



# Canada's Health Workforce Digital Research Infrastructure Ecosystem:



**Building the Foundation  
for Canadian Health  
Workforce Science &  
Informed Decision-Making**

# Canada's Health Workforce Digital Research Infrastructure Ecosystem:

Building the Foundation for Canadian Health Workforce Science & Informed Decision-Making

Submitted by the Canadian Health Workforce Network

## Current State of Health Workforce Science in Canada

Health workers are the foundation of all health systems and as such, robust health workforce science is critical to making the best decisions about this essential human resource. Health workers account for more than 10% of all employed Canadians and over 2/3 of all health care spending, not including the personal and public cost to their training. That amounts to \$175 billion in 2019 or nearly 8% of Canada's total GDP.<sup>1</sup> Despite the critical role the health workforce plays in society, health workforce research secures less than 3% of health services and policy research funds,<sup>2</sup> and investments in necessary data infrastructure from governments have not materialized. As a result, Canada lags behind comparable OECD countries including the UK, Australia and the US in terms of health workforce data and digital analytics.<sup>3</sup> The significant gaps in our knowledge about the health workforce have been exposed during the COVID-19 pandemic causing systemic risks for planners to manage during a health crisis.<sup>4</sup>

Deficiencies in health workforce science and evidence-informed planning stem from a number of limitations in health workforce data. Poor quality health workforce data lead to inadequate health workforce intelligence. We also lack the kinds of digital tools to represent those data in a manner that can best support policy decision-making across Canada. Absent timely and relevant health workforce intelligence, decision-makers cannot optimally deploy health workers to where, when, and how they are most needed. It is also critical to know where healthcare resources are needed to reach individuals and communities. Thus, the consequences of poor health workforce data and science range from sub-optimal health workforce utilization to poor population health outcomes. This situation is remediable with strategically targeted investments by the NDIRO.

### *What are the main DRI tools, services and/or resources?*

At present, a complex web of health workforce stakeholders gather health workforce data at the federal, provincial/territorial, regional/health authority, hospital/clinic and local educational institution levels. These stakeholders reflect historical legacies regarding the governance of healthcare in Canada. Canada's health workforce system also involves a range of government and non-governmental actors in domains that address the education, accreditation, funding, regulation, practice and deployment of health workers. At every level, data are collected that reflect the inputs, activities and outputs of these organizations. These data are largely not aligned causing inefficiencies in both the submission and utilization of these data to inform critical system decisions. Best practices in the gathering of health workforce data are to collect once for multiple purposes.

---

<sup>1</sup> Source: Estimated from the National Health Expenditure Data, CIHI, 2019

<sup>2</sup> [Pan-Canadian vision and strategy for health services and policy research: 2014–2019](#). CIHR IHSPR 2014:1–36.

<sup>3</sup> [Poor health workforce planning is costly, risky and inequitable](#). CMAJ, 191(42), E1147-E1148.

<sup>4</sup> [Crisis underscores that health workers are backbone of health system](#). Hill Times, April 7.

As the pan Canadian organization for health data and analytics, the Canadian Institute for Health Information (CIHI) has a remarkably small health workforce team with the unenviable task of synthesizing disparate data collected by various stakeholders in the provinces/territories and processing these data into reports on the Canadian health workforce. Health workforce data gathered and processed at CIHI focus primarily on basic headcounts and limited demographics (age and binary sex), with the exception of physicians, where billing data is submitted by some jurisdictions. CIHI has very little control over the content, format, and quality of the data that are submitted. CIHI's health workforce reports are profession-specific and say little about how health workers function as teams in the provision of patient care. This is woefully inadequate.

Little has been done at CIHI or elsewhere to develop data infrastructure and advance research that illuminates the contributions of the range of health workers along "real world" patient care pathways. Understanding and improving integrated vertical and horizontal care continuums requires enhancements to existing health workforce data such that they uniformly capture: *diversity* (e.g., racial and Indigenous identity and a more inclusive definition of gender), *practice setting* (e.g., hospital inpatient vs hospital outpatient vs emergency department vs clinic in the community vs home care vs other), and *practice characteristics* (e.g., scope and full-time equivalence or service capacity). These are necessary for meaningful health workforce science and decision-making. Moreover, health workforce data must be linkable to relevant patient information, including healthcare utilization and outcome data. These linkages are necessary to better understand patient health conditions, the range and characteristics of health workers caring for patients, the types of care they provide, and the outcomes experienced by patients. Advances in health workforce science and planning require each of these components.

#### *Primary challenges accessing and using the DRI tools, services and/or resources?*

**First**, comprehensive Canadian health workforce data that reflect critical measures of activity and participation rates as well as diversity indicators are remarkably absent. **Second**, the availability of health workforce data is highly variable across jurisdictions and professions. **Third**, the lack of standardization and interoperability of available health workforce data severely limits interprofessional and cross-jurisdictional analyses necessary for the full development of health workforce science and analytics on one hand and planning and decision-making on the other. Beyond issues of data availability, when data are available, administrative, temporal and financial barriers of access to health workforce data limit the feasibility and productivity of planning exercises. These limitations have become particularly salient during the COVID-19 pandemic, causing both the CIHR Institute of Health Services and Policy Research and CIHI to identify health workforce data infrastructure as a key priority.

#### *What else is missing?*

Canada needs a centrally coordinated health workforce data, analytics and science infrastructure, addressing a critical gap that has been readily acknowledged for over a decade. In contrast to many of its OECD counterparts, Canada has no designated health workforce agency, despite being recommended by the 2010 [Parliamentary Standing Committee on Health](#) and several stakeholder organizations that provided testimony to the committee. The absence of central coordination and implementation of

integrated health workforce data, analytics, and planning activities, combined with the diffuse governance responsibilities inherent in a federated system, leaves us with blurred lines of responsibility and poorly coordinated efforts. Given that other comparable jurisdictions (such as Australia and NZ) have found solutions to these issues,<sup>5</sup> this persistent deficit is inexcusable.

## Future Digital Research Infrastructure in Support of Health Workforce Science

*What is your vision for a cohesive Canadian health workforce DRI ecosystem?*

Our vision for a cohesive Canadian health workforce digital research infrastructure ecosystem in support of more robust health workforce science and decision-making has two key elements:

- 1) an inclusive, interprofessional, cross-jurisdictional, fit-for-purpose health workforce minimum data standard co-developed and adoptable across a range of health workforce data stewards; and
- 2) a range of digital tools to enable
  - a. health workforce data stewards to collect more standardized health workforce data across a range of health workers; and
  - b. health workforce decision-makers to make more timely, targeted & evidence-informed decisions.

*What are the types of DRI tools, services and/or resources required?*

A number of digital research infrastructure tools, services and resources could support this vision.

**First**, DRI tools in the form of **standardized digital data collection platforms** could enable the rapid adoption of a re-envisioned and fit-for-multiple-purposes health workforce minimum data standard (MDS). Health workforce MDSs typically contain a coherent set of explicitly defined data elements on demographic, educational and practice characteristics. Key diversity data, such as racialization, Indigeneity and disability, required by Federal Employment Equity legislation (currently in the process of being updated) but presently absent in health workforce datasets in Canada. Setting a common definition of required data and coordinating data collection across professions, sectors and jurisdictions may be challenging but is becoming increasingly important in learning health systems. A health workforce MDS is foundational to more accurate and effective health workforce planning and evidence-based decision-making. Harmonized and standardized pan-Canadian datasets would enable more integrated planning, allowing for the production of plans that reflect more optimized allocation of services across the full range of health workers. There are tremendous economies of scale and scope that can be achieved with central coordination.

**Second**, DRI tools in the form of **interactive health workforce dashboards** could synthesize health workforce data from multiple sources and visualize it in different ways across workers and geographic regions in support of a range of decision-making scenarios for different health workforce stakeholders. These interactive tools could be leveraged to help these stakeholders understand how inputs and outputs change under different scenarios, such as changing population demographics and health needs and changing availability and scope of different health worker groups. Evidence-informed scenario analyses

---

<sup>5</sup> [The need for a pan-Canadian Health Human Resources Strategy](#). In [Toward a Healthcare Strategy for Canadians](#).

could help stakeholders better navigate uncertainty in health workforce planning and support decision-making with the highest quality data available. Prototypes of these tools are in the developmental phase.<sup>6</sup>

*What challenges do you foresee while using integrated DRI tools, services and/or resources?*

We anticipate some challenges will emerge in the development and implementation of these standardized DRI tools, none of which are insurmountable. Articulating these new digital infrastructure tools with existing tools services and resources will require attention to interoperability as well as intellectual property. Different types of privacy legislation governing the work of data stewards will need to be addressed. This challenge could be supported by a commissioned legal review and set of suggested amendments to legislation, regulation and organizational by-laws, paralleling existing reviews with regard to patient data. It is also critical that the agenda drives the tools (rather than the opposite) and that appropriate attention be given to stakeholder engagement to ensure the development of flexible systems that allow tailoring to local and occupational needs as well as changes over time.

### **Strategic Investment in the Health Workforce DRI Gap would be Transformative**

*How do you see NDRIO's role in addressing current gaps in the health workforce DRI ecosystem?*

Strategic investment into Canada's health workforce digital research infrastructure could dramatically transform the current costly, inefficient, and inequitable ecosystem that entails enormous risks to patients, populations, health workers and system responsiveness, into a state-of-the-art health workforce science and decision-making infrastructure. Not only would these strategic investments enable Canadian health workforce scientists to build local research and knowledge user capacity, this infrastructure would also attract international health workforce scientists to Canada, expanding international collaborations and accelerating our learning and the development of knowledge, tools and services. Strategic investment by the NDRIO into Canada's health workforce digital research infrastructure would also attract broader digital and analytic capacity from other sectors in support of advancing health workforce data transformation into digital decision-support tools.

*What tools, services and resources should NDRIO leverage to achieve your desired future state?*

Strategic investment by the NDRIO into Canada's health workforce digital research infrastructure would serve to galvanize stakeholders across the complex system of health workforce data stewards and knowledge users, leveraging their often-expressed desire for a more rational and coordinated health workforce data infrastructure. The desire for this type of digital infrastructure has not tempered since the submissions many made to the 2010 Parliamentary Standing Committee on Health, but rather, calls for this type of infrastructure have amplified in light of the importance of the workforce to our pandemic response.

### **Centralised & Coordinated Support for Health Workforce Data, Analytics & Science**

Since 2011, the Canadian Health Workforce Network (CHWN) supports integrated knowledge exchange between health workforce researchers, decision-makers and other knowledge users. Initially supported

---

<sup>6</sup> Data Visualization for Integrated Health Workforce Planning (2020) Canadian Health Workforce Conference.

through a contribution agreement from Health Canada from 2011-13, it was one of two competitively awarded CIHR network catalyst grants from 2012-15. In its 10 years, CHWN has created a growing network of national expertise drawn from the research, professional, clinical, legal/regulatory, managerial and policy communities across key sectors and health workforce themes, supported by international advisors with the International Health Workforce Collaborative.

CHWN gathers and exchanges knowledge among the health workforce research and decision-making communities through its website and its organization of the biennial Canadian Health Workforce Conference in 2014, 2016, 2018 and 2020, co-hosted by CIHI. The expertise of CHWN scientists has been harnessed through a number of commissioned reports in support of a range of health workforce policy initiatives at the regional, provincial/territorial and federal level. Most recently this has included a white paper for CIHI on their health workforce data holdings and tools. CHWN also supports a number of competitive research grants for Tri-Council funding. We are a small scientific community that punches significantly above its weight.

CHWN is well-placed to appreciate the strengths and limitations of the health workforce data infrastructure in Canada and build on targeted investments by the NDIRO to make significant advances in health workforce science and decision-making. CHWN has become the first point of contact for many individuals and groups seeking health workforce information in support of health system decision-making.

### Supplementary Documents for Additional Background

**Bourgeault, I.,** Simkin, S., & Chamberland-Rowe, C. (2019). [Poor health workforce planning is costly, risky and inequitable](#). *CMAJ*, 191(42), E1147-E1148. DOI: 10.1503/cmaj.191241

**Bourgeault, I. & Bartram, M.** (2020). [Improved mental health access tied to workforce capacity](#). *Hill Times*, Oct 7.

**Bourgeault, I.,** Simkin, S., & Chamberland-Rowe, C. (2020). [Crisis underscores that health workers are backbone of health system](#). *Hill Times*, April 7.

Sim, J., Gupta, N., & **Bourgeault, I.L.** (2020). [Health-worker deaths from COVID-19 not just about the numbers](#). *Toronto Star* Sept. 4<sup>th</sup>

**Bourgeault, I.L. & Huyer, G.** (2016). [What kind of health workforce will be needed to serve our aging population?](#) *The Hill Times Policy Briefing: Canada's Aging Society*. June 6, p. 33.

**Bourgeault, I.L.,** Demers, C. & **Bray, E.** (2015) [The need for a pan-Canadian Health Human Resources Strategy](#). In S. Carson, K. Nossal & J. Dixon (Eds), *Toward a Healthcare Strategy for Canadians*, MQUP.

This white paper was prepared by **Ivy Bourgeault** ([ibourgea@uottawa.ca](mailto:ibourgea@uottawa.ca)) University of Ottawa Chair in Gender, Diversity and the Professions on behalf of CHWN, with additional contributions from: **Geoff Ballinger**, Manager, Physician Information, Canadian Institute of Health Information; **Brenda Gamble**, CHWN Healthy Work Environments Lead, Ontario Tech University; **Neeru Gupta**, CHWN Equity, Diversity and Inclusion Lead, University of New Brunswick; **Gayle Halas**, Rady Chair, Interprofessional Collaborative Practice, University of Manitoba; **Lindsay Hedden**, Assistant Scientific Director, BC Academic Health Science Network; **Kate Leslie**, CHWN Governance and Regulation Lead, Athabasca University; **Sarah Simkin**, CHWN Health Workforce Planning Lead, University of Ottawa; **Steve Slade**, Director of Research, College of Family Physicians of Canada; and **Arthur Sweetman**, Ontario Research Chair in Health Human Resources, McMaster University.