing any role in an eReferral/eConsult workflow
- Advancement of the pan-Canadian eReferral and eConsult specifications to include additional services (Provider Registries, Digital Identities, etc.)

Driving Value Through a Top-Down Approach

As these four initiatives progress, so will the maturation of certain interoperability building blocks. As new goals emerge and new initiatives are added, more building blocks will progress, driving pan-Canadian interoperability. The following graphic illustrates how this approach will help progress pan-Canadian interoperability while accelerating implementation of interoperable health systems that drive clinical and business value in each jurisdiction.

Putting it all together, the following picture illustrates the relationship between the goals, the initiatives and the first set of activities to get started:



6 – The Building Blocks to Advance Interoperability (Bottom-Up Approach)

Consistent with the combination of a top-down and bottom-up strategy, achieving interoperability at a pan-Canadian scale will take a measured, collaborative approach from both jurisdictions and health technology vendors. From a global perspective (e.g., the United States and Europe), countries that have been successful in advancing interoperability invested in the development of core components/ capabilities ("building blocks") that were common and standard across the health system – the bottom-up half of the strategy. This approach allows health system participants and stakeholders to collaborate on and build consensus toward key expectations for any health technology solution that will play a role within that health system, driving predictable, repeatable solutions.

The initial set of *non-exhaustive* building blocks were identified and grounded in three (3) core frameworks that support the entire array of top-down functionalities desired. Each of these pan-Canadian frameworks will be developed in a collaborative manner over several iterations. Presently, the frameworks are summarized as follows:

1. **Data Foundation and Portability Framework**

   This framework will create a shared data foundation that is both patient-focused and internationally aligned. It will drive toward a single, extensible approach, encompassing (but not limited to) a referenceable data model (and the associated formats), appropriate guidance around semantic data components, minimal mandatory data assets and appropriate clinical guidance. Ultimately, through collaboration with relevant stakeholders, the framework components will align ecosystem participants on a standard expectation for the organization, representation and interpretation of health care data so it can be appropriately shared and utilized, agnostic of specific technologies and local jurisdictional requirements.

2. **Access and Exchange Framework (Data and Service)**

   This reference architecture driven, conformance assessed, technical framework will define the standard components of the health technology ecosystem. At minimum, this framework will cover access, services and information exchange as core functionalities. The standardization of these core functionalities and interfaces will align the health technology ecosystem participants on the minimum expectations in the pan-Canadian market. This framework intends to drive toward a flexible health technology ecosystem with core functionalities that can be easily accessed, reused and extended to address interoperability on an incremental basis.

3. **Trust Framework**

   The trust framework will establish and build consensus on the auditable business, technical and legal rules that will create the go-to guide for what participants in shared digital health systems need for electronic health systems to be able to connect and share with each other in the way that meets the needs and expectations of Canadians.

   Leveraging existing provincial, national and international work (including technology-focused standards like the IPS), Infoway will bring together policy and decision-makers and other health care stakeholders to:

   a) Capture the activities and responsibilities of participants in shared systems, such as hospital information system (HIS) users across organizations, in a way that promotes trust among those participants
   b) Enable participating organizations to rely on a business or technology process that was undertaken by another trusted organization
   c) Allow faster adoption of innovative technology by having a straightforward framework that is consistently used by diverse stakeholders, without constraining or imposing on business/technology processes
   d) Assure patients that their information will be appropriately protected and respected
   e) Educate jurisdictions on the value of a trust framework to enable both intra- and inter-jurisdictional interoperability

   Infoway will recommend the components (e.g., common agreements, technical implementation guides, operating policies, test plans, and operational governance) for a trust framework; the respective roles, and responsibilities in developing the various components; and identify other questions and considerations that need to be addressed by stakeholders across all jurisdictions.

Initial Set of Interoperability Building Blocks

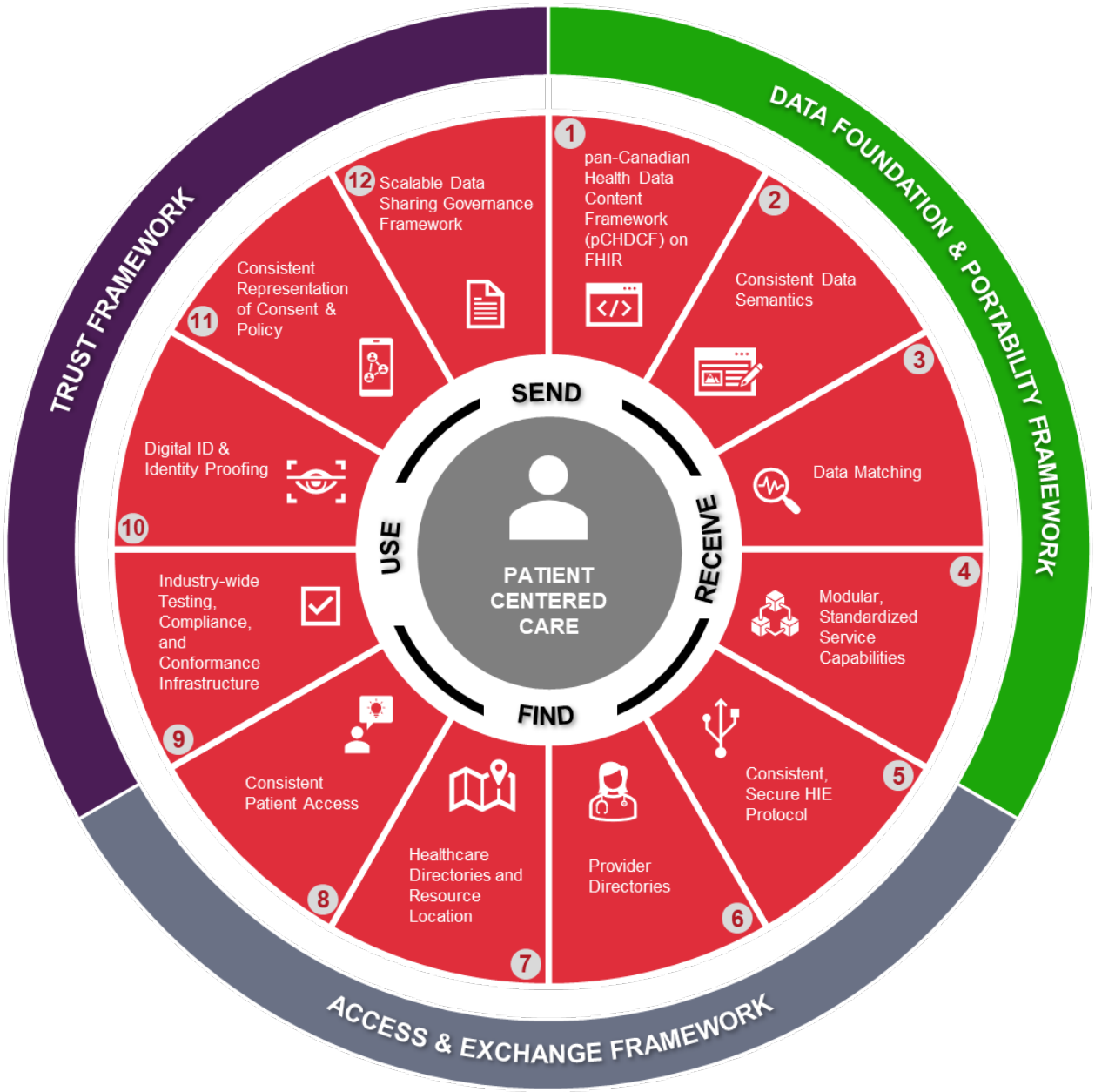
The initial set of building blocks that will be continuously developed over the next five (5) years are based on:

- A series of initiatives and programs that are meaningful and aligned to jurisdictional priorities.
- The foundational investments that must be made to satisfy programmatic needs and dependencies in the future. The following diagram depicts the initial and non-exhaustive set of building blocks that support the three pan-Canadian frameworks described above.

As these building blocks advance in maturity, they can be applied, extended and packaged to solve a growing number of jurisdictional priorities, while still maintaining a common set of principles and expectations for health technology ecosystem participants to manage.

It is important to understand that the building blocks will not be established using a “Big Bang” approach. Consistent with our principles, we will focus on incrementalism and a continuous evolution of each building block’s maturity. Taking this approach ensures each stage of development provides incremental value while leveraging the initial foundation. Naturally, this means that each building block may not be developed in complete isolation. As items mature and align to specific top-down initiatives, dependencies between building blocks will influence the sequence of development timelines and overall Roadmap in the future.

The Building Blocks to Advance Interoperability



Core Capabilities

A more holistic understanding of each building block identified as the minimum requirement to enable interoperability in Canada in the future is discussed below. **Roadmap items highlighted in red text represent core capabilities that will be enabled over the next five years.**

Building Block #1: pan-Canadian Health Data Content Framework (pCHDCF) on FHIR

Current State and Context:

Personal health information must meet certain criteria in order to be easily accessible, consumable and shareable. Health technology products must be able to structure, exchange and act on the data they receive in an efficient and predictable manner. The variation in both the data formats and how these concepts relate to one another create scenarios where systems cannot easily process the information that is received.

For example, if a patient visits a hospital where a Hospital Information System (HIS) captures the encounter using an HL7 v2 standard, while the Electronic Health Record (EHR) system that will receive this information expects a FHIR format, the information from that patient's hospital visit will not be consumable in the EHR system. This may mean that other providers in the circle of care will not have visibility into that visit. Furthermore, even if the formats utilized are the same, the structure of the data and the meaning of each element within it must be common, so that it can efficiently be processed without further human intervention, which is often not the case.

Contributing factors to the current state include:

- Lack of data standardization in EMR, HIS and other information systems
- The ability to highly customize EMRs renders any standardization ineffective
- Heterogeneity amongst health technology data implementations
- Variations in data representation marred by different formats (e.g., CDA, HL7 v2 messaging, HL7 v3, HL7 FHIR)
- Maturity of implementation affecting data quality, often leading to unstructured or proprietary data formats
- Lack of a national data guidelines informing the market

Proposed Roadmap Items:

To address the current state challenges, this Roadmap will focus on ensuring health care technology solutions can standardize, structure, exchange and act on data in an efficient and predictable manner.

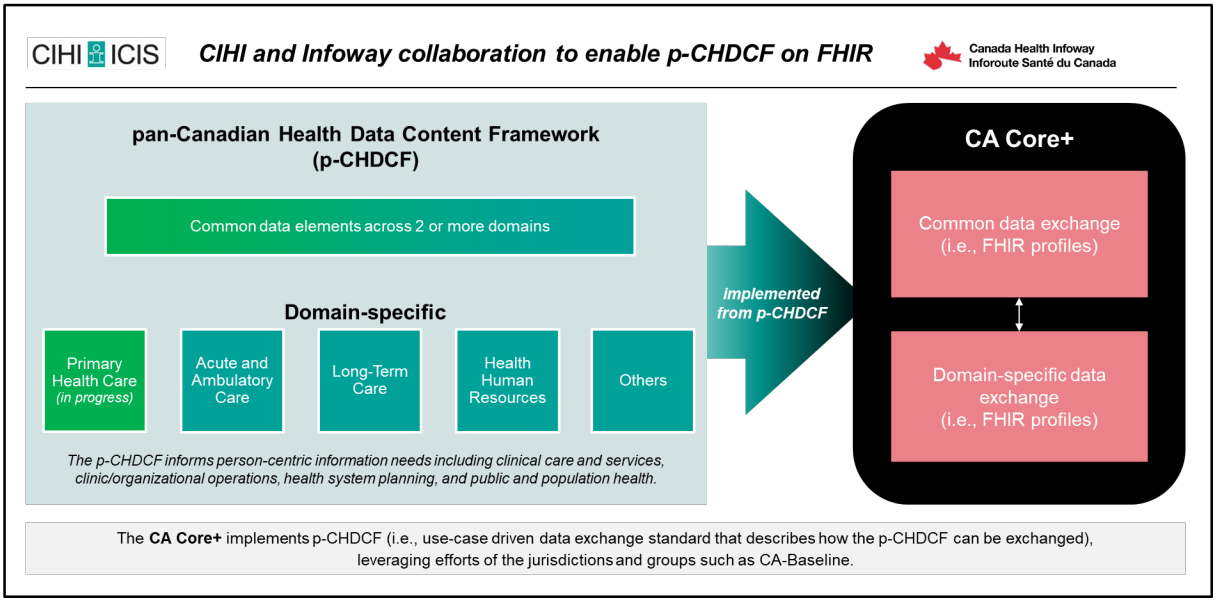
Key components of this item include the following:

- A coordinated approach in establishing **person-centric pan-Canadian health care data** to address the spectrum of health information needs for clinical care, patient access, facility and clinic operations, health system planning and use, and population and public health management.
- Beginning with the foundational data domain of primary health care, **CIHI will develop a pan-Canadian Health Data Content Framework (pCHDCF)** to lay the foundation that will enable interoperability across health systems. The Framework, supported by and aligned with jurisdictional projects, will establish the data standards, business glossary, data models (business context, information, conceptual and logical) and other metadata required to support

the capture, understanding and use of the data by clinicians, patients and data analysts in addition to technical implementations.

- **Infoway will implement the pan-Canadian Health Data Content Framework as a collection of FHIR profiles (CA Core+)** that include data exchange formats common across domains, as well as domain-specific data exchange. CA Core+, similar in concept and aligned with the US Core (which adapted the technology agnostic USCDI data set based on the FHIR standard) and other international standardization guides (e.g., IPS, IPA), will be enhanced for the Canadian health landscape and will support a very predictable syntactic and semantic digital transformation for data exchange.

Building Block #1: pan-Canadian Health Data Content Framework on FHIR



Building Block #2: Consistent Data Semantics

Current State and Context:

For personal health information that flows from one system (or provider) to another to be unambiguously understood, common representation and interpretation of this data is necessary. In the current state, there is a high degree of variance in the representation of health care concepts and data elements exchanged by provider solutions.

For instance, a patient diagnosed with “Tennis Elbow” may have their diagnosis represented as such in System A while System B may list their diagnosis as “Lateral epicondylitis.” This is the same diagnosis as the two terms have a common meaning; however, there is limited ability for that meaning to translate across systems. Furthermore, the utilization of value sets and code systems does not solve this problem on its own. System A may use SNOMED CT codes while System B may employ ICD codes, which still creates a scenario where systems are not speaking the same language and are unable to process and interpret data from the other.

Contributing factors to the current state include the following:

- Varying degrees of data maturity across health care technology solutions
- Differing policy requirements for code systems across jurisdictions

- Lack of national guidelines on the use of coded terminologies (e.g., SNOMED CT-CA, ICD-10-CA/CCI, pCLOCD)
- Inconsistent use of value sets and maps across organizations and technology vendors
- Lack of national infrastructure that provides digital support for at-scale consumption of coded terminologies
- Limited or lacking French language support across solutions

Proposed Roadmap Items:

To address the current state challenges, the Roadmap will build towards a consolidated approach to guidance, development and maintenance of pan-Canadian value sets that will be consistently utilized by health care technology vendors, organizations, and implementers alike.

Without consistent data semantics, it is difficult to have a single, clear view of the patient. In most cases, without the presence of human intervention, patients may appear to have multiple, different conditions. In more severe cases, there is a risk that a condition from one system may be omitted altogether on another because it cannot be interpreted.

Additionally, to enable data analysis and reporting of the very granular codified data captured by and required for clinical care, the information often needs to be summarized and/or classified (i.e., put into mutually exclusive categories). In many cases this can be achieved through simple groupings of codes, whereas other instances may require more sophisticated automated or semi-automated maps or derivations. The wider availability of these categorizations and maps will increase the efficiency of data analysis and reporting activities, as well improve the comparability of the statistical information produced by different organizations.

In support of these considerations, key components will include the following:

- Through CIHI and Infoway collaboration, governance and consensus building among stakeholders and the development of **recommended uses for code systems** in health data exchanges
- Development and maintenance of **domain-focused pan-Canadian value sets and maps** for semantic support of clinical/business workflows in care delivery, data exchanges, and data analysis.
- Deployment of managed **Digital Terminology Services** that allow for digital consumption of these semantic products by the market

Building Block #3: Data Matching

Current State and Context:

The challenge of building a single longitudinal health record for each patient is exacerbated by a widely inconsistent method for identifying a patient's record within each point of service system in which the patient's information resides. As such, solution designs are challenged by non-standardized identification patterns across jurisdictions.

Jurisdictions have made strides toward matching patient information across health technology systems via (i) mandatory query elements (e.g., date of birth, gender, name and heath card number); and (ii) the collection of elements in centrally deployed clinical data repositories. That said, the current state still does not easily enable the search, retrieval and synthesis of patient records across multiple

systems. Furthermore, there is very limited support for anonymized, patient-agnostic identifiers that make for safer, more secure access to data.

Contributing factors to the current state include the following:

- Non-standardized, poor algorithms used to identify patients across jurisdictions and health organizations
- Poor data quality (e.g., completeness, format) due to a lack of data governance and standardization
- Data entry errors resulting in creation of duplicate patient records

Proposed Roadmap Items:

To address the current state challenges, the Roadmap will work towards the development of a record matching strategy and its digital components to allow for scalable data access, whether distributed or centralized. Ideally connected to digital identities, this Roadmap item needs to inform consistent health information exchange patterns across the sector.

Key components of this item include the following:

- Employment of common data standards for recording demographic data (implementation of Building Blocks #1 & #2)
- **Development of a standard approach (including algorithms) to data matching** across systems (in lieu of a single identity)
- **Integration with future digital identities** (Building Block #10)

Building Block #4: Reference Architecture (Modular, Standardized Service Capabilities)

Current State and Context:

In the current state, health technology implementations are based on proprietary systems that are not modular, do not have a standard set of interface capabilities, and are not built as a service-oriented architecture. This status quo makes it hard to grow, improve, scale and maintain services as new technologies become available.

Contributing factors to the current state include the following:

- Short-term focused investments with non-scalable implementations
- One-off deployments of new functionality, at times on top of legacy designs
- Limited feature portability, developed as competitive barriers by the industry
- Inability to scale due to highly customized interfaces
- Vendor lock-in that prevents access to data, as well as innovation

Proposed Roadmap Items:

To address the current state challenges, the Roadmap will work toward a pan-Canadian, **service-oriented Reference Architecture** that accomplishes the following:

- Definition of an ecosystem-wide, **standardized common services set** (e.g., service and provider directories, digital identity assertion services, health data access services, electronic booking or request services)
- Alignment with and leverage of successful international integrations patterns and services

- Drive towards a convergent method of **large-scale service integrations**

Building Block #5: Consistent Secure Health Information Exchange Protocols

Current State and Context:

In the current state, there are multiple methods for information exchange, including email protocols, SOAP-based web services, RESTful operations, messaging and even peer-to-peer customized services. At this point, there is limited consensus at the pan-Canadian level on how and when these methods should be used. As a result, there is a high degree of variability that must be managed by vendors. This lack of standardization leads to poor scalability and predictability across health information exchanges, posing as a barrier to secure and efficient methods of information exchange.

Contributing factors to the current state include the following:

- Incremental development of new services that coexist with older, legacy services
- Local innovation focused on immediate delivery at the detriment of alignment with broader trends
- Implementation of international solutions built against competing standards
- Lack of national guidance on data and exchange strategies in green field implementations

Proposed Roadmap Items:

To address the current state challenges, the Roadmap will focus on building a pan-Canadian convergence toward a health information exchange protocol that reduces optionality in favor of large-scale spread. This will reduce the burden of protocols that both vendors and jurisdictions must manage.

Key components of this item include the following:

- Development and adoption of a secure, modern and predictable **Health Information Exchange (HIE) specification** that achieves standardization of a minimum set of capabilities at scale (identifies the fewest number of HIE protocols necessary to exchange health information)
- The HIE protocol's **integration with policy and consent-based access** to data (privacy by design)
- **Integration of common data standards** into the HIE protocols (Building Blocks #1 and #2)

Building Block #6: Provider Directories

Current State and Context:

In the current state, provider directories are typically managed by professional organizations and/or associations within each jurisdiction (e.g., colleges of physicians and surgeons, nursing associations). The information contained in these directories is often based on local needs and is largely unstandardized from one jurisdiction to another (as they are governed by separate entities). Furthermore, the accuracy, completeness and currency of the information available is difficult to assess, which limits the confidence and utility in the data captured (e.g., provider discoverability).

Contributing factors to the current state include the following:

- Siloed, geography/organization-based management of provider directories
- Data captured is based on limited use cases and are not directly tied to other data in the health system
- Data entry errors resulting in creation of duplicate provider records and/or inaccurate information
- Variation in the methods for data capture and how it is formatted/stored for future use
- Poor, non-standardized algorithms used to identify providers across jurisdictions and health organizations

Proposed Roadmap Items:

To address the current state challenges, the Roadmap will focus on a unified, pan-Canadian approach to provider directories that will ensure they are reliable sources of truth that are usable by a number of ecosystem services.

Key components of this item include:

- Pan-Canadian consensus and standardization of the type of data that should be collected (provider - minimum data set) and how it should be formatted
- Standardized mechanism for updating provider information (minimizing variation and manual/duplicative tasks for providers and administrators)
- Focus on standardizing how regulatory colleges present provider information
- **Standardized mechanism for accessing/presenting provider directory data**

Building Block #7: Health Care Directories and Resource Location

Current State and Context:

In the current state, there are multiple siloed health care directories across jurisdictions which are usually tied to specific use cases and proprietary vendor networks. As health care becomes more innovative and collaborative, health care services will become available across a wider base of locations, providers and services.

In addition, the scope of specific providers (e.g., pharmacists and nurse practitioners) are expected to evolve and expand in the future. If siloed, inaccessible health care directories will continue to exist as they do today, and the cost of maintaining this information and the risk associated with inaccuracy, completeness and currency will only grow. Patients and providers alike will not have the necessary information to access the right areas of the health system to meet an individual's specific needs.

Contributing factors to the current state include:

- Proprietary networks often using local protocols and data representation
- Closed, use case-specific directories leading to duplicative data entry with little to no additional value to end users
- Current directories rely on manual/high-effort methods of maintaining and updating information, leading to a high cost of maintenance and poor data quality
- Lack of standardization in both the collection and structure of data limits discoverability and the ability to expand data capture as needs evolve

- Information is often outdated because clinicians do not have the ability to delegate authority to supporting staff for updates

Proposed Roadmap Items:

To address the current state challenges, the Roadmap will work toward the standardization of health care service directories and address the interoperability capabilities required to interact with them. This type of capability is essential to the enablement of sophisticated electronic referral, consult, booking and other workflows.

Key components of this item include the following:

- **Pan-Canadian specification to represent health care services** (and providers that may practice across multiple organizations)
- **Standardization of health care service directory interfaces** to enable simple access to data across health technology systems

Building Block #8: Consistent Patient Access

Current State and Context:

In the current state, patients, families and caregivers are often asked to recall and retell their own or their loved one's health history as they move across care settings and providers. Patients (and/or their delegates) have limited accessibility to their own health records.

Contributing factors to the current state include the following:

- The health technology ecosystem is siloed and does not enable simple exchange and aggregation of patient information
- There is a large volume of patient access points (e.g., portals, lab applications) that make it difficult for patients to aggregate information across provider solutions
- Patient-generated data are often captured and stranded in consumer applications and are not easily extractable/shareable
- Data available to patients are usually only in a read-only format within a portal

Proposed Roadmap Items:

To address the current state challenges, this Roadmap will focus on enabling patients to access and digitally interact with their longitudinal health record. Patients should be able to use smart applications of their choice that access and process their data and allow for easier sharing of this data with the providers of their choice:

- Development of **a pan-Canadian Patient Access specification** that incorporates and aligns with international standards (e.g., SMART on FHIR, IPA) that enable patient access to their longitudinal health record
- Integration of this specification with Digital Identities (Building Block #10) and access authorization

Building Block #9: Industry-Wide Testing, Compliance and Conformance Infrastructure

Current State and Context:

Interoperability hinges on vendors' ability to design systems that are compatible with one another. Typically, this compatibility is assessed through testing, compliance and conformance programs.

In the current state, some jurisdictions and professional organizations have certain compliance services in place. That said, the challenge is in the lack of a pan-Canadian framework where solutions can be easily assessed to ensure they can then move across jurisdictional boundaries. This current state prevents the scaling up of solution portability and potentially creates competing conformance programs at the pan-Canadian level.

Contributing factors to the current state include the following:

- Lack of coordination to ensure jurisdictions are collaborating and are aligned on testing, compliance and conformance expectations
- Limited opportunity for vendors to test and prove core capabilities (e.g., generation of a compliant Patient Summary document) required for a jurisdictional integration
- Variation in jurisdictional requirements that lead to multiple unscalable solution designs across jurisdictions

Proposed Roadmap Items:

To address the current state challenges, this Roadmap will focus on the establishment of a first-class conformity assessment program. Conforming a number of core services at the pan-Canadian level will result in the opportunity for predictable growth, while allowing for different deployment architectures across jurisdictions.

Key components of this item include:

- Development of **a pan-Canadian Conformity Assessment program** tied to the Reference Architecture (Building Block #4) that enables vendor solution capability assessment against core ecosystem expectations
- Deployment of **a first-class conformity assessment platform** (e.g., Gazelle) that provides the infrastructure for jurisdictions and vendors to leverage core testing capabilities for the standardized components referenced above

Building Block #10: Digital ID & Identity Proofing

Current State and Context:

Patients and providers have multiple identifiers across health technology solutions. As such, there is no single way to identify users and grant them required access based on a single set of credentials/profile characteristics, nor is there a way to consistently access their distributed health data using these segregated identities. Thus, the onus is put on users to manage these identifiers across multiple applications and sources of information, and stitch together information from these systems.

Contributing factors to the current state include the following:

- Lack of standardization in methods pertaining to identity proofing and authentication
- Low level of trust among health technology system providers that the appropriate level of assurance has been met by others to permit data access and health information exchange

- Inability for a system to accept/acknowledge identity proofing and authentication processes carried out by other external systems

Proposed Roadmap Items:

To address these challenges, the Roadmap will focus on a pan-Canadian approach to digital identities, for patients and providers alike, that will universally enable access to services and data across health technology systems. This will unlock the possibility of connecting people, based on their roles, to the data to which they should have access.

Key components of this item include:

- A standardized, pan-Canadian approach to defining **digital identities and identity federation** (aligned with Digital ID & Authentication Council of Canada (DIACC)'s Pan-Canadian Trust Framework™)
- **Standardization of the Levels of Assurance ("LOA")** required for access to data
- Definition of **identity claims and their representation in digital transactions**

Building Block #11: Consistent Representation of Consent and Policy

Current State and Context:

In the current state, there is limited consistency around the interpretation of consent or how policy is expressed/represented across jurisdictions (e.g., with whom data can be shared, by whom it can be accessed and for what purpose, how these consent elements are communicated and represented). Without the appropriate elements in place (and the interpretation thereof) alongside technical representations of policy and consent, the use of an individual's health information for their own care, as well as secondary uses, will be limited and inefficient. Health technology systems will not have the ability to ascertain or interpret whether consent has been appropriately obtained and can be acted on. Inconsistent, insufficient or absent consent representation is a serious barrier to data sharing and privacy protection.

Contributing factors to the current state include the following:

- Policies often vary among jurisdictions, reducing predictability and leading to vendor solution designs that are hard to scale
- Policies and regulatory constraints leave considerable room for interpretation among vendors, clinicians and organizations, resulting in variances in how permissions and consent are collected, presented and enforced
- Consent directives do not effectively extend to legal guardians and representatives, and are captured in different ways, often creating the need to re-establish consent with the same patient once the individual crosses service or organizational boundaries

Proposed Roadmap Items:

To address the current state challenges, the focus will be on establishing a pan-Canadian approach that **defines the technical representation of policy and consent in the data exchange** which can then be informed by key legislative and regulatory policies across jurisdictions. Note that this building block only standardizes the way a system represents and interprets policy and consent. It does not require that all jurisdictions have the same policy or consent regulations.

Key components will include:

- Standardization of digital consent and policy representation for data access
- Standardized consent representation in the clinical workflow
- Definition of consent directives and their relationship to data access
- Guidance on patient-managed consent directives
- Consent model to allow patients/citizens to manage the extent to which their health record is shared for clinical care and analytics/subsequent use
- Framework/guidance for how consent/policy governs access to data

The framework will inform how organizations and vendor solutions will align to respect patients' privacy choices.

Building Block #12: Scalable Data Sharing Governance Framework

Current State and Context:

In the current state, as more health technology solutions enter the market and the need for interoperability grows, so does the number of sharing agreements (e.g., data sharing arrangements, key accountabilities, minimum service level agreements). The lack of common standards, services, policies and practices creates an environment with the following challenges:

- The market must govern and adapt these agreements each time a new data sharing relationship is built
- There is a lack of understanding of roles and responsibilities for participation in health delivery and information exchange
- There is a large variance across jurisdictions that do not allow for repeatable, scalable processes
- Poor governance and scalability of these agreements do not allow data sharing relationships to adapt to changing requirements beyond their initial intended use

Proposed Roadmap Items:

To address the current state challenges, this Roadmap will focus on a data sharing governance framework that allows data sharing relationships between health technology ecosystem participants to scale.

Key components of this item include the following:

- Creation of **a pan-Canadian data sharing governance framework** that will build the common set of standards, services, policies and practices necessary for scalable data sharing arrangements
- A framework for effective pan-Canadian decision making around data sharing

Planning for Maturity of Each Building Block

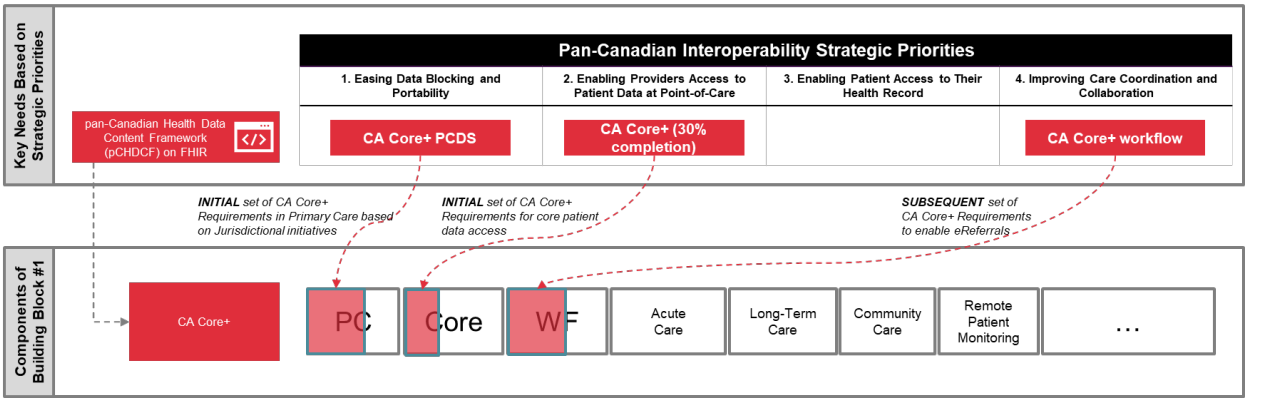
As noted above, these building blocks represent the bare minimum to facilitate interoperability and address the four (4) pan-Canadian strategic goals. As such, the sequence and logic for each block's development will be directly tied to jurisdictional priorities (and resulting programs/initiatives) to ensure immediate incremental value to jurisdictions. As these priority areas develop, resulting in new requirements, the corresponding building blocks will also mature with new components/extensions to address these needs.

To bring these concepts to life, let us look at **Building Block #1 (pan-Canadian Health Data Content Framework (pCHDCF) on FHIR)**. If there is consensus across jurisdictions that there is a need to standardize and enable access to primary care data, the development of a pan-Canadian model will start with data domains that address this need, with a view to building a foundation that can be extended to other care settings, use cases, etc., in the future.

Subsequently, as maturity in the market and primary care evolves, there may be additional jurisdictional initiatives, such as the enablement of eReferrals. If eReferrals is the next top-down initiative, the development of the pan-Canadian data model will extend upon the current foundation to standardize the minimum data set elements required to facilitate the necessary workflow for eReferrals. Below is an illustrative view of how Building Block #1 would mature in this scenario.

This example shows that while each building block has been identified, the short-term milestones are a product of the needs from the top-down perspective. The development for each building block will grow organically and remain grounded in continuous collaboration and consensus across jurisdictions.

Illustrative View of Building Block #1 Development Based on Top-Down Priorities

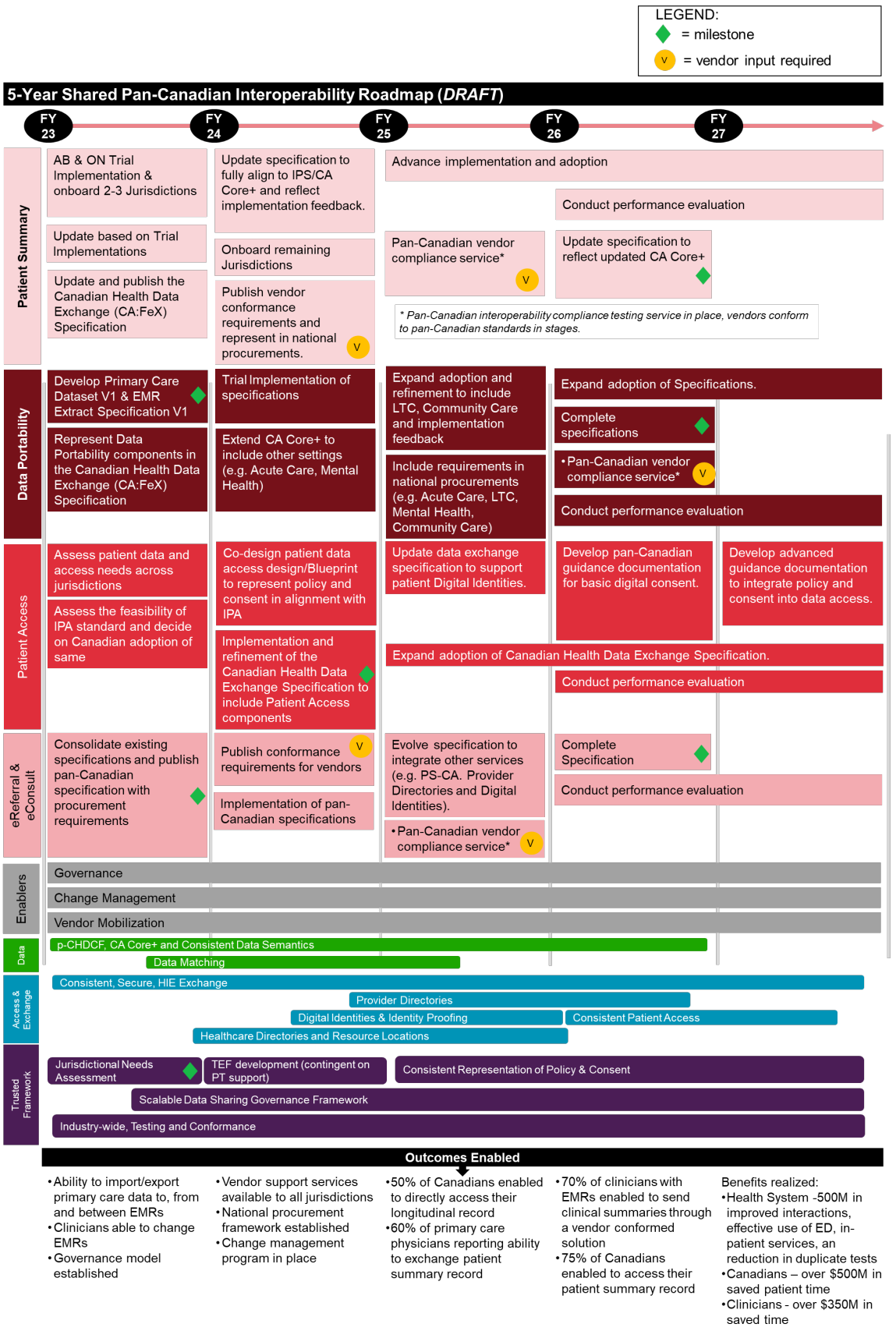


7 – The Road Ahead: Five-Year Shared Roadmap Infographic

Without national or pan-Canadian technical standards for digital health systems, vendors are using inconsistent technical standards for data exchange, which prevents interpretable information flow from one IT system to another – ultimately increasing health system costs – and creates issues with respect to continuity of care. While there is broad adherence to the family of HL7 standards, there are no pan-Canadian agreements on which standards to use, and there is variation in the use of standards across different systems.

Based on the current landscape, and the interoperability challenges faced by the jurisdictions, the Roadmap infographic articulates a logical path forward for the next five years in support of pan-Canadian shared interoperability goals. The first four initiatives to advance pan-Canadian interoperability have been identified. These initiatives will focus on realizing immediate benefits that will improve care delivery, the patient experience and health outcomes.

The Roadmap (***see next page***) depicts the key activities, milestones and outcomes that could be realized through the development and implementation of the four priority initiatives described in this document.


LEGEND:
= milestone
V = vendor input required
5-Year Shared Pan-Canadian Interoperability Roadmap (DRAFT)
FY 23
FY 24
FY 25
FY 26
FY 27
Patient Summary
AB & ON Trial Implementation & onboard 2-3 Jurisdictions
Update based on Trial Implementations
Update and publish the Canadian Health Data Exchange (CA:FeX) Specification
Update specification to fully align to IPS/CA Core+ and reflect implementation feedback.
Onboard remaining Jurisdictions
Publish vendor conformance requirements and represent in national procurements.
Advance implementation and adoption
Conduct performance evaluation
Pan-Canadian vendor compliance service*
Update specification to reflect updated CA Core+
* Pan-Canadian interoperability compliance testing service in place, vendors conform to pan-Canadian standards in stages.
Data Portability
Develop Primary Care Dataset V1 & EMR Extract Specification V1
Represent Data Portability components in the Canadian Health Data Exchange (CA:FeX) Specification
Trial Implementation of specifications
Extend CA Core+ to include other settings (e.g. Acute Care, Mental Health)
Expand adoption and refinement to include LTC, Community Care and implementation feedback
Include requirements in national procurements (e.g. Acute Care, LTC, Mental Health, Community Care)
Expand adoption of Specifications.
Complete specifications
•Pan-Canadian vendor compliance service*
Conduct performance evaluation
Patient Access
Assess patient data and access needs across jurisdictions
Assess the feasibility of IPA standard and decide on Canadian adoption of same
Co-design patient data access design/Blueprint to represent policy and consent in alignment with IPA
Implementation and refinement of the Canadian Health Data Exchange Specification to include Patient Access components
Update data exchange specification to support patient Digital Identities.
Develop pan-Canadian guidance documentation for basic digital consent.
Develop advanced guidance documentation to integrate policy and consent into data access.
Expand adoption of Canadian Health Data Exchange Specification.
Conduct performance evaluation
eReferral & eConsult
Consolidate existing specifications and publish pan-Canadian specification with procurement requirements
Publish conformance requirements for vendors
Implementation of pan-Canadian specifications
Evolve specification to integrate other services (e.g. PS-CA. Provider Directories and Digital Identities).
•Pan-Canadian vendor compliance service*
Complete Specification
Conduct performance evaluation
Enablers
Governance
Change Management
Vendor Mobilization
Data
p-CHDCF, CA Core+ and Consistent Data Semantics
Data Matching
Access & Exchange
Consistent, Secure, HIE Exchange
Provider Directories
Digital Identities & Identity Proofing
Consistent Patient Access
Healthcare Directories and Resource Locations
Trusted Framework
Jurisdictional Needs Assessment
TEF development (contingent on PT support)
Consistent Representation of Policy & Consent
Scalable Data Sharing Governance Framework
Industry-wide, Testing and Conformance
Outcomes Enabled
•Ability to import/export primary care data to, from and between EMRs
•Clinicians able to change EMRs
•Governance model established
•Vendor support services available to all jurisdictions
•National procurement framework established
•Change management program in place
•50% of Canadians enabled to directly access their longitudinal record
•60% of primary care physicians reporting ability to exchange patient summary record
•70% of clinicians with EMRs enabled to send clinical summaries through a vendor conformed solution
•75% of Canadians enabled to access their patient summary record
Benefits realized:
•Health System -500M in improved interactions, effective use of ED, in-patient services, an reduction in duplicate tests
•Canadians – over $500M in saved patient time
•Clinicians - over $350M in saved time

Near-Term Focus (Next 24 Months)

Achieving a more connected care system in a landscape with disparate policies and legislation, varied levels of digital health adoption and interoperability maturity, and unique jurisdictional needs (based on size and scale) requires an approach that is agile and focuses on quick wins, while simultaneously working towards achieving long-term goals.

As all jurisdictions see the need for, and are driving toward, a connected system, key components to drive transformation are already in flight. These components either provide foundational work, replace antiquated systems that cannot readily interoperate, or address critical problems like unattached patients and health human resources challenges.

To support the evolution and maturity of a connected care system, Infoway will work in close collaboration with jurisdictions and other key stakeholders, focusing efforts in the first two years on foundational work that supports their individual and pan-Canadian goals.

1. **Patient Summary and the core data set** were seen as catalysts to and critical for exchanging meaningful, standardized patient health information across care settings. Infoway will complete the alignment of the PS-CA specification to the IPS, support further adoption and make adjustments that reflect implementation realities.

2. **eReferral and eConsult** projects are underway in multiple jurisdictions and of high interest to others. As a result, Infoway will develop a pan-Canadian specification to ensure alignment across implementers and incorporate guidance from international best practices, thereby reducing work effort for those implementing as fast followers.

3. In support of data access and portability, development of open migration/export specifications will help provide a consistent way to migrate/export data (i.e., “locked data”). It will also enable access for a myriad of situations, including clinical care (e.g., a physician switching from one EMR to another EMR), health system planning, and research. A standard pan-Canadian health care data set is a critical component towards interoperability.

   The initial focus will be on developing a primary care data set as part of the **pan-Canadian Health Data Content Framework (p-CHDCF)** followed by the development of the **CA Core+** (the p-CHDCF implemented as a collection of FHIR profiles) for additional clinical care settings (e.g., acute care, long-term care, mental health, community care, etc.) to support data portability across the care continuum. To establish the method of exchange, the **Canadian FHIR Exchange (CA:FeX) specification** will be further developed for implementation and adoption by the jurisdictions.

4. Current projects in support of **patients accessing their health information** primarily focus on patient portals. While considering new and emerging technologies and improved methods for patient access to their health information, we will begin by assessing existing solutions to understand current state, identify gaps and co-design an approach that enables expanded patient access. Concurrently, we will provide guidance to support improved access to patient summaries using existing patient access solutions.

The technology and standards work will be heavily supported by key enablers like change management to educate stakeholders (e.g., patient education programs) on the value of this work, and to remove/mitigate barriers to adoption. Other key enablers include strategic investments to jurisdictions, a coordinated vendor mobilization program and a trust framework.

Long-Term View (Years 3-5)

To ensure that programs continue to be meaningfully aligned to address health system challenges, which in turn drive jurisdictional priorities, Infoway will conduct annual business planning to revisit priorities and iterate this "living" Roadmap to ensure we continue to drive value for all stakeholders. This will include the identification of potential new initiatives/programs (beyond the first four, which will help establish data access and foundational exchange) that will further enable connected care and advance pan-Canadian interoperability. These additional initiatives/programs may or may not include priorities such as:

- Improve sharing and documentation of clinical encounters, such as patient visits to primary, specialty and community care providers, both in-person and virtually, and other care episodes such as post-ED or post-acute discharge summaries.
- Electronic ordering of diagnostic tests and procedures (laboratory, imaging, ambulatory procedures)
- Improve documentation and sharing of results from diagnostic tests and procedures
- Improve interoperability to enable increased secure clinical communications and collaboration among providers, patients and caregivers, including e-booking/e-scheduling
- Public health surveillance
- Advance care planning

Continued advancement of the interoperability building blocks will be a central focus for years three to five. While there is an inherent order of progression due to dependencies, final prioritization will be determined through strategic and tactical collaboration with the jurisdictions and other key stakeholders. The Roadmap represents a proposed progression that considers dependencies and builds toward the future based on current challenges and priorities.

While additional programs may be established because of the review, we will continue to build upon, support adoption and evaluate performance of our foundational work in years one and two.

8 – Critical Success Factors

Successful execution of the Shared Pan-Canadian Interoperability Roadmap will result in the advancement of intra-jurisdictional and inter-jurisdictional interoperability, including the development, implementation, adoption and maintenance of priority interoperability work items. Several critical success factors need to be established to support this work. It is well-recognized that many jurisdictions are experiencing funding and/or resourcing challenges. The following (non-exhaustive) set of critical success factors is intended to highlight the essential levers and support functions that will ensure all partners of Infoway are adequately supported to execute this work.

1. Adequate Funding (Strategic Investment)

Jurisdictional participation is critical in the success of the Roadmap's execution. However, jurisdictions are currently faced with funding challenges, resourcing constraints and competing priorities, such as driving the deliverables on their individual digital health roadmaps. It is recognized that a key enabler of the Roadmap is to ensure jurisdictions receive strategic investment support and resourcing expertise to effectively co-design, implement and adopt pan-Canadian interoperability work items.

Infoway's funding approach involves the development of an investment strategy and collaboration supported by shared investment with provinces and territories. Jurisdictions identify projects that meet outlined objectives and bring them to Infoway for funding consideration. Projects brought forward for co-investment by Infoway are selected on established criteria as defined in the investment strategy. Once a project is approved, Infoway commits to reimbursing a portion of the eligible costs for planning, implementation and adoption, with jurisdictional partners funding the balance as well as ongoing operational and maintenance costs.

As a key component for managing investment project risk, Infoway uses a gated funding model. This means project funding is provided to jurisdictional partners only when agreed-upon milestones are met. Additionally, where appropriate, these milestones include adoption targets to which, in most cases, one half of funds are tied. This approach ensures strong accountability from jurisdictional partners for each specific investment project and ensures the solutions will be adopted and used.

Approved investment projects are monitored by Infoway and managed by its jurisdictional partners. As a strategic investor, Infoway participates in all project phases including planning, design, implementation, adoption, and evaluation. This active engagement provides Infoway with the opportunity to ensure sharing of best practices and knowledge translation across projects, and to augment jurisdictional efforts with needed subject matter expertise, such as change management and technical advisory supports, to support their successful implementations.

Infoway's strategic investment approach has been considered a requirement for ensuring meaningful incentives and levers are applied to produce results. It recognizes the importance of targeted project funding towards the achievement of outcomes, rather than the deployment of technology to ensure the adoption and use of implemented systems. The effectiveness of this investment approach is well supported, as evidenced in the findings from a 2021 Independent Performance Evaluation which cited:

> *"Infoway's cost-sharing investment model and gated funding approach have been an effective approach to achieve desired results. They helped to demonstrate federal leadership, catalyze action, level the playing field, and ensure projects moved through their life cycles to adoption and use. The investment model and funding approach were well understood and eventually supported by jurisdictional key informants."*[9]

2. Legislative Enablement

Canada's privacy and data governance landscape is both dynamic and complex. The federal government and provincial/territorial governments are at various stages of critical work to modernize their legislative structures (e.g., Digital Charter Implementation Act at the federal level, Act 25 in Quebec, and targeted health related changes in several provinces). The recent years of transformational change in digital health exacerbated the pre-existing complexity of a fragmented

[9] Bell Browne Molnar & Delicate Consulting Inc. *Independent Performance Evaluation Final Report* (2021), 54. https://www.infoway-inforoute.ca/en/component/edocman/4000-march-2021-independent-performance-evaluation-full-report/view-document?Itemid=101

legislated landscape. The interplay of commercial, health and public sector privacy legislation is strikingly difficult to navigate for service providers looking to deliver innovative solutions in the Canadian marketplace, clinicians looking to enable tools to deliver care, and most importantly, Canadian citizens seeking to understand their rights.

Further fragmentation of the already highly variable landscape is a real and present risk. There is also vital opportunity in this shifting landscape to enable a stronger emphasis on data subject centricity (in the health context, person-centred orientation) in legislation that is, in many cases, significantly aged and not reflective of current consumer expectations for the treatment of their health information, such as in the areas of data portability and consent.

Respecting that processes to modernize legislation are often in and of themselves lengthy and complex, there is an opportunity to coalesce around core objectives, and to go beyond correcting variability in legislation that creates impediments to interoperability, to a vision in which policy levers enable and accelerate the safe and secure exchange of information.

The measures that may be explored with federal, provincial and territorial leaders reflect the operational roadmap. Specific common aims that may be met through policy alignment and legislative enablement include:

I. **Measures to help data move**

   This may include both explicit statutory enablement to promote movement of data across entities and jurisdictions as well as legislated prohibition against data blocking.

II. **Consistent facilitation of easy access**

   Reflecting the specific operational work and objectives described in this area above, inter-jurisdictional alignment on identity and consent management standards is optimally expressed and reflected in legislation. Alignment on underlying consent requirements across legislation is not a prerequisite condition to interoperability as standards and technology can be leveraged to bridge the variability; however, this is an example of where greater legislative alignment can act ask an enabler or accelerant to health information exchange.

III. **Cement agreement on inter-provincial/territorial standards**

   In review of international comparators, the value of codifying common technology standards in legislation is apparent. Common integrated data standards and integrated health data architecture enable clear communication to the market and decrease the reliance on point-to-point agreements and contracts to establish frameworks for technology exchange. In addition to making the digital health technology market more welcoming to new entrants and navigable for existing participants seeking to grow and innovate, establishing health data standards in legislation will also provide a meaningful assist to cross-jurisdictional sharing.

IV. **Respond to the pressing imperative to keep data safe**

   Whether integrated into privacy and data governance legislation or enabled through specific cybersecurity legislation, there is an opportunity to establish clearer guidance on security safeguards for health information. In comparable jurisdictions, and as proposed in other critical sectors, the importance of clearly defining security requirements is reflected in regulation. This is a valuable mechanism to promote consistent application of security standards and address the uncertainty created by principle and context-based security requirements, such as the requirement to implement “safeguard appropriate in the context” that is found in a number of provincial health privacy statutes.

V. **Implementing mechanisms to allow data to move freely**

Finally, but highly critically, is the need for regulation to restrict data blocking activities and positively enable movement of health data throughout the system. Data portability and data blocking prohibitions are a cornerstone of other legislative schemes, from the European Union's General Data Protection Regulation (GDPR), to information blocking regulations in the United States, and more locally, to Quebec's recently implemented Act 25.

This work is a fundamental foundation of interoperable architecture supported by minimum technical and data standards to enable the movement of data across jurisdictions.

3. Governance (pan-Canadian Digital Health and Data Interoperability Governance)

Governance refers to the structure, processes, ways of working and accountabilities to facilitate consensus, decision-making and appropriate oversight. Given the interoperability work underway at multiple levels in the health system and across jurisdictions, it is paramount to forge ahead with a coordinated governance approach, aligned within the broader health ecosystem (i.e., with the pan-Canadian Health Data Strategy [PCHDS]), that supports progress towards a common vision for pan-Canadian digital health and data interoperability.

To complement the ongoing work, Infoway and CIHI have worked with stakeholders to develop a governance approach that will accelerate the interoperability agenda at a pan-Canadian level while mutually reinforcing the efforts underway in the jurisdictions. While the interoperability roadmap references data governance, frameworks and policies, much of which will initially be developed through other anticipated workstreams of the PCHDS (e.g., through effective and equitable data policies), the initial interoperability governance model will focus on supporting the pan-Canadian digital health interoperability initiatives that are in progress now, or soon to get started. In doing so, it is anticipated that the governance approach will need to iteratively and incrementally evolve as initiatives and processes develop and mature, and other workstreams in the PCHDS progress, seeking the alignment of actions to advance the collection, sharing, use and protection of health data.

Establishing clear objectives

Pan-Canadian digital health and data interoperability governance will aim to:

I. **Advance pan-Canadian interoperability vision and objectives**

II. **Accelerate pan-Canadian interoperability efforts** in priority areas and support jurisdictions with their initiatives by:

   a. Identifying opportunity areas as well as challenges and resolutions that are needed to advance pan-Canadian interoperability efforts

   b. Facilitating pan-Canadian alignment on common data standards for adoption and implementation

   c. Supporting the mobilization of vendors to adopt required standards

   d. Enabling knowledge exchange of best practices and lessons learned across jurisdictions

III. **Report on progress** made across the country towards pan-Canadian interoperability objectives, as reflected in the shared pan-Canadian Interoperability Roadmap

With a focus on incrementalism, both short-term and long-term outcomes can be achieved through effective pan-Canadian digital health and data interoperability governance.

4. Vendor Mobilization

Another key success factor will be to ensure that vendors subscribe to the idea of converging on common pan-Canadian standards to enable greater digital health and data interoperability.

What is vendor mobilization?

Vendor mobilization is the orchestration of market dynamics through various levers, combined with meaningful engagement, to stimulate vendors of software solutions to implement capabilities that meet interoperability and other requirements that are essential to achieve digital health transformation objectives and benefits.

Mobilization programs are most effective if they target all relevant actors involved in digital health transformation strategies, not only vendors. Mobilization is best achieved through an integrated, multi-stakeholder and multi-lever strategy. Ultimately, the goal of multi-stakeholder mobilization is to ensure that solutions in the market meet functional and interoperability requirements, and that these capabilities are deployed and used as intended within reasonable timelines. To that end, a mobilization strategy will be required.

What is a mobilization strategy?

A mobilization strategy is a harmonized set of actions among provinces, territories, Infoway and other relevant organizations to accelerate digital health transformation in agreed priority areas, stimulating vendors to buy in and participate in a timely manner in concurrent efforts to (i) enhance their solutions and (ii) to deploy new capabilities to support and achieve digital health transformation objectives.

Harmonized actions include agreeing on common requirements with which vendors must comply, coordinating regulatory and market interventions, and agreeing on integrated mechanisms for vendor engagement and compliance.

How can a mobilization program be pursued successfully?

In consultation with jurisdictions, clinicians and industry, the ongoing process to define a pan-Canadian Interoperability Roadmap will, in the near term, result in a first set of clinically relevant and value-based work packages (releases) for vendors to implement in stages, which will serve as input to a pan-Canadian mobilization program.

In line with the agreed-upon Roadmap, jurisdictions are fully committed to collaborate and agree on common requirements, standards and implementation guides that will minimize variability across jurisdictions, enabling vendors to develop once and efficiently implement enhanced solutions across the country. Unavoidable variability should not require rework by vendors.

The resulting pan-Canadian standards and implementation guides shall be based on international standards to increase sustainability and to maximize buy-in from the vendor community.

Releases for implementation will be defined through meaningful consultation with impacted stakeholders, confirming implementation feasibility, realistic schedules and milestones. Releases shall reflect an integrated approach, combining bundles of contemporaneous changes and requirements from various initiatives, as opposed to a piecemeal project-by-project approach, consequently ensuring that regulatory and economic interventions can be designed for maximum synergy.

A separate report on vendor mobilization (**Digital Health Vendor Mobilization: Environmental Scan and Strategic Recommendations to Accelerate Canada's Digital Health Agenda**) can be found in the Appendix, further expanding on this critical topic. The vendor mobilization scan includes lessons learned from Australia, Denmark, France, New Zealand, the United States, the United Kingdom and Canada. This report outlines:

- Key success factors for cost effective mobilization, beyond simply getting vendors to implement standards, and how effective vendor mobilization hinges on mobilizing buyers of solutions (clinicians and organizations)
- An inventory of mobilization levers – regulations (e.g., prohibiting information blocking) as well as economic incentives and disincentives – and how leading countries are combining these to achieve digital health transformation objectives and benefits
- Strategic recommendations, both short and medium term, to apply key success factors and the inventory of mobilization levers in support of the priority areas outlined in this document

5. Change Management

Successful implementation of interoperable digital health solutions and sharing of health data is not only dependent on technology, but also on the willingness and ability of individuals to adapt to new tools and processes. This shift in behaviours and mindsets often rely on change management to prepare, support and equip individuals to drive change successfully. As such, change management is integral to successful implementation of a connected health system in Canada and the realization of its benefits.

Planning effective change management activities requires identifying, understanding and addressing current and potential barriers and drivers to adopting and using interoperable solutions. Change management plans should also include means to evaluate effectiveness and impact of activities on desired outcomes (i.e., indicators and metrics for monitoring and evaluation).

It is also important to ensure that change management activities are executed using an integrated approach and are aligned with existing and planned health system programs -- especially those related to digital health and interoperability -- to maximize effectiveness and potential synergies with projects underway.

Engagement and consultations with a broad range of stakeholders (e.g., clinicians and their support staff, vendors, government organizations, health care organizations, patients, families and caregivers) are required to better understand the varying needs and challenges of each stakeholder group, to gather and validate requirements, and to inform the development of strategic and tactical change management activities intended to support stakeholders impacted by changes in the interoperability space, particularly within the primary and acute care sectors.

Given that resource constraint is consistently identified by stakeholder groups as a key challenge to advancing interoperability efforts, where possible, change management resources and supports will be developed with a pan-Canadian lens to allow jurisdictions and specific organizations to leverage and adapt them as required to support their own needs and change initiatives.

Change management supports related to the knowledge, skills, and processes necessary to advance a connected health system will need to be targeted and aimed at supporting the specific needs of each stakeholder group. These change management activities will focus on:

- Involving senior leadership, management, key opinion leaders and impacted stakeholders (e.g., patients, providers) who will advocate for as well as build support and buy-in for changes needed to remove barriers to adoption and advance interoperability efforts within and across organizations and jurisdictions
- Effectively communicating the need for interoperable digital health solutions and building awareness of the value proposition of a connected health system. This will in turn help stakeholders understand of the benefits of interoperable systems and technology, and increase motivation to implement, adopt and use them. Customized communications may be needed as the impacts of an interoperable health system will vary across stakeholder groups and at different levels across the health systems (e.g., local, regional, provincial/territorial, and national)
- Building capabilities and supporting end-users (e.g., jurisdictional partners, patients, clinicians, and their support staff) with acquiring the required knowledge and skills to effectively leverage and use interoperable digital health technologies and data
- Providing the right incentives and enabling infrastructure to support the implementation, adoption and use of interoperable systems and technology

Infoway's expertise and previous work in change management, such as the Virtual Care Change Management program (which provided clinicians and their staff as well as patients, families and caregivers with tools and resources to support effective adoption, optimization and use of virtual care) and the EMR Program, will be leveraged to develop change management supports (e.g., communications, tools and resources, learning supports, incentive programs and knowledge sharing opportunities) to drive implementation and use of interoperable solutions in the health system.

6. Policy, Privacy and Security

A consistently cited impediment to the progress of interoperability has been privacy.[10] Infoway's consultation with stakeholders provides a nuanced understanding of an opportunity to modernize privacy legislation as explored in the prior section, but also a practical need to continue to advocate for greater use of existing legislative structures and to leverage practical means of moving forward and areas. Infoway will continue to take a leadership role in providing pragmatic perspectives on these matters and continue to convene privacy leaders and oversight representatives through the long-standing Privacy Forum and in targeted engagements to align on areas of inconsistency. Subject matter expertise will also be made available to support key Roadmap activities.

Increasingly, the focus of anxiety and trepidation has shifted to cybersecurity as the health sector has become a focused target of cyberattacks. The impact of these attacks on health care institutions and systems has very publicly impacted the ability of these systems to provide timely access to patient information and quality care. The implications to patient safety and public health cannot be understated and, as organizations seek to limit their exposure and risk profile, risks putting a significant chill on interoperability activities.

As an initial structural step, Infoway has convened a leadership group of representative cybersecurity leaders spanning government, industry and health system providers in the Cybersecurity Forum. Meeting since 2022, this group has provided valuable insight into the varying needs and priorities

[10] Canada Health Infoway, *A Path Forward for Data Sharing in Canada: A White Paper* (2023). https://www.infoway-inforoute.ca/en/component/edocman/resources/reports/privacy/6428-a-path-forward-for-data-sharing-in-canada-a-white-paper?Itemid=101

across the digital health ecosystem. Consequently, we understand that variable services and/or supports will be required from Infoway.

The Roadmap activities associated with these areas will focus on:

I. **Building knowledgeable health care leadership for security in Canada**

   This will take the form of a program of education and broadened access to licensed or subscribed services and tools, as well as providing guidance and advocacy on key security issues to health sector leaders.

II. **Protecting against external threats, working towards greater technical robustness of the health sector**

   This tranche of activity focuses on facilitating knowledge sharing to ensure that organizations are aware of existing resources available to protect the perimeter of their network, (e.g., cybersecurity monitoring, threat intelligence, other information and message alerts sources).

   Aligned with the core interoperability activities, Infoway will leverage its convening capability to share best practices and knowledge (national and international) in key risk areas and establish standards for key areas (in support of interoperability), including common agreement on required technical controls, identity management and access requirements.

   Infoway continues to explore the need for establishing health care specific threat-detection, reporting and management network(s) for participating jurisdictions and health service organizations.

III. **Making smart security investments**

   Leveraging the expertise of Infoway's procurement program, Infoway is positioned to make available security risk assessments and market knowledge to gain useful insights into the direction of the broader digital health market and available security specific services and tools. In this vein, Infoway will continue to deliver privacy and security expertise in its procurement processes to support the prequalification of security tools/vendors, as needed by partners in the jurisdictions.

IV. **Ensuring resilience plans are comprehensive and coordinated to promote safe digital health**

   The importance of comprehensive and clinically appropriate incident response by organizations impacted by cyber events remains a critical patient safety issue. Common processes and tools to support organizations in cyber crisis are also a necessary and vital component of a functional interoperable system. These might include templates and (where appropriate) common incident response procedures, including shared planning and testing exercises to form a baseline of support; escalating to incident coordination and Incident Response Support (e.g., cyber mutual assistance [or shared incidence response team] structures); and a vendor of record program for incident response services.

As further described in the section describing Infoway's vendor mobilization program, Infoway will work collaboratively with technology vendors to reach security objectives.

These are two clear domains where practical policy work is required to enable the progress towards digital health interoperability. Additional areas of development are expected to be identified and will be addressed through discrete and pragmatic work efforts.

7. National Procurement

The creation of a cohesive health data ecosystem in Canada, including implementation of interoperable digital health solutions and sharing of health data, will be enabled by a robust procurement framework. Establishing common outcomes; focused requirements; and multi-jurisdictional, value-based procurement processes will facilitate the achievement of interoperability, improve patient outcomes, drive health system efficiencies and deliver value for money. Access to pre-qualified vendors and/or robust sets of requirements will reduce procurement cycle time.

There is an increasing awareness in the Canadian health system of the need to achieve value for money through procurement processes, using innovation as an enabler to introduce and capitalize on new solutions and technologies. This means a shift from **traditional procurement**, where value is represented by cost control, to **value-based procurement**, where value is determined by the product/service that performs best, providing the highest measurable quality outcome relative to need at the lowest total cost of ownership.

To help enable value-based procurement of digital health solutions, Infoway will establish a collaborative national innovation procurement centre of expertise. In doing so, Infoway will provide education, guidance and resources to public procurers by:

- Acting as thought leaders to share knowledge and expertise in value-based and innovation procurement methodologies, helping to disseminate Canadian and international best practices in the field of procurement for innovation
- Leveraging this expertise to provide strategic guidance and lead multi-jurisdictional procurements, thereby creating efficiencies on behalf of the jurisdictions and delivering value to the system through negotiating multi-jurisdictional terms/pricing so that awards are value-based and result in reduced total cost of ownership
- Establishing a strong national forum or community of practice for information exchange on behalf of Canadian health care procurement professionals. Infoway will support the jurisdictions through collection and dissemination of market intelligence on new and evolving technologies as well as identifying vendors and their capabilities

Operationally, Infoway can support the jurisdictions through several activities. Infoway developed an initial procurement toolkit for dissemination to the jurisdictions and other interested stakeholders. Currently focused on the key learnings from Requests for Pre-Qualification (RFPQs) for virtual visit and remote patient monitoring solutions, this knowledge base will be expanded as the procurement portfolio expands.

Once the community exchange portal is established, Infoway will implement plans to engage a broad spectrum of stakeholders through online forums, conferences, etc. Infoway will seek feedback to ensure these community exchange options deliver value, so they become recognized as a robust source of health care procurement leading practices.

Vendor stakeholder relationship management (SRM) is a systematic approach to establishing relationships with vendors and contributing to the success of the multi-jurisdictional procurement initiatives. SRM identifies and leverages strategies to improve vendor performance through a robust evaluation process.

Procurement professionals in all jurisdictions will benefit from metrics that can be used to benchmark procurement activities within and across the jurisdictions. This will enable jurisdictions to evaluate and

improve procurement performance and outcomes against a common set of metrics. It will also provide an opportunity for them to measure against benchmarks with their peer organizations. Infoway can establish a universal set of procurement metrics that assess performance, compliance and opportunity.

8. Standards: National Release Centre

When sharing information between various systems and providers, it is of vital importance that the meaning of the information being shared is preserved to assure its value to the patient, their health care providers, health system planners, and population and public health.

To do this, one must standardize the way information is captured, recorded and shared. This is achieved by leveraging various standards, such as common data content standards, reference terminologies, data models and exchange standards. Without all these standards working together, there is no interoperability.

What are the common standards that enable interoperability?

There are four common standards that enable interoperability:

1. Common data content standards
2. Reference terminologies
3. Data and information models
4. Exchange standards

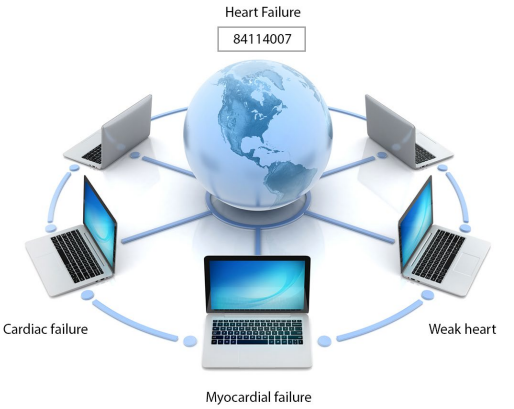
Common content data standards address the spectrum of health information needs across the health systems. These standards identify the health categories, data elements and value sets necessary for individual clinical care, health care operations, health system planning, and population and public health. Examples include primary care, acute and ambulatory care, long-term care and home care.

Reference terminologies are clinical vocabularies or code systems that are used to capture health and care information at the point of care. These reference terminologies model the information and give each concept a unique concept identifier (encoding), format and structure so that when this information is communicated from system to system and from provider to provider, the meaning is preserved. For example, while a health care provider understands that “heart failure” and “myocardial failure” are used interchangeably, disparate computer systems or applications may treat these terms or phrases differently.

Using a reference terminology, like SNOMED CT, in both systems ensures that these two terms are treated the same way, in the proper context.

Examples of clinical vocabularies in use in Canada include:

- The Canadian edition of SNOMED CT for immunizations, problems, and conditions as examples
- The Canadian constraint of Logical Observation Identifiers Names and Codes (LOINC) known as the pan-Canadian LOINC Observation Code Database (pCLOCD) for laboratory tests
- The International Classification of Diseases (ICD) developed by the World Health Organization, such as ICD-10-CA (Canadian version), ICD-O-3, and ICD-11



Reference terminologies are applied (or bound) against data and information models. These models establish rules for defining concepts, as well as their attributes and relationships, so that they can be applied uniformly to share health information across the continuum of care, and over the lifetime of the patients and beyond in terms of population health, research and surveillance. They clearly define data elements, such as gender, reason for health care visit, allergies and diagnosis, to name a few, as well as how these data elements relate to one another.

Once modeled and encoded, to be shared with other systems, the data must be conveyed in a standardized exchange format. This is accomplished by using HL7 standards, such as HL7 FHIR (Fast Healthcare Interoperability Resources) and creating a specification that technically articulates how to solve a clinical problem.

Taken together, these standards allow one to share patient summary information, show proof of vaccination, or monitor laboratory results at the right place, at the right time and with the right people.

As we move forward, Canada will:

- Define, maintain and publish standardized data models, terminologies, code systems and respective value sets for each defined data set
- Provide access to additional standards-related tools and services for terminology and exchange standards
- Provide licensed access to reference terminologies and exchange standards
- Adopt or adapt international standards for use in Canada
- Promote Canadian requirements to be reflected in these international standards
- Develop a centre of excellence (COE) to promote and provide support and expertise on interoperability standards

In addition to the above, the National Release Centre provides a central location to license, access, leverage, implement and maintain all these important standards.

9 – Anticipated Outcomes and Benefits

The health system has become largely digitized over the past twenty years. However, as the Canadian Interoperability Landscape Study describes, connectivity has not sufficiently advanced to meet clinicians' needs[11].

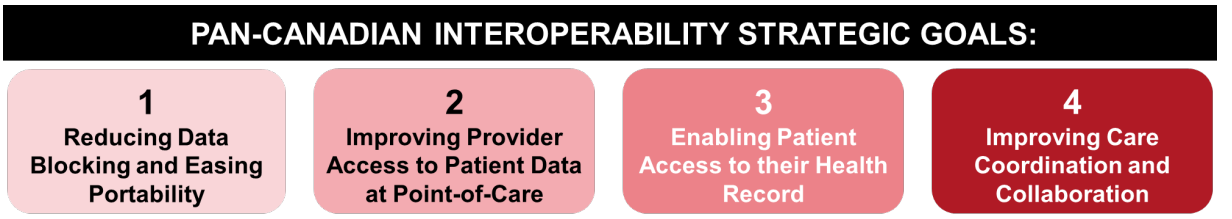
- 82 per cent of clinicians say that they do not always have a summary of the care their patients received outside of their practice setting
- Clinicians report spending almost 40 additional minutes per day searching for patient information from other settings
- 92 per cent of clinicians say that interoperability would enable safer patient care by having more complete, timely and accurate information at their disposal
- 88 per cent of clinicians say that interoperability would improve their ability to collaborate and coordinate care with other health care providers/clinicians and/or specialists

The problems created by insufficient connectivity are contributing root causes for some current health system challenges, including clinician burnout, strained system capacity and poor patient experiences.

Patient access to their own health information remains piecemeal and limited for most Canadians. Interoperability can make data accessible, while investing in citizen access channels and supporting services will give patients greater ownership of their care journey.

[11] Canada Health Infoway, *Canadian Interoperability Landscape Study* (2022). https://www.infoway-inforoute.ca/en/component/edocman/6407-canadian-interoperability-landscape-study-executive-summary/view-document?Itemid=101

Interoperability is an essential enabler for the PCHDS, allowing data-driven management of health systems. Building on successful digital health modernization initiatives over the past two decades, the Roadmap is oriented to achieving specific impacts. Measurement of these impacts, and the factors that contribute to the outcomes, will enable leadership across the health ecosystem to manage activities for maximum value.



The improvements in interoperability targeted in the Roadmap will unlock significant value once achieved, with specific estimates including:

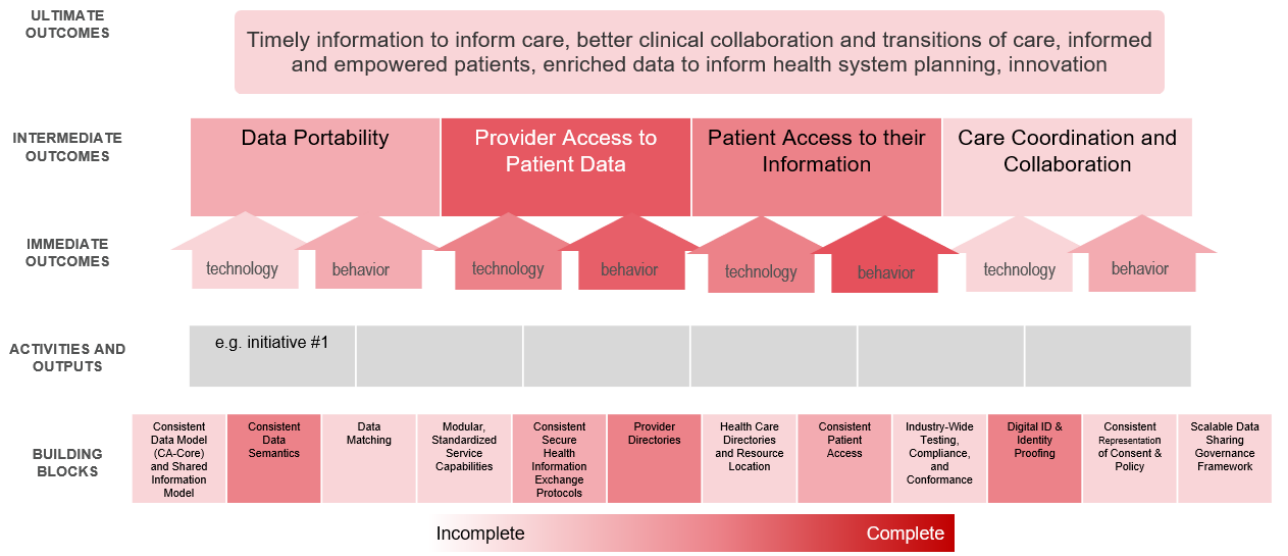
- Clinician time savings valued at $350M annually or almost 1.5M hours from efficiencies around information availability and communication
- More effective use of resources with a potential value of over $500M annually from avoidance of unnecessary ambulatory care and emergency department visits, unnecessary or prolonged hospitalizations and duplication of tests
- Savings of patient time and expenses valued at over $500M or 15M hours annually
- Better real-time data to help with health system planning and resource management (e.g., hospital capacity planning), as well as better informed health system performance evaluation (e.g., population health management)
- A common data sharing standard across Canada to reduce the barrier to entry for vendors and innovators while ensuring a diverse and innovative digital health ecosystem, spurring economic development
- The economic value of coherent health data which could exceed all other benefits in magnitude, including building digital health and broader life sciences sector employment, capital investment and revenue

These benefits are expected to emerge over time, as solutions are deployed and adopted, and as workflows and the technology ecosystem evolves. The desired future state will require active monitoring and purposeful management toward outcomes.

Measuring towards maturity and outcomes

The initial measurement approach to support the Roadmap has been developed and is under review with partners. This approach includes a comprehensive set of KPIs (Key Performance Indicators) and maturity models which will be monitored in the Interoperability Roadmap Performance Dashboard (see figure below). This dashboard is built as a logic model, to align with common reporting requirements across FPT stakeholders and represents the current state (based upon the best available evidence).

Interoperability Roadmap Performance Dashboard – Illustrative current state:

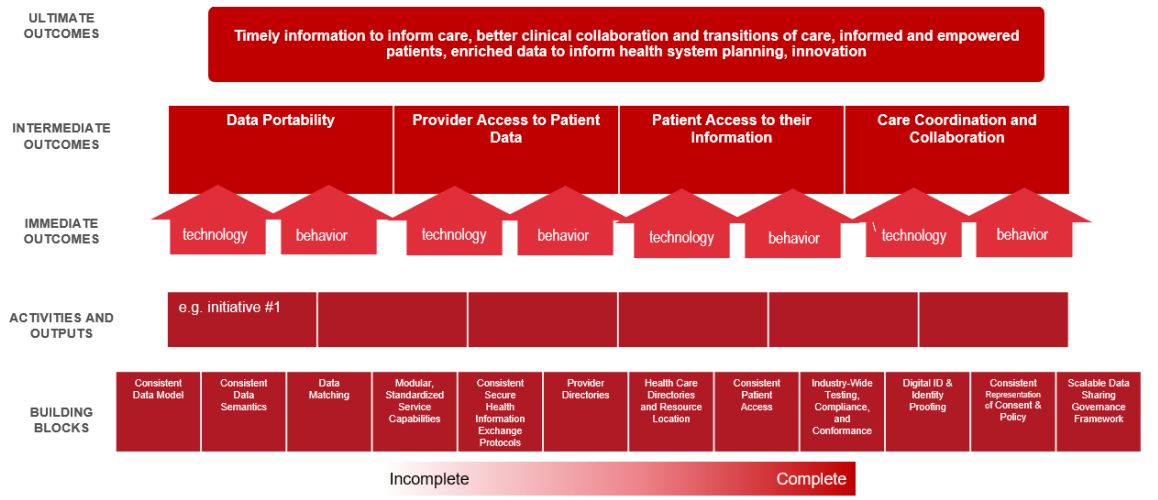


A list of draft KPIs and building block maturity models is available in the Appendix for review and ongoing refinement. The Health Canada headline indicators for digital health (patients accessing information and clinicians sharing electronically) are included KPIs, and accompanied with additional data to provide a more comprehensive view.

The dashboard provides a single page view of progress toward the Roadmap. It will act as a heat map to indicate which building blocks, initiatives and goals are progressing or complete. This will be translated to a dynamic online tool providing all stakeholders with a real-time view of progress. Each domain is designed to capture incremental progress toward goals and be capable of presenting progress for each FPT health system.

Infoway and partners are continuing to assess the current state against the KPIs and building block maturity. As the initiatives deliver and outcomes are achieved, KPIs and maturity model indicators will be updated to display progress visually.

Interoperability Roadmap Performance Dashboard – Target future state showing all building blocks and initiatives completed and all outcomes achieved:



Collaborating for successful measurement

As with other sections of this roadmap, consensus on the desired outcomes and measurement approach is necessary for success. CIHI, StatCan and FPT governments will be important partners in this work.

Collaborating internationally, for example, with partners from the Global Digital Health Partnership (GDHP), will keep Canada on pace with leading practices and allow us to take advantage of international measurement opportunities. As the Roadmap advances and plans become more specified, with accountabilities for partners clarified, the measurement approach will be updated.

Research partnerships will be important in the long term for a more robust picture of the impacts to the Canadian health system. Important data gaps exist, especially related to the interoperability maturity dimensions, and will need to be addressed. There are a variety of opportunities to fill these gaps, including data from vendors or health service providers. These will be assessed with partners to determine the path forward.

The initial review of data requirements identifies four main data sources, which are common to previous Infoway measurement strategies. Many of the data sources and processes are in existence. Others will flow from execution of Roadmap activities, but net new data collection will also be required. Landscape surveys of clinicians and Canadians are ongoing, having informed the baseline and planning of this Roadmap, and will be essential for monitoring uptake (i.e., adoption and use) and user perceptions of value.

Data sources to report against roadmap progress:

Operational Reporting: Information collected through the initiatives, including project milestones, adoption data, reach, etc.	Partially in place
Partner data: Key data from PTs, vendors, clinical groups and other partners (vendor conformance, enrollments, certification, etc.)	TDB – 2023
Landscape Surveys: Canadian Digital Health Survey 2022 and forward, National Clinician Surveys (Commonwealth Fund 2022, National Survey of Canadian Nurses 2023, etc.), institutional survey TBD	Partially in place
Research Projects and Evidence Scans: Small set of research projects which address key evidence gaps; potential CIHI and/or CIHR partnership	TDB - 2024

Interoperability maturity early scoping against the 12 Building Blocks

Initial assessment and discussions around interoperability measurement and maturity have identified a number of important areas for structured maturity measurement to align on desired end state and more effectively monitor progress. We also have gaps in our knowledge of the current state to be addressed. Most notably, the real-world use of semantic and message exchange standards is not sufficiently clear at the health system level.

The initial approach is included in the Appendix and will be refined in the coming months as maturity dimensions are specified and agreed upon. Additional data collection and assembly will be required to map the current state. Some of this data is already available and requires consolidation and presentation; other data will require new collection activities.

10 – Getting Started

With our pan-Canadian strategic direction defined and first set of initiatives/programs identified, we will soon shift our focus to planning and design, beginning with the following items in Q1 of FY23.

Securing Funding

Over the past year, Infoway has had ongoing, meaningful discussions to keep Health Canada informed on the roadmap development process. These discussions have touched on the strategy to advance pan-Canadian interoperability as well as the necessary funding and supports required to enable the realization of our collective Connected Care vision. Infoway will continue to engage with Health Canada to secure the funding necessary to advance pan-Canadian interoperability swiftly, which includes strategic investment funding to help jurisdictions create more capacity and enhance expertise. In addition, funding is also required to adequately support other key stakeholders (e.g., clinicians, vendors) to enable greater adoption.

What to expect:

- Estimation of the effort and funding required to adequately support jurisdictions across the four priority initiatives/programs
- Identification of the areas in which Infoway may provide funding and/or support

Governance

Recognizing the work underway at multiple levels in the health system, across jurisdictions, and through recent efforts to advance collection, sharing, use and protection of health data through the PCHDS, Infoway and CIHI have continued to engage stakeholders to develop a collaborative

governance approach that can support pan-Canadian digital health interoperability initiatives that are in progress now, or soon to get started. This approach will incrementally evolve as new pan-Canadian initiatives are established.

There are currently two pan-Canadian initiatives underway: i) the pan-Canadian Patient Summary (led by Infoway); and ii) the Interoperable Primary Health Care Common Data standard (led by CIHI). The roadmap will identify other interoperability to commence after April 2023, aligned with funding.

Principles for moving forward:

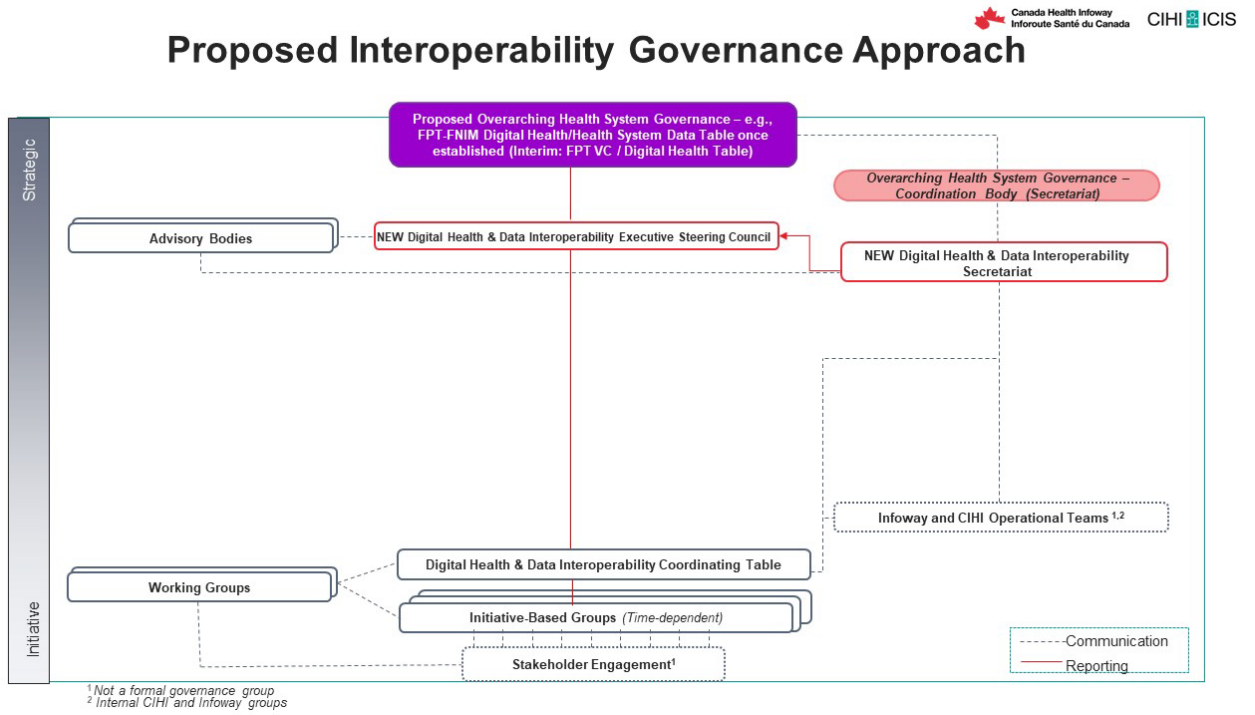
- Support the initiatives currently in play and incrementally evolve the approach as new pan-Canadian initiatives are established
- Maintain structures and processes that are working well and only establish new structures or processes when needed, respecting the resource capacity of participating stakeholders
- Support decision-making and issues resolution at the lowest possible levels, informed by the right expertise (e.g., architectural, standards, clinical). Ensure participation by the right subject matter experts (SMEs) or role levels, to support these decisions without duplicating participation elsewhere
- Establish terms of reference for an Executive Steering Council to operate as a nexus between initiative-level and coordinating tables and higher-order health system governance structures, supporting alignment, direction building and issues resolution for matters that are bigger than any of the initiatives and that require a higher level of strategic consideration
- Regularly review the governance model and adjust as needed

To get started, the governance model that was followed by the Canadian Patient Summary initiative (an example of an existing pan-Canadian initiative), will be leveraged and adjusted to accommodate for an expanded set of pan-Canadian initiatives coming into play, and as the developing PCHDS governance approach progresses. Ongoing evaluation and fine-tuning (as needed) will be embedded to ensure the governance approach supports the work underway.

These initial adjustments include:

- Establishing a new Executive Steering Council with expanded membership and governance scope, building on the current Executive Table that was in place to support the Canadian Patient Summary initiative, and including representation from the Coordinating Table
- Expanding the membership of the existing Coordinating Table to enable the necessary coordination, linkages and intersections across all pan-Canadian digital health and data interoperability projects that will be led by CIHI and Infoway
- Developing new working groups or advisory bodies such as clinical, change management, architectural and standards to ensure the right expertise is incorporated across the entire life cycle of standards development, supporting the coordinated implementation and adoption with FPT roadmaps
- Establishing a new secretariat function (run by Infoway) to support all governance activities (i.e., coordination, alignment, knowledge stewardship)

The image below depicts key interactions and alignment of the proposed governance approach within the broader, overarching health system governance framework.



Initiative/Program Scoping and Design

Thus far, we have only aligned on the broad strokes to achieve our collective vision of creating a connected health system. The logical next step will be to spend the next few months scoping out the work to be undertaken for each of the four initiatives in the first phase. Simultaneously, we can identify scope items for subsequent phases to enable greater clarity, thereby allowing execution/project level stakeholders to better prepare for the work on the horizon. Clearly defining scope will allow for efficient and focused execution to begin unlocking value immediately.

What to expect:

A program guide will be developed to clarify the following:

- Program overview and level-setting
  - Key assumptions
  - Guiding principles
- Program scope:
  - Current scope
  - Potential future scoping
  - Out of scope items
- Roles and responsibilities between Infoway, the jurisdictions, vendors and other stakeholders
  - This will include identifying those areas in which Infoway will not take an active role (e.g., implementation will be undertaken by the jurisdictions)

- Work done by the jurisdictions to date (i.e., a gap analysis to determine maturity level)
- Process for managing changes to the Roadmap and workplans
- The delineations between pan-Canadian work and local work (i.e., defining and maintaining lines of demarcation)

Taking Inventory of Jurisdictional Assets and Expertise

Concurrently, we will take inventory of all existing jurisdictional assets/solutions, standards, governance frameworks, funding frameworks, capabilities and knowledge to determine existing areas of strength that can be leveraged or evolved to become pan-Canadian standards, thereby accelerating time-to-value and not "reinventing the wheel." We recognize that all jurisdictions have in-flight initiatives, many of which are congruent to this Roadmap.

As a guiding principle, we want to build upon existing assets and solutions, rather than starting from scratch. We will work with the jurisdictions to co-develop a methodology to help guide the evolution of assets and solutions that can either be enhanced or repurposed to become a pan-Canadian standard. Similarly, we will also co-define pragmatic migration paths for assets and solutions that have limited long-term viability. In all instances, we do not expect jurisdictions to make any immediate drastic changes; we further anticipate that any significant uplift or migration would be done so at a pace comfortable and sustainable for each jurisdiction.

What to expect:

A gap analysis will be conducted to assess the functional and technical current state of each jurisdiction against the target state for each of four priority areas. This analysis will include:

- The work has been done by the jurisdictions to date (to determine maturity level)
- How Infoway can support jurisdictions who already have in-flight projects in the four priority areas
- How Infoway can support jurisdictions in adapting to the new agreed upon pan-Canadian specifications and standards in those areas in which they have already completed projects
- There is a recognition that interoperability work is already in progress in many Canadian jurisdictions and procurement processes as well as vendor solution design require guidance to stay aligned with this Roadmap.

Alignment with Jurisdictional Implementation Plans

When considering timing and approach for implementation, we recognize a tailored approach will be necessary for each province and territory due to varying degrees of digital health adoption and differing systems and infrastructure at play, coupled with jurisdictions' respective in-flight projects and/or procurements. Some jurisdictions are already in the process of implementing initiatives related to those identified in this roadmap, while others are just beginning planning efforts. In all cases, Infoway will engage each jurisdiction to align the pan-Canadian roadmap to jurisdictional implementation plans and ensure adequate planning and change management efforts are accounted for.

Market Guidance

Infoway, in collaboration with our stakeholders, will work towards generating a market guidance document within the first half of FY23 that will detail expected trends in each of the three interoperability frameworks (i.e., data, access and exchange, and trust) presented in this Roadmap. While final and detailed conformance specifications will only be available when those priority areas are addressed, general market guidance will be given for areas, including health data definition and use; information access and exchange; privacy, consent and security; and others as appropriate.

Conclusion

Canada Health Infoway is excited about the journey ahead and to coordinate, convene, collaborate on and, where appropriate, lead important work that will enable the advancement of pan-Canadian interoperability. We look forward to continued success working in collaboration with all our strategic partners.

Appendix

1. Interoperability in Canada: Current State Snapshot

Health care interoperability between solutions or solution modules operated ***within*** health delivery facilities have had a long and successful history in Canada, as well as in other health systems. These have been underpinned by key interoperability standards developed by Health Level Seven (HL7), SNOMED International, Regenstrief's LOINC, DICOM and the International Standards Organization (ISO), among others. Rigorous procurement requirements, as well as the typically higher cost of in-facility systems, have generally driven successes in meeting the associated internal interoperability needs.

Over the last 15 years, HL7 and other interoperability standards promoted by Infoway have been successfully adopted by jurisdictions to establish data repositories available to clinicians (electronic health record, EHR) and patients (patient health record, PHR) to consolidate imaging, laboratory, immunization and medication data fed from publicly managed services and community pharmacies. These assets have allowed clinicians and patients to access a significant portion of health records, but not all. More recently, Canada's electronic prescription service, PrescribeIT®, has also made important progress in integrating community pharmacy and primary care prescribers.

However, interoperability challenges remain. Some notable areas to address these challenges include:

- Enhancing the content of provincial repositories (EHR/PHR infrastructure) with information from primary and community care settings. This is increasingly critical due to the large number of unattached patients across the country that consult multiple providers, the increased use of private virtual care services, and increased volume of diagnostic and other procedures performed through ambulatory services. Data from these encounters is critical to establish a complete longitudinal patient record that is accessible to providers and patients.
- Interconnecting primary care, specialty care, community care, and patients, families and caregivers to improve collaborative care workflows and care transitions by enabling cross-solution secure messaging and collaboration, e-referral, e-consult, e-ordering and e-booking.

A fragmented and uncoordinated approach to interoperability across provinces and territories has contributed to a lack of progress in addressing these challenges, but other factors also create systemic barriers. For example:

- Early incentive programs[13] to encourage adoption of electronic medical record (EMR) point-of-care solutions focused largely on general clinical practice requirements, including charting and granting view access to data in provincial repositories, with relatively less focus on broader interoperability to support distributed (cross-solution) workflows.
- Lack of consensus and coordination for the prioritization of clinical harmonization required to drive standardization of structured clinical data.
- The HL7 v3 standard was not widely adopted on a global scale by the vendor community, dampening its adoption. Instead, industry is increasingly adopting the new HL7 FHIR standard. This creates a transition gap and the need to realign solutions across the ecosystem to support the newer standard. Unfortunately, FHIR implementations currently vary across the country.

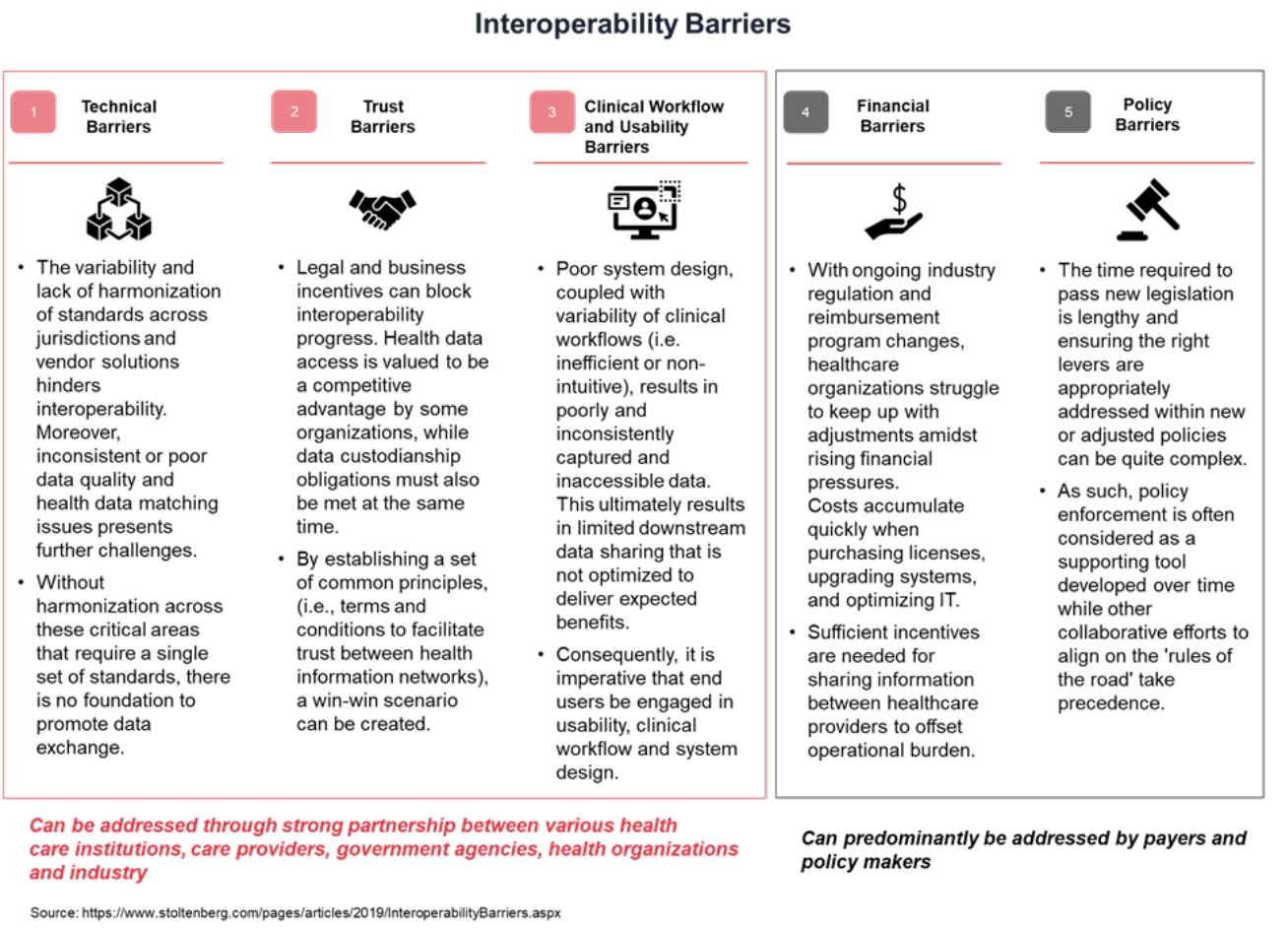
[13] Canada Health Infoway, "Infoway Invests $380 Million to Help Physicians and Nurse Practitioners Implement Electronic Medical Record (EMR) Systems," (2011). News release. https://read.chcm.ubc.ca/2011/02/23/infoway-invests-380-million-to-help-physicians-and-nurse-practitioners-implement-electronic-medical-record-emr-systems/ [Accessed Jan 1, 2023]

Provinces and territories are currently either planning or at the early stages of significant digital health programs, partially driven by the aftermath of the COVID-19 pandemic. For example,

- ON, BC, QC, SK and other provinces are pursuing investments in care coordination to enable e-referral, e-consult, virtual access to specialized services and e-ordering. This includes improving interoperability and collaboration between primary and specialty care providers.
- Several provinces are pursuing or planning to pursue modernization of their provincial health information exchange and data repositories (HIE/EHR/PHR), including ON, NB, AB and others. These programs also seek to integrate data from primary care and ambulatory services.
- The need to reduce provider stress and potential burnout is driving efforts to streamline current processes and workflows. This will be addressed in part by deploying highly integrated clinical solutions in publicly funded establishments and by interconnecting these to improve coordination across secondary, tertiary and long-term care.
- Deployment of PrescribeIT® will accelerate and expand to include integration with hospitals to support discharge prescriptions.

2. Interoperability Barriers

To advance pan-Canadian interoperability, we will need to overcome these barriers collectively.



Source: https://www.stoltenberg.com/pages/articles/2019/InteroperabilityBarriers.aspx

3. Stakeholders Engaged/To Be Consulted

The following section describes the importance of strategic partnerships and why meaningful engagement will help advance pan-Canadian interoperability.

Organization Type	Organizations	Meaningful partnership and engagement
Jurisdictions (**Provinces and Territories**)	All thirteen provinces and territories	Through ongoing engagement, governance committee meetings, targeted consultations, workshops and more, Infoway has built strong relationships with Canadian jurisdictions. Strong engagement has helped to build an understanding of the care delivery and data sharing challenges experienced on a day-to-day basis, and to identify interoperability and digital health opportunities that can be addressed and executed in the coming years. This meaningful engagement is critical to moving the interoperability agenda forward on a pan-Canadian scale in addition to enabling jurisdictions to learn and benefit from one another, adopt standardized approaches to shared challenges and avoid reinventing the wheel. Infoway will continue to collaborate with jurisdictions to ensure they are supported in their digital health ecosystem transformation in a faster and more efficient way. In turn, commitment from the jurisdictions to work together on a pan-Canadian scale is needed for the successful advancement of interoperability with prioritization of interoperability initiatives amongst their broader digital health priorities.

Organization Type	Organizations	Meaningful partnership and engagement
Federal Stakeholders and Organizations	Organizations such as: • Correctional Service of Canada (CSC) • Innovation, Science and Economic Development (ISED) • National Defense and Canadian Armed Forces (CAF) • Veterans Affairs Canada (VAC) • Indigenous Services Canada (ISC) • Royal Canadian Mounted Police (RCMP) • Global Affairs Canada (GAC)	While health care in Canada is primarily delivered by the provinces and territories, health care services intersect with federal stakeholders and organizations in several key domains, including but not limited to: correctional services; federal police, armed forces, and veterans; First Nations and Inuit health services not otherwise delivered by the provinces and territories; and others. Infoway has begun dialogue with federal organizations and stakeholders to better understand their interoperability needs and will continue working with Health Canada and federal partners to ensure the distinct needs of these specific – and unique – settings are met.

Organization Type	Organizations	Meaningful partnership and engagement
Pan-Canadian Health Organizations (PCHOs) **and Federal Agencies**	Organizations including but not limited to: • Canadian Institute for Health Information (CIHI) • Statistics Canada (StatCan) • Public Health Agency of Canada (PHAC)	Infoway recognizes that working collaboratively with PCHOs is critical to the advancement of interoperability, particularly to establish data standardization. For example, Infoway is working with the Canadian Institute for Health Information (CIHI) to formally establish the interoperability governance model that is aligned with the broader health ecosystem. Infoway and CIHI will work together to engage with jurisdictions (FPTs), Indigenous organizations, Statistics Canada (StatCan), the Public Health Agency of Canada (PHAC), vendors, other PCHOs, clinicians, patients and other stakeholders, to establish and facilitate pan-Canadian interoperability governance to guide and facilitate consensus for the selection, design, implementation, adoption and maintenance of pan-Canadian data standards and specifications. Infoway and CIHI have been and will continue to work harmoniously with all the necessary public and private-sector stakeholders to establish data terminology and message exchange standards. In parallel, Infoway will take charge of establishing the interoperability architecture, a national procurement program and vendor mobilization; while CIHI will drive data content standards, data and information enhancements, and establishing indicators and reporting. When it comes to establishing data and exchange standards, Infoway's partnership with CIHI is crucially important to ensure data standards then translate to standardized terminology and technical exchange standards, as all are equally critical in enabling more meaningful and efficient information sharing to enable better care delivery.

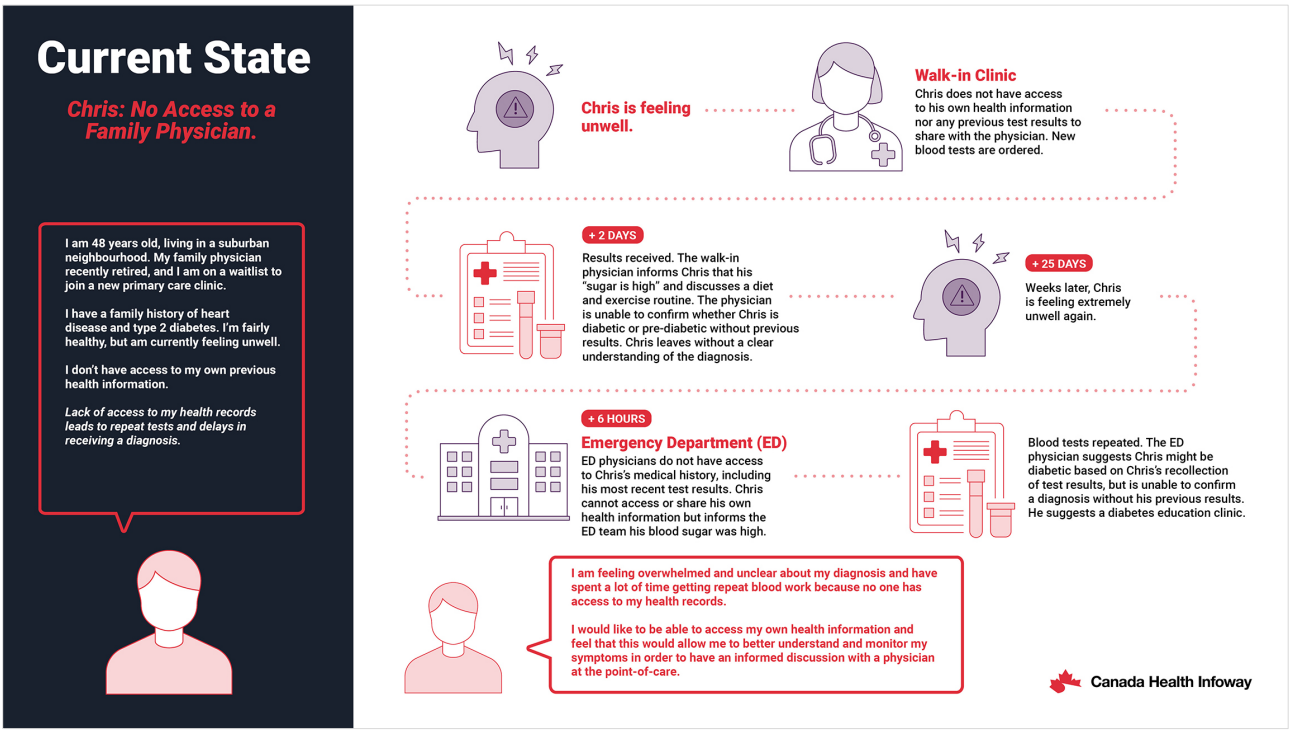
Organization Type	Organizations	Meaningful partnership and engagement
Indigenous Peoples	Organizations and groups such as: • First Nations Digital Health Advisory (FNDHA) • Assembly of First Nations (AFN) • First Nations Digital Health Ontario (FNDHO) • BC First Nations Health Authority (FNHA) • National Indigenous Information Technology Alliance (NIITA) • Inuit Tapiriit Kanatami (ITK)	Interoperability is essential to enabling digital health ecosystem capabilities that serve Indigenous Peoples in Canada. With the data that a better-connected system produces, insights and evidence can be used by Indigenous Nations and organizations to measure progress in addressing inequity, protect and add to their own knowledge base for Indigenous health and wellness, and advance their self-determined health priorities. Infoway also recognizes the importance of an interoperability model that respects and incorporates Indigenous data sovereignty and governance. Infoway has been working with First Nations organizations to better understand their health goals and priorities and discuss the ways in which digital health can have a meaningful impact (e.g., via telehealth solutions, community electronic medical records [cEMRs], PrescribeIT®), with efforts underway to further relationships with Inuit and Métis Peoples. More recently, Infoway has been participating with a consortium of organizations that are collaborating to create an Indigenous Digital Health Ecosystem. Designed by First Nations, for First Nations, this ecosystem is architected with interoperability and standards at the core to ensure partner solutions can seamlessly exchange information. Re-imagined around the social determinants of health, this innovative ecosystem will support traditional Indigenous-led health care delivery models.

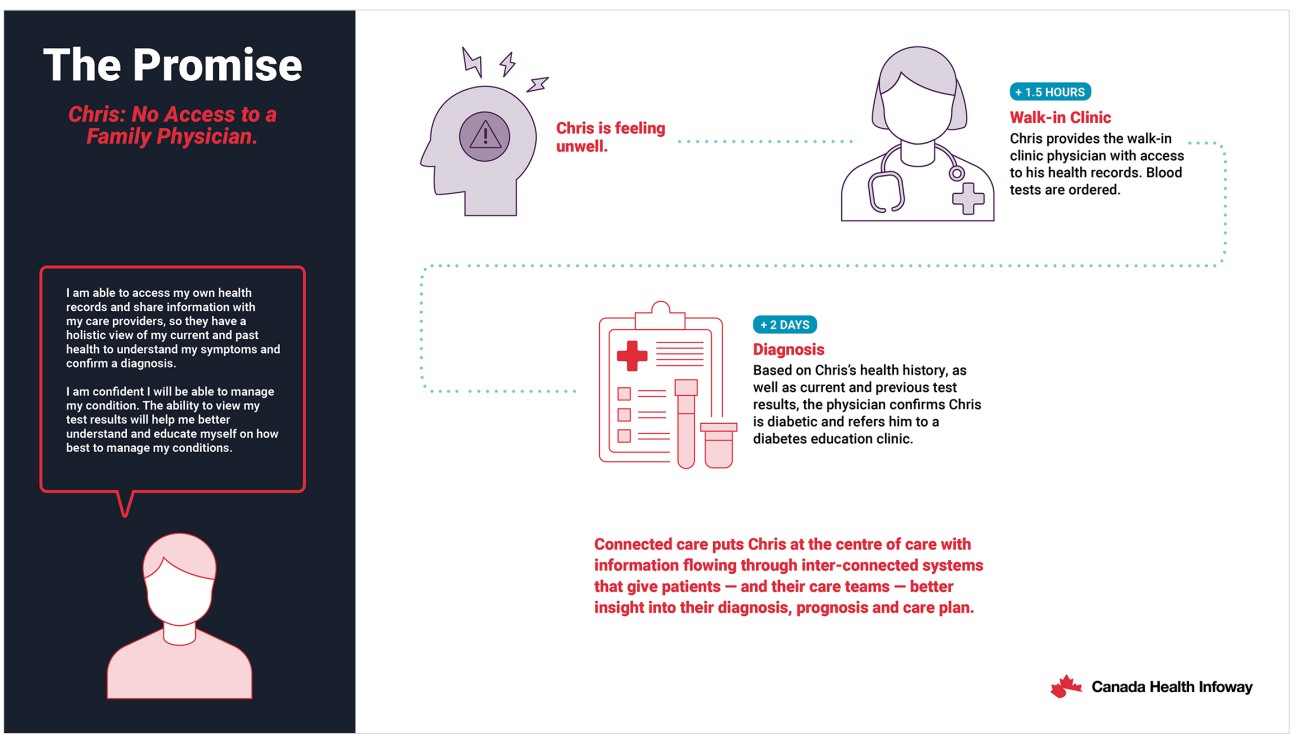
Organization Type	Organizations	Meaningful partnership and engagement
Patients, Families and Caregivers	Engagement with diverse group of patients by leveraging Infoway's patient partners as well as organizations such as: • Patient Advisors Network (PAN) • Imagine Citizens Network • Patient Voices • Network Centre of Excellence on Partnership with Patients and the Public (CEPPP)	Infoway's goal is to help improve the health and health care of Canadians; we engage with those who receive care to shape our strategies and enhance our services. We do this by listening to the perspectives of patients, family members and caregivers, and by working with them to identify and address their digital health priorities so that they can play an active role in managing their health. Infoway consults regularly with patients, families and caregivers to better understand what they need from their health system. Through surveys, collaboration tables, focus groups and more, Canadians help inform priority areas, representing key engagements in interoperability advancement. Infoway believes that a more connected and collaborative system is a healthier system. The more patients, families and caregivers are empowered through digital health literacy and tools, the more connected and collaborative they will be.
Clinicians	Engagement with various health professional associations and individual clinicians through various committees and stakeholder meetings, including organizations such as: • Canadian Medical Association • Canadian Nurses Association • Canadian Nursing Informatics Association • Canadian Pharmacist Association	Infoway works with clinicians, care providers and health workers through a variety of initiatives to accelerate the adoption of digital health to ensure that they receive the support and resources they need to connect with their patients, collaborate effectively and deliver the best care possible. From helping to fund the adoption of foundational digital health technologies, such as electronic medical records, to creating clinician peer networks, to supporting care providers who embraced virtual care during the COVID-19 pandemic, Infoway understands that meaningful, focused partnerships with clinicians and health workers to understand their needs and develop solutions that fit their workflows are critical to the advancement of interoperability. The more clinicians and the health workforce are consulted and supported with the right tools and resources to help improve care delivery, the more connected and collaborative they can become.

Organization Type	Organizations	Meaningful partnership and engagement
Private Sector	Broad and sustained engagement with the vendor community (e.g., EMR, HIS, virtual care, clinical collaboration, patient engagement, HIE, cloud vendors) through existing channels (e.g., Infoway Partnership Conference, InfoCentral, collaborations with TECHNATION, Digital Health Canada)	Mobilization of industry in support of digital health modernization programs will require the balanced orchestration of regulations (e.g., prohibiting information blocking) as well as economic incentives and disincentives, combined with meaningful engagement to simulate vendors to implement capabilities that meet interoperability and other requirements essential to achieve program objectives and benefits. Having vendors at the table, consulted in a meaningful way, is key to successfully achieving the objectives of the Shared pan-Canadian Interoperability Roadmap, while enabling vendors to enhance their solutions once, and avoid rework due to inconsistent requirements and standards across the country. Infoway will ensure early and frequent engagement with industry to create an inclusive culture and formal mechanisms to: • Incorporate industry's input in defining priorities and timelines that are practical and feasible • Foster co-operation, participation and consultation on the design of clinically relevant and value-based solution enhancements for vendors to implement in stages • Allow vendors to adequately plan, budget and commit resources to adopt pan-Canadian data and exchange standards, and to complete compliance testing on these prior to their deployment
Data and Standards Experts	Organizations including but not limited to: • Canadian Standards Association CSA Group • HL7 International, Gender Harmony Project • Integrating Healthcare Enterprise Canada	Data and standards experts offer critical subject matter expertise and support for the collaborative to establish person-centric health systems that use standardized data standards, terminology, and data exchange standards to enable meaningful health care and health system information to be shared and leveraged by the individual, clinical care teams, analytical systems and policy makers. As part of the work of the Data and Standards Communities, clinical input and input from those with lived/living experience is regularly sought to ensure the definition and standardization of data and exchange standards can be meaningfully, efficiently and effectively shared. Standardization is a key enabler for learning health systems and for their associated benefits to be fully realized.

Organization Type	Organizations	Meaningful partnership and engagement
Other Leading Countries	For example: • USA • Australia • Switzerland • UK • New Zealand	To ensure Canada advances interoperability while accelerating time-to-value, it is necessary that Canada engages with and learns from other leading countries that have a proven track record of advancing interoperability. With specific respect to establishing a national trust framework, countries like the U.S. have enabled patient health information sharing at scale across private and public health systems.

4. Patient and Provider Personas





Current State

Leela: Transitioning to Long Term Care

I'm 90 years old and have advanced dementia, chronic obstructive pulmonary disease (COPD) and congestive heart failure (CHF).

I've been living with my family, but they are struggling to provide me with the care I need. I'm moving to a long term care (LTC) home.

Missing information and failed faxes cause delays to my transition to an LTC home where I can receive the level of care I require.

Leela is ready to transition from home to an LTC facility.

Care coordinator requests documentation and faxes form to general practitioner (GP).

DELAY 1 + 3 DAYS

GP is on vacation with no locum coverage. Forms not completed.

DELAY 2 + 8 DAYS

GP returns, but is missing key information from Leela's recent visit to the hospital, including specialist notes and medication changes. He can't complete the form and requests the information.

DELAY 3 + 4 DAYS

Information recieved. GP faxes completed form, but one page doesn't go through.

Leela's family experiences anxiety and frustration as a result of the delays.

It's been 20 days and my family and I are still waiting for my application to be completed. The care I need is delayed causing my family anxiety.

Canada Health Infoway

The Promise

Leela: Transitioning to Long Term Care

Integrated electronic systems enable me to transition to an LTC facility with fewer delays by ensuring my care team has all the information they need to care for me properly.

Leela is ready to transition from home to an LTC facility.

Care coordinator submits form electronically to GP.

+ 1 DAY

The request is automatically referred to an available GP at the clinic. The covering GP completes the prepopulated form in the electronic medical record (EMR), attaching hospital visit patient summaries, medication lists, specialists notes and more. The completed form is returned to the care coordinator.

Care coordinator shares the completed form with the LTC care team. They now have all the information they need to provide Leela safe care. They can also connect with her family GP and specialist.

Leela's family is relieved Leela can now get the care she needs.

With connected care, Leela can get the level of care she needs much sooner and save her family a lot of worry.

Canada Health Infoway

Current State

Fujiko: Inter-provincial Traveller

I'm 65 years old and live in a small urban centre in Canada. My primary language is Japanese and I speak limited English.

I have rheumatoid arthritis and coronary artery disease which are being managed by medication. I'm taking a short trip to a neighbouring province with a friend. I take a number of medications but decide to only bring enough doses to last the duration of my trip, leaving a few behind.

I experience shortness of breath and light headedness and am taken to the local emergency department (ED).

Lack of access to my medical records leads to information gaps which inadvertently puts my health at risk.

Fujiko is taken to the ED.

Emergency Department

The ED team is unable to access Fujiko's health records. Fujiko has difficulty communicating with the ED team due to a language barrier. She shows the ED team the prescriptions she has in her purse, though these are not all the medications she takes.

+ 2.5 HOURS

Working in the Dark

The ED team does not have access to Fujiko's health history or full medication list but manage to get Fujiko's symptoms under control.

+ 1.5 DAYS

An Unexpected Turn

Unfortunately Fujiko's condition takes an unfortunate turn for the worse due to a drug toxicity that was initially undetected. Fujiko is transferred and stabilized in the Critical Care Unit. The care team investigates further, contacting her family physician's office for a more complete history.

While I'm stable now, my care team does not have a holistic view of my health, and is not sure how to best provide safe and effective care without my full history and list of medications.

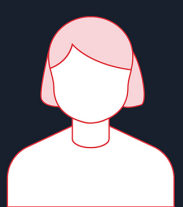
To avoid further adverse events, decisions will need to be delayed until my family physician is reached.

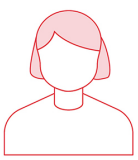
Canada Health Infoway

The Promise

Fujiko: Inter-provincial Traveller

With access to my medical records and health history, my care team is able to provide informed, safe and effective care.





Fujiko is taken to the ED.

+ 1.5 HOURS

Emergency Department (ED)

Despite challenges with communicating directly with the ED team due to a language barrier, Fujiko provides them with access to her electronic health information. The ED team is able to access Fujiko's complete health history, including a recent angiogram/stent report, specialist consultations, medication list and allergies.

+ 1 HOUR

Informed Decisions

With an understanding of Fujiko's history, the ED team is able to determine Fujiko's condition isn't cardiac in nature and prescribe a new medication for her, safe in the knowledge it won't interact adversely with her current medications.

Fujiko is able to stay connected with her health information even when she is travelling. The ability to access a patient's medical records and health history improves the quality, safety and effectiveness of clinical care.

Canada Health Infoway

Current State

Dr. Abbas: A Clinician's Experience

I'm a family physician practicing in a small urban centre about one hour from a large hospital.

I'm often unable to get a full picture of my patients' visits to hospitals, emergency departments or specialists due to missing records or delays in receiving them.

I'm caring for Emma, a 77-year-old female who suffered a stroke and has just been discharged from the hospital. This is a life-changing event for her.

I've spent a lot of time trying to get a hold of Emma's complete health records to develop a proper care plan and ensure she receives appropriate follow-up services.

Emma's Care Plan

Dr. Abbas does not have access to Emma's hospital discharge summary and referrals to inform her care plan.

10 + DAYS

Hospital Visit Record & Medication List

Dr. Abbas learns from Emma's son that many of her meds were changed, but is unable to access the updated medication list. He is also unable to access Emma's hospital discharge summary. His team faxes the hospital for the records, but doesn't receive a response.

Specialist Follow-up

Dr. Abbas is unable to find a referral for Emma to see a neurologist or outpatient stroke clinic. Emma's son doesn't remember hearing about one either and hasn't received an appointment.

Dr. Abbas's team fax an urgent referral, but do not receive any confirmation for an appointment or a receipt of the referral. A second fax also goes unanswered.

Home Care

Dr. Abbas learns Emma has not been connected to home care yet and faxes a referral. The referral is rejected days later, because the electronic medical record (EMR) has an old referral format on file.

Administrative Burden

I have spent a lot of time trying to get Emma the post-discharge care she needs, but I'm still waiting on hospital records and trying to confirm whether referrals for services have been made.

I would like to spend less time looking for records, so that I can focus my efforts on discussing Emma's health condition and care plan with her.

Canada Health Infoway

The Promise

Dr. Abbas: A Clinician's Experience

I'm able to electronically access Emma's detailed hospital report and referrals in near real time. I'm able to review these records in advance of meeting with Emma.

I can focus my time providing Emma with direct care, helping her and her son better understand and manage her long term health and answering their questions rather than searching for records. This also frees up time for me to see other patients.

Patient Digital Access

Before leaving the hospital, Emma and her son sign up to access her health records electronically. Emma makes an appointment with Dr. Abbas.

NEAR REAL TIME

Dr. Abbas Accesses Emma's Info

Dr. Abbas receives a notification of Emma's recent ED visit and notes an appointment has been made. He is able to access Emma's health information, including her test results, a reconciled medication list, a discharge plan and referrals.

Emma's Care Plan

Emma has her appointment with Dr. Abbas. With Emma's information available to him, he is able to answer Emma and her son's questions and guide her post-stroke care plan.

With all of Emma's health information available in near real time, Dr. Abbas is able to spend more time guiding Emma's post-stroke recovery, rather than searching for scattered records. Her specialists are also able to access her history, ensuring they avoid medication conflicts and unnecessary duplication of tests.

Canada Health Infoway

5. Trust Framework – Hypothesized Components

Hypothesized Components of a Pan-Canadian Trust Framework

Principles

- Common set of foundational principles for policies and practices to facilitate data sharing, including admissibility criteria

Governance Approach

- Working structure that all parties agree to (via the common agreement) for all entities to maintain the Common Agreement and Framework documents that enable participants to share health information with each other

Common Agreement

- Legal contract that all parties sign to establish the model and governing approach for all entities to share health information with each other

Standards of Practice

- Standard operating procedures for topics such as:
  - Governing council
  - Advisory groups
  - Conflicts of interest
  - Dispute resolution
  - Privacy and security

Technical Framework

- Describes the functional and technical requirements and technical specifications that a Health Information Network needs to fulfill in order to share data under the common agreement

Conformance Criteria

- Ensuring entitles have the ability to perform the required functions of a Health Information Network and demonstrated resources and infrastructure to support a reliable and trusted network

6. Key Performance Indicators and Maturity Models – DRAFT

Data sources available	Some data sources TBD

Ultimate Outcomes for Canadians KPIs		
	Areas of Measurement	**Measurement Indicators**
Ultimate Outcomes	Timely information to inform care Better clinical collaboration and transitions of care Informed and empowered patients Enriched data to inform health system planning Innovation	• Clinician reported satisfaction, efficiency impacts, impacts on availability of information, safety impacts (% agreement) • Patient reported satisfaction, trust, time savings, empowerment/ literacy, ability of self manage, avoided visits (% agreement) • Change in completeness, accuracy and timeliness of clinical communication (partner data, primary research) • Impacts on health system capacity, including workforce productivity and health system utilization (partner data, primary research) • Application of patient summary data for health system planning (#, case studies)
Data Portability KPIs		
	Areas of Measurement	**Measurement Indicators**
Intermediate Outcomes	Patient summaries standardized, available	• % patient records meeting minimum patient summary requirements (by setting, data type) • Data is being contributed to CIHI or other health data partners (TBC) (maturity levels TBC)
Immediate Outcomes	Technology: Upgraded Electronic Record Systems	• # Vendors or clinicians with upgraded solutions adhering to minimum patient summary requirements • % market share deployed upgrades (enabled / activated)
	Behaviour: Clinicians capture and share standardized data	• % Clinicians (by role/setting) reporting standardized data capture • % Clinicians reporting ability to do basic practice management functionality • % Clinicians with skills/ supports/ incentives/ workflows to enable effective data capture

Provider Access to Patient Data KPIs		
	Areas of Measurement	**Measurement Indicators**
Goal	Provider Access to Patient Data	• #/% Clinicians routinely using health information from other settings (by setting, data type, mode of access)
Immediate Outcomes	Technology: Solutions available, health data accessible	• % patient records meeting minimum patient summary requirements available to clinicians (by setting, data type, mode of access) • # Vendors or clinicians / % market share with deployed (enabled/activated) /upgraded solutions adhering to minimum patient summary requirements • Clinician access solutions live and available (% population)
	Behaviour: Seeking information	• % Clinicians (by role/setting) reporting access to patient data • % Clinicians with skills/ supports/ incentives/ workflows to routine use of data
Patient Access to their Information KPIs		
	Areas of Measurement	**Measurement Indicators**
Intermediate Outcomes	Canadians accessing their own information	• #/% of Canadians accessing comprehensive record (by data type, data sources, functionality) • # Enrolled or active users of patient access initiatives • #/% Transactions or visits (per user, by data type, data source)
Immediate Outcomes	Technology: Solutions available, health data accessible	• Patient access solutions live and available (% population) • Functionality and patient summary scope (data type, data sources)
	Behaviour: Patient awareness, incentives, context	• % Canadians reporting they have accessed their information • % Canadians who want access to their health information • % Canadians reporting skills nationally • % reporting barriers or disincentives • # Canadians uptake of change programs

Care Coordination and Collaboration KPIs		
	Areas of Measurement	**Measurement Indicators**
Intermediate Outcomes	Clinicians securely exchange digitized patient summaries	• # Enrolled or active users of secure exchange projects (by use case, service type) • #/% transactions electronic (by use case, service type) • #/% transactions adhering to minimum patient summary requirements (by use case, solution)
Immediate Outcomes	Technology: Upgraded clinical systems and available services	• % Market share with solutions conforming to exchange specifications (by use case, e.g., e-referral) • # Clinicians with updated systems • # Clinicians with services available (by service, e.g., e-referral)
	Behaviour: Clinicians with knowledge, skills and incentives	• % Clinicians reporting they do securely exchange digitized patient summaries • % Clinicians reporting skills nationally • % Reporting barriers or disincentives • # Clinician uptake of change programs
Initiative Performance Measurement KPIs		
	Areas of Measurement	**Measurement Indicators**
Activities and Outputs	Pan-Canadian Roadmap	• P/T commitment to roadmap (# / % pop) • Partner confirmation of suitability of roadmap (CIHI, Clinician groups, vendors, etc.)
	Vendor Mobilization Program	• # Vendors / % vendor market share (or # vendors) products conformed to minimum patient summary requirements, • # Vendors / % vendor market share demonstration of core use cases
	Standards and Functions	• Standards availability for all patient summary requirements, in alignment with CIHI • Downloads of content (#), • P/T inclusion of standards in procurements (# / % pop)

	Areas of Measurement	Measurement Indicators
Activities and Outputs (cont.)	Common Procurement	• P/T participation in procurement development (# / % pop), • P/T use of common procurement (#, % relevant procurements) • # Vendors / % vendor market share engaged
	Change initiatives	• Clinicians and/or Canadians in scope of initiative (reach) • PT readiness assessment (policy, etc.)
	Solution deployment projects	• PT Commitment (% pop) • Canadians/clinicians in scope of project (reach)
	Trusted Exchange Model	• Partners declaring support for model (CIHI, P/T, Clinician groups, vendors, etc.)
	Pan-Canadian Interoperability Governance	• P/T, Clinical and Vendor declarations of commitment to patient summary and transaction standards (# / % pop) (pan-Canadian interoperability approach) • Timely execution of multisectoral initiatives

Building Block Maturity	Ideal State
Building Block #1: **pan-Canadian Health Data Content Framework (pCHDCF) on FHIR**	CA Core+ agreed upon by all key stakeholders
Building Block #2: **Consistent Data Semantics**	PS-CA uses a common semantic standard agreed upon by all key stakeholders
Building Block #3: **Data Matching**	Standardized approach to matching and common data standards across all required elements
Building Block #4: **Modular, Standardized Service Capabilities**	Pan-Canadian reference architecture in place for large scale, structured, and standardized integrations across P/T that has been agreed upon by all key stakeholders
Building Block #5: **Consistent Secure Health Information Exchange Protocols**	PS-CA uses a common exchange standard agreed upon by all key stakeholders
Building Block #6: **Provider Directories**	Directory infrastructure in place that allows key systems to connect with one another
Building Block #7: **Health Care Directories and Resource Location**	Directory infrastructure in place that allows key systems to connect with one another
Building Block #8: **Consistent Patient Access**	Patients can access, from a single source, multiple elements of their health record across a number of care settings
Building Block #9: **Industry-Wide Testing, Compliance, and Conformance Infrastructure**	Pan-Canadian conformance assessment and testing that enable vendors to test and scale their solution across P/T
Building Block #10: **Digital ID & Identity Proofing**	A singular identification and authentication process for patient and provider access to health records across care settings
Building Block #11: **Consistent Representation of Consent & Policy**	A standardized system that can interpret policy and digital consent regulations across P/T
Building Block #12: **Scalable Data Sharing Governance Framework**	Pan-Canadian Data Sharing Governance Framework that defines the requirements for scalable data sharing agreements and brings the key stakeholders, with defined roles and responsibilities, to the table

7. Pan-Canadian Interoperability Governance

CIHI & Infoway - Interoperability Gover

Pan-Canadian Interoperability Governance Jurisdictional Scan

This report presents findings from an international scan of governance structures from several global entities to better understand their current interoperability initiatives and governance model(s) for shared data standards. Research was completed through a combination of desktop research and interviews. It involved the following six countries: Australia, Denmark, Israel, New Zealand, United Kingdom, United States.

Implementing Interop_Gov. 2023.pd

Implementing an Approach for Pan-Canadian Interoperability Governance

This document is presented to provide background information on the proposed digital health and data interoperability governance approach, and its alignment with the overarching pan-Canadian Health Data System (PCHDS) governance structure that is currently being contemplated by the federal government.

8. Digital Health Vendor Mobilization Scan and Recommendations

Vendor Mobilization is the orchestration of market dynamics through various levers, combined with meaningful engagement, to stimulate vendors of software solutions to implement capabilities that meet interoperability and other requirements essential to achieve digital health transformation objectives and benefits. This report provides actionable recommendations to mobilize vendors more effectively, acting as a unified market.

Infoway is undergoing discussions with provinces and territories on the report recommendations, aiming to arrive at a cross-PT consensus on an initial harmonized action plan for the 2023-24 fiscal year.

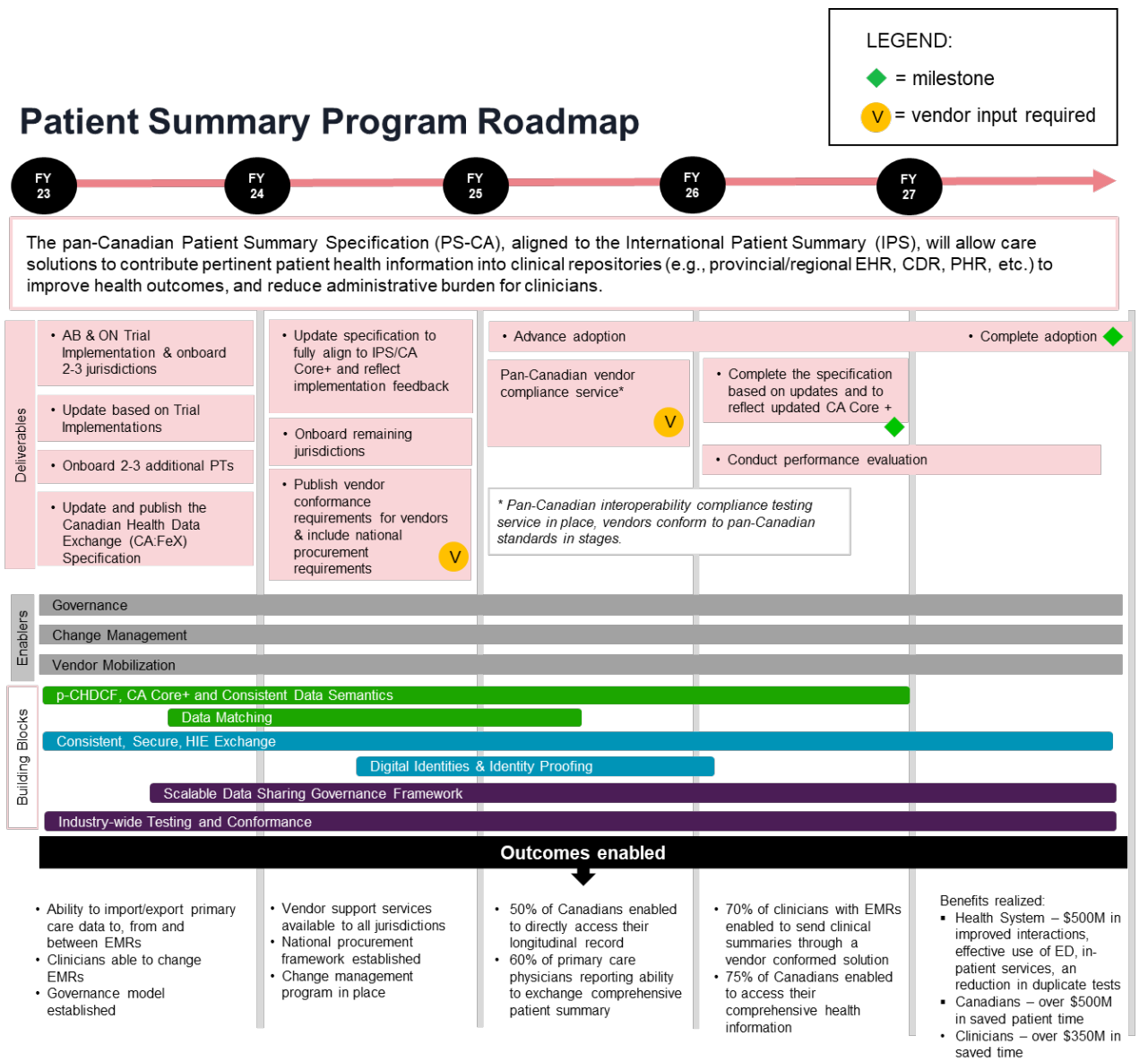
Digital Health Vendor Mobilization Scan anc

Executive Summary

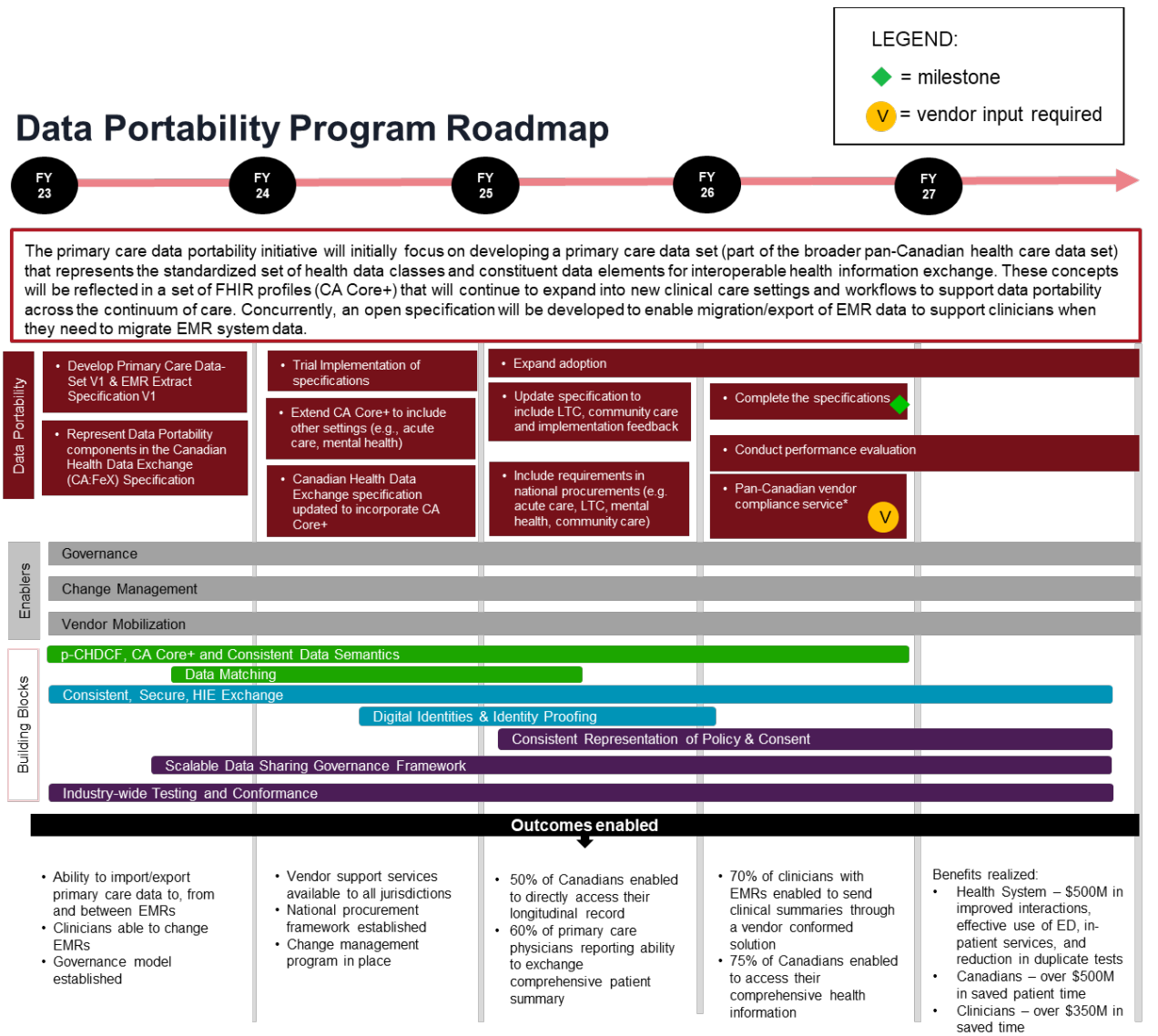
Digital Health Vendor Mobilization Scan anc

Full DRAFT Report

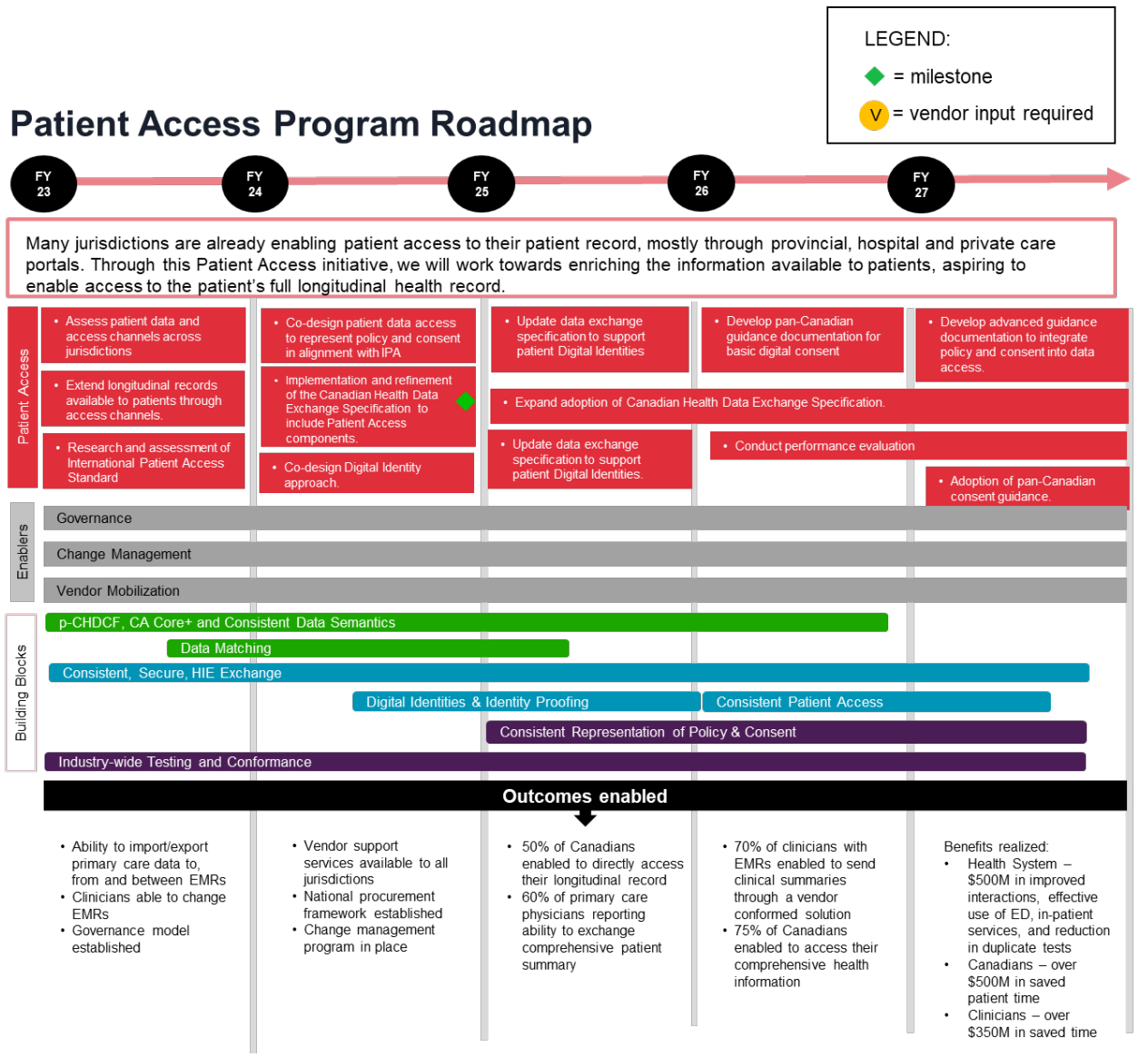
9. Near-Term Initiatives – DRAFT Roadmaps

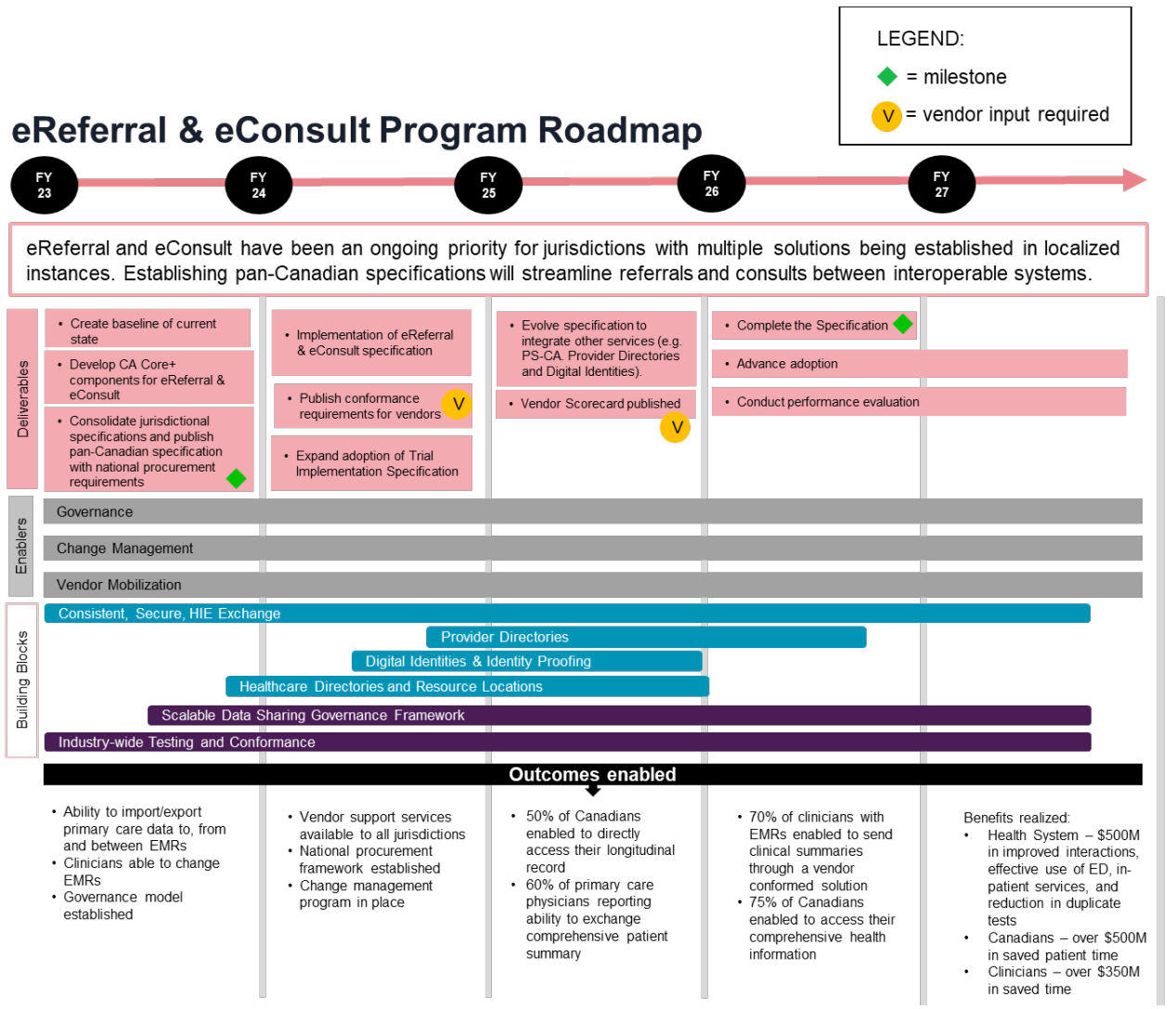


Data Portability Program Roadmap

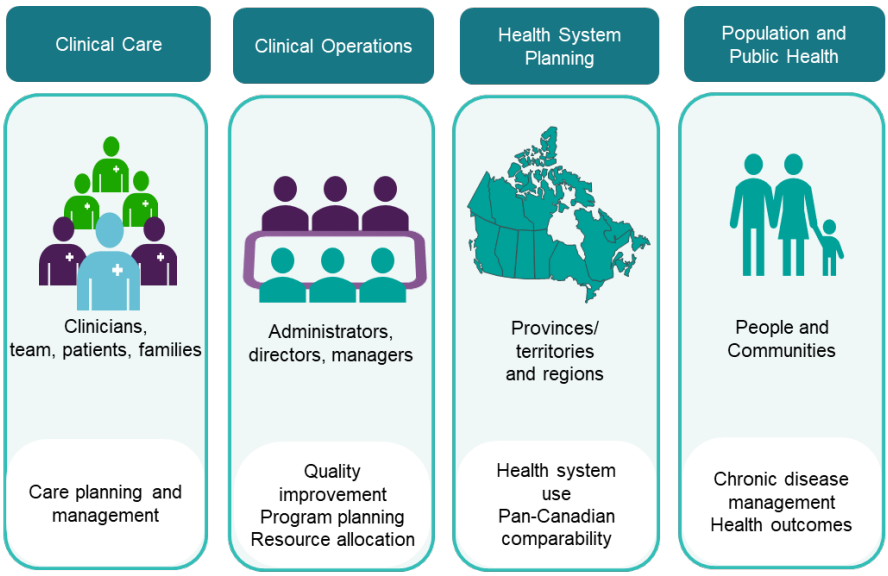


Patient Access Program Roadmap




LEGEND:
= milestone
V = vendor input required
eReferral & eConsult Program Roadmap
FY 23
FY 24
FY 25
FY 26
FY 27
eReferral and eConsult have been an ongoing priority for jurisdictions with multiple solutions being established in localized instances. Establishing pan-Canadian specifications will streamline referrals and consults between interoperable systems.
Deliverables
Create baseline of current state
Develop CA Core+ components for eReferral & eConsult
Consolidate jurisdictional specifications and publish pan-Canadian specification with national procurement requirements
Implementation of eReferral & eConsult specification
Publish conformance requirements for vendors
Expand adoption of Trial Implementation Specification
Evolve specification to integrate other services (e.g. PS-CA. Provider Directories and Digital Identities).
Vendor Scorecard published
Complete the Specification
Advance adoption
Conduct performance evaluation
Enablers
Governance
Change Management
Vendor Mobilization
Building Blocks
Consistent, Secure, HIE Exchange
Provider Directories
Digital Identities & Identity Proofing
Healthcare Directories and Resource Locations
Scalable Data Sharing Governance Framework
Industry-wide Testing and Conformance
Outcomes enabled
Ability to import/export primary care data to, from and between EMRs
Clinicians able to change EMRs
Governance model established
Vendor support services available to all jurisdictions
National procurement framework established
Change management program in place
50% of Canadians enabled to directly access their longitudinal record
60% of primary care physicians reporting ability to exchange comprehensive patient summary
70% of clinicians with EMRs enabled to send clinical summaries through a vendor conformed solution
75% of Canadians enabled to access their comprehensive health information
Benefits realized:
Health System – $500M in improved interactions, effective use of ED, in-patient services, and reduction in duplicate tests
Canadians – over $500M in saved patient time
Clinicians – over $350M in saved time

10. Enabling Primary and Secondary Use



Implementation of health data standards produces information that can be used:

- ✓By patients and families, to engage in care planning
- ✓By clinicians and care teams, to inform and manage care provision
- ✓By organizations, to inform quality initiatives and management of resources to drive continuous improvement efforts
- ✓By the health system, to inform resource allocation, benchmarking and health outcomes by planners and policy-makers

CIHI ICIS

Canada Health Infoway

Get in touch

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