

A Modern Data Architecture for Health Workforce Planning in Canada

Key Messages:

- This is the first publicly available modern data architecture for pan-Canadian health workforce planning
- Many parts of this architecture are well under way in Canada – but are occurring in siloes
- Adoption of a modern data architecture for health workforce planning would decrease data collection burden, allow real-time data analytics for decision-makers, and improve health care and system outcomes as per the quintuple aim

Background:

- Data pipelines are commonly used to automate data collection, processing and reporting, but this approach has not been implemented in Canadian health systems
- Examples of health data pipelines:
 - o US Centers for Disease Control Data Modernization Initiative pilot data pipeline for public health¹
 - o European Health Data Space²
- In Canada, the processes of hospital electronic data extraction (Gemini), minimum data standards (CIHI, CHWN), standard terminology and interoperability (CHI, CIHI), and interactive dashboards (Toronto Region Primary Care Workforce Planning Toolkit, DocForce, NS Action for Health) are already happening^{3,4}

Methodology:

- Literature review and environmental scan
- Expert stakeholder consultations
- Conceptualization of the data architecture

Results:

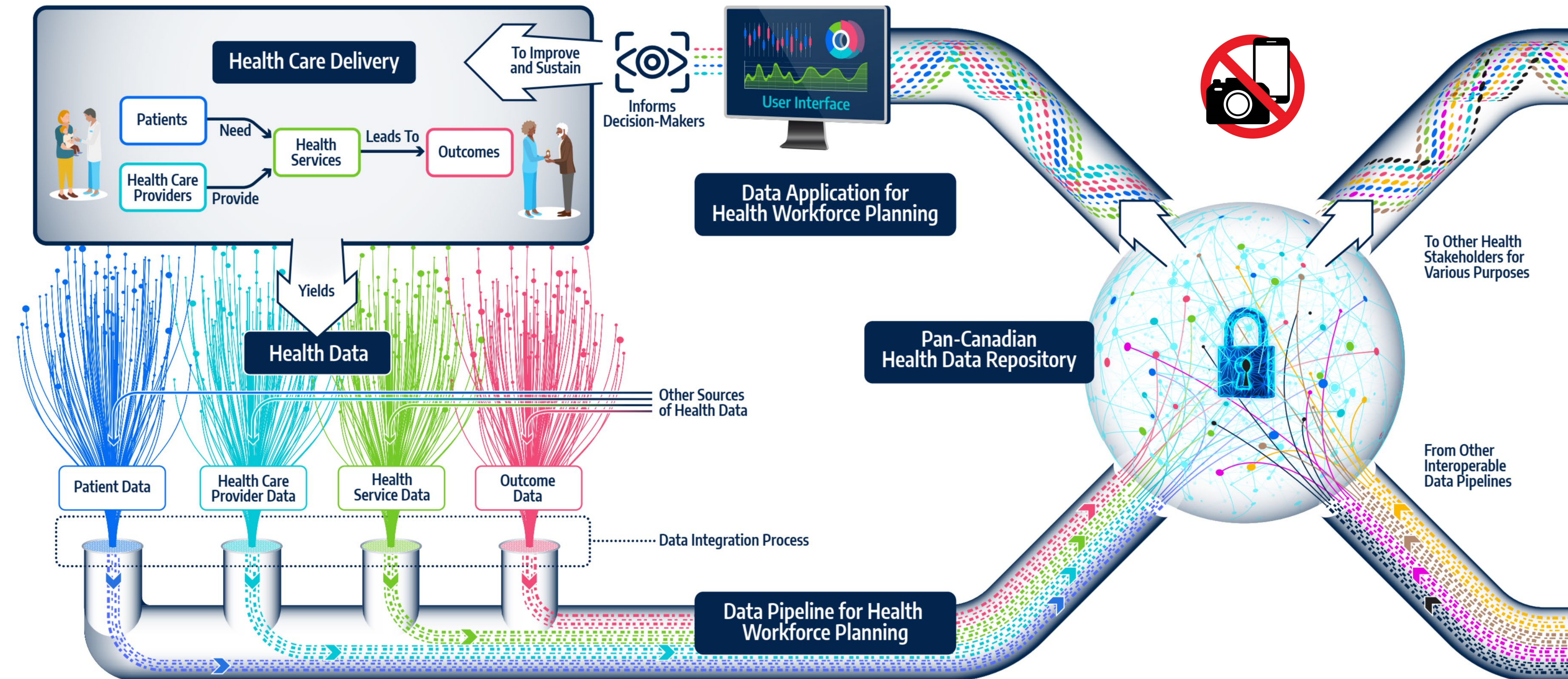


Figure 1: A modern data architecture for health workforce planning

Health Care Delivery generates data regarding who received what health service from whom, when, where, how and why, along with outcomes. **Health Data** related to patients, health care providers, health services, and outcomes – from health care delivery and other sources – undergo data integration, including standardization using purpose-built interdisciplinary minimum data standards, as they flow into a **Data Pipeline for Health Workforce Planning**. The data pipeline leads to a secure **Pan-Canadian Health Data Repository**. Health data in the repository are accessible through an encrypted cross-platform compatible **Data Application for Health Workforce Planning** which allows for aggregation, analysis, and real-time data queries and visualizations, according to user needs. Decision-makers are thereby empowered with fit-for-purpose tools allowing them to make informed decisions to improve and sustain public health care delivery.

Discussion:

- This data architecture for health workforce planning addresses deficits in the current system, including lack of comprehensive, granular, timely, standardized and interoperable health workforce and system data that are accessible and usable for fit-for purpose planning scenarios
- The use of a building block approach and international data terminology and exchange standards will allow for modularity and flexibility and make the processes sustainable over time
- Key opportunities include: Ensuring inclusive and equitable design, including interdisciplinary (allied) health care providers, using common standards for interoperable data pipelines, hosting a national health application, incorporating tools to assist stakeholders in engaging with planning
- Enablers of implementation include data governance legislation, minimum data standards, vendor mobilization and sustainable funding

Resources & References:

1. Murray, M. et al. (November 2022) A Prototype of Modernized Public Health Infrastructure for All: Findings from a Virginia Pilot https://github.com/CDCgov/phdi/blob/main/publications/DMI_VAWhitePaper_V3.pdf
 2. European Health Data Space <https://www.european-health-data-space.com>
 3. Goel, V. et al (May 2022) Pan-Canadian Health Data Strategy: Toward a world class health data system <https://www.canada.ca/content/dam/phac-aspc/documents/corporate/mandate/about-agency/external-advisory-bodies/list-pan-canadian-health-data-strategy-reports-summaries/expert-advisory-group-report-03-toward-world-class-health-data-system>
 4. Canada Health Infoway (May 2023) Shared Pan-Canadian Interoperability Roadmap <https://www.infoway-inforoute.ca/en/component/edocman/6444-connecting-you-to-modern-health-care-shared-pan-canadian-interoperability-roadmap/view-document?Itemid=103>
- Abbreviations:** CHI = Canada Health Infoway; CIHI = Canadian Institute for Health Information; CHWN = Canadian Health Workforce Network; NS = Nova Scotia