Réseau de recherche sur les données de santé du Canada
Health Data Research Network Canada

HEALTH DATA RESEARCH NETWORK CANADA AND COVID-19
BRIEFING NOTE — MAY 28, 2020

ISSUE

The organizations that make up Health Data Research Network Canada (HDRN Canada) hold population-wide health data and have a role to play in accelerating, and increasing the quality of, COVID-19 analytics, predictive models and research studies.

NEW DEVELOPMENTS AND STATUS AS OF MAY 28, 2020

(substantive changes relative to last update in **blue bold font**)

- Some HDRN Canada organizations have linkable COVID-19 test results data
  - Four (4) provinces (NL, AB, **MB,** ON) have COVID-19 test result data integrated into their data platforms
  - BC and **NL** are beginning to process COVID-related data access requests, and will be able to provide COVID-19 test results data to researchers
  - Multiple other HDRN Canada organizations are in discussions about obtaining COVID-19 test result data

- We are gathering information about COVID-relevant data holdings (Table 1) and resources (Table 3), including:
  - **CIHI's COVID 19 intervention scan provides comprehensive information for key policies and interventions across federal, provincial and territorial governments. The scan covers case finding and management, physical distancing, health workforce, health services, and travel restrictions as well as contextual information, such as the timing of spring breaks. The scan is in the form of a table that lists the date measures were first announced or implemented in each province, intervention details and a link to an official source. The scan is updated regularly and will be released on CIHI's website. An early version can be requested by emailing CPHI@cihi.ca**
  - **Through a partnership between the Newfoundland and Labrador Centre for Health Information (NLCHI), the Department of Fisheries and Land Resources and the NL Stats Agency, a [COVID-19 Data Hub](https://covid-19-newfoundland-and-labrador-gnl.hub.arcgis.com) has launched that provides accurate and timely information and data about the COVID-19 pandemic. This page is updated daily and includes an interactive map of the distribution of COVID-19 cases across the province, graphs displaying the spread of the virus, and information on the number of cases, hospitalization, recoveries, deaths, and tests completed. ESRI named this initiative their app for the month for May. Available at: https://covid-19-newfoundland-and-labrador-gnl.hub.arcgis.com**

- HDRN Canada organizations are also gathering information about COVID-related analytics applications, predictive models and research studies that use jurisdiction-wide or population-wide data (Table 2).
  - Thus far, **21** different types of COVID-related analytics/research have been identified, comprising more than **47** individual analyses/models/studies

This briefing note will be updated ~ biweekly. Additional information, including a link to register to receive future updates is at hdrn.ca/en/covid.

HDRN CANADA AND COVID-19

The organizations that make up HDRN Canada create and manage population-wide health and health-related data infrastructure that is used by a network of hundreds of expert analysts and researchers across Canada.

If/when HDRN Canada organizations are able to link COVID-19 test results with existing data platforms, it will be possible to have more meaningful interpretation of COVID-19 data. For example, in addition to counting/forecasting the number of COVID-19 cases, we will be able to draw upon decades of experience to add a layer of analyses/understanding related to health conditions, demographic factors and prior health system utilization. HDRN Canada can also play a role in bringing together collaborators on COVID-19 analytics, predictive models and research studies so that they include multiple provinces and territories.

Table 1: Key data holdings at HDRN Canada Organizations

Legend: ■ = Population-wide coverage; ▨ = Less than population-wide coverage; plan = Linkage and integration planned not yet implemented

	BC[1]	AB	SK	MB	ON[2]	QC	NB	NS	NL	CIHI	STC
COVID-19 TEST RESULTS DATA	■	■		■	■				■		
HEALTH ADMINISTRATIVE DATA											
Acute care hospitalizations	■	■	■	■	■	■	■	■	■	■	■
Ambulatory clinic visits	■	■	■	■	■	■	■	■	■	▨	■
ED visits	■	■	■	■	■	■	▨	■	■	▨	■
Physician claims	■	■	■	■	■	■	■	■	■		
Prescribed medications	■	■	■	■	▨	▨	■	■	■	▨	
Home care	■	■	■	■	■		plan		plan	▨	
Continuing care	■	■	■	■		■	■		■	▨	
OTHER HEALTH DATA											
Vital statistics	■	■	■	■	■	■	■	■	■		■
Primary care EMR	▨	▨		▨	▨	▨	▨	▨	▨	▨	
Cancer registry	■	■	■	■	■	■	■	■			■
PREMs and PROMs	▨	▨	▨							▨	
Genomics	▨				▨	plan			plan		
Lab and imaging	▨	▨	▨	▨	▨	plan	▨	plan	■		
SOCIAL DATA											
Education	■			■		▨	■	▨	▨		■
Immigration	■			■	■		■				■
Workers compensation	■						▨				
Early childhood development	■			■			■				
	BC	AB	SK	MB	ON	QC	NB	NS	NL	CIHI	STC

LEGEND AND NOTES:

■ = Population-wide coverage

▨ = Less than population-wide coverage

plan = Linkage and integration planned not yet implemented

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[1] A survey of BC researchers identified high-priority data sets, all of which will be available for approved COVID-19-related projects. This includes: 1) COVID-19 testing data, individual-level for both those positive and negative, 2) Fee-for-service physician payments (MSP), 3) Hospital separations (Discharge Abstract Database, or DAD), 4) Emergency Department visits (NACRS), 5) Prescription pharmaceuticals (PharmaNet), 6) Deaths (Vital Statistics), Other data sets are under discussion. (Update 2020 04 22)

[2] ON COVID test results are near-real time and being integrated with other data that are being made available with increased frequency. As of May 11, 2020 data include daily COVID test data linkable to Ontario's data repository and weekly feeds of emergency department triage data.

Table 2: Examples of COVID-related Analytics, Predictive Models and Research Studies and the Jurisdiction/ Population-wide Data Being Used[3] (substantive changes relative to last update in **blue bold font**)

	Type of Analysis/Model/Study	Main Data/Datasets	Jurisdiction(s)/ Organization(s)
1	**Health System Capacity Planning Tool to support decision-makers in understanding expected health resource demands and supply shortfalls related to the COVID-19 pandemic. See Information Sheet on CIHI's COVID-19 page**	SEIR model as the foundation, utilizing publicly available COVID case information	CIHI
2	COVID-19 predictive modelling, <u>multiple studies active/being initiated</u>, including using of machine learning for modelling	COVID-19 test results positive and negative, age, sex, location, hospital admissions, deaths	NL, ON, AB, MB[4]
3	Relationship between COVID-19 test results and outcomes for patients with comorbidities; <u>multiple studies are active/being initiated</u> including cardiovascular related diagnoses (e.g., HF, AMI, AFib, other arrhythmias, chronic IHD), chronic kidney disease, neurodegenerative diseases and other conditions	COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data	AB, ON
4	Investigating the potential association between medications and adverse COVID-19 outcomes; <u>multiple studies are active/being initiated</u> including studies of the effect of angiotensin converting enzyme inhibitors (ACE) inhibitors, angiotensin II receptor blockers (ARBs), statins, NSAIDS/anti-inflammatories, hydroxychloroquine, and associations between drug exposure and coronavirus detection	COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data	AB, ON, MB
5	Relationship between COVID-19 test results and health resource use (e.g., hospitalization, ICU admission, long term care (LTC) and primary care) **and association with outcomes during current and prior pandemics for specific diseases (e.g., cancer)**	COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data, **cancer diagnosis and associated treatment databases**	AB, ON, MB
6	Analyses of who is being tested for COVID-19 terms of demographics, geography, comorbidities, live at home or in LTC, SES, and other factors	COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data	ON, AB, MB

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[3] The examples provided here do not constitute a complete list of all work in Canada. These are the analyses, predictive models and research studies that are known to HDRN Canada organizations as of the date of this briefing note, generally because they make use of population-wide health and health-related datasets held by HDRN Canada organizations. Please contact info@hdrn.ca if you would like to add to this list, or if your jurisdiction is interested in performing similar work or collaborating to expand the number of provinces/territories involved in an analysis/model/study

[4] It is likely that most other provinces and territories are also undertaking modeling that does not involve data held by HDRN Canada organizations

	Type of Analysis/Model/Study	Main Data/Datasets	Jurisdiction(s)/ Organization(s)
7	Study examining blood-type and association with coronavirus and SARS like illness	Laboratory data, DAD, NACRS	ON
8	Study examining duration of viral shedding at confirmation of COVID infection	COVID-19 test results	ON
9	Analyses of the effect of COVID-19 on elective procedures	DAD, NACRS, physician and other practitioner billing, vital statistics	ON, AB, MB
10	Analysis of the effect of COVID-19 on wait times (first study is on cardiac wait times)	DAD, NACRS, physician and other practitioner billing, vital statistics	ON
11	Using prior influenza work to assess utility of OLIS lab test results data for studying respiratory virus epidemiology	DAD, NACRS, physician and other practitioner billing, vital statistics, Rx drug data, OLIS data as possible complement or substitute for other respiratory virus laboratory data	ON
12	Prevalence of COVID-19 comorbidity risk factors by age group	DAD, NACRS, physician and other practitioner billing, vital statistics	ON, AB
13	Analyses related to ICU capacity; <u>multiple studies are active/being initiated</u> including, ICU admissions, most common elective diagnoses/procedures and demographic factors resulting in ICU admission, # of ventilators)	DAD, NACRS, physician and other practitioner billing, vital statistics	NL, ON
14	Analyses related to hospital capacity (e.g., ED usage, hospitalizations, admissions from LTC, most common elective diagnoses/procedures resulting hospital admission)	DAD, NACRS, physician and other practitioner billing, vital statistics	ON, AB
15.	Analysis of admissions for vascular events and medication adherence during COVID-19	COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data	ON
16.	Analys**es** related to impact of pandemic on quality of care for cardiovascular patients, **including use of tools to reduce mortality and unplanned harm**	Cardiac procedures data, COVID-19 test results, DAD, physician and other practitioner billing, vital statistics, available Rx drug data	ON, **AB**
17.	Analys**es** of association between surgeries and infection rates and outcomes pre/post pandemic	Cancer diagnosis and associated treatment databases, COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data	ON
18.	**Impact of pandemic on economic activity in health-care sector**	**DAD, NACRS, OHIP**	**ON**

	Type of Analysis/Model/Study	Main Data/Datasets	Jurisdiction(s)/ Organization(s)
19.	**COVID-19 impact on vulnerable populations**	**COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data**	**ON**
20.	**COVID-19 during peripartum period and infant health**	**COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics**	**ON**
21	**Analysis of impact of COVID-19 on specific age groups**	**COVID-19 test results, DAD, NACRS, physician and other practitioner billing, vital statistics, available Rx drug data**	**ON**

Table 3: Additional Resources and Applications at HDRN Canada Organizations (from west to east)

HDRN Canada Organization	Resource/Application and URLs where applicable
Population Data BC	Information on PopData support for COVID-19 research can be found at https://www.popdata.bc.ca/COVID-19_research_support
Saskatchewan Health Quality Council	HQC does not have access to any COVID-related data, but the Government of Saskatchewan has COVID data available on their public website.

HDRN Canada Organization	Resource/Application and URLs where applicable

CIHI	In addition to the analyses/models/studies noted in Table 3, CIHI is leading multiple pan-Canadian COVID-related activities, including exploring opportunities for access to near real-time hospital utilization data—aggregate and record level. The best resource for all CIHI-led work is https://www.cihi.ca/en/covid-19-resources; links to select key resources are/will be included below.
	
	• WHO approved ICD codes for use in Canada:
	   ○ (February 24, 2020) ICD-10-CA Coding Direction for Confirmed COVID-19 Cases
	   ○ (March 26, 2020) ICD-10-CA Coding Direction for Suspected COVID-19 Cases
	   ○ (April 2, 2020) Capturing COVID-19 Diagnoses in the NRS
	   ○ (April 2, 2020) Capturing COVID-19 Diagnoses Using interRAI Assessments in Long-Term Care, Home Care and Inpatient Mental Health
	   ○ **(April 30, 2020) ICD-10-CA Coding Direction for COVID-19 in Obstetrics, and Updates on the Use of COVID-19 Laboratory Test Results**
	   ○ Infographic with **guidance on clinical documentation for confirmed and suspected cases of COVID**
	   ○ CIHI communicated this coding direction to coders in Canada on February 24, 2020.
	• **(May 13, 2020) COVID-19 coding direction released for dialysis patients and transplant recipients in the Canadian Organ Replacement Register (CORR)**
	• **(May 21, 2020) Reporting COVID-19–Related Expenses using MIS Standards**
	• **(May 21, 2020) Estimating Planned Surgical Cancellation Due to COVID-19 using historical Data, summary and data tables, available via CIHI's COVID-19 page**
	• **CIHI's COVID 19 intervention scan provides comprehensive information for key policies and interventions across federal, provincial and territorial governments. The scan covers case finding and management, physical distancing, health workforce, health services, and travel restrictions as well as contextual information, such as the timing of spring breaks. The scan is in the form of a table that lists the date measures were first announced or implemented in each province, intervention details and a link to an official source. The scan is updated regularly and will be released on CIHI's website. An early version can be requested by emailing CPHI@cihi.ca**
	• Rapid analysis of at-risk populations in long term care and home care, resulting in a decision support algorithm for care providers, to support more immediate health system planning. CIHI released the COVID-19 comorbidity count algorithms for home care residents and long-term care residents to data providers and key stakeholders in April 2020. These are available upon request from CIHI at **help@cihi.ca**
	• A series of new data tables and analyses to monitor and analyze health system activity over time, demonstrating the baseline capacity and the subsequent the impact of COVID-19, sourcing multiple CIHI datasets (e.g., acute, ED, LTC, home care, physician billing, drugs). Specific products and release dates TBD.
	• Update to CIHI case grouping methodologies with COVID codes and looking at Population Grouper for forecasting (available: tentative end of April)

HDRN Canada Organization	Resource/Application and URLs where applicable
ICES	- ICES' Code for cleaning COVID-19 lab test results available under open source licence **here.** This code was developed through a collaborative effort by ICES and the Ministry of Health to identify COVID-19 cases in Ontario lab data consistently and accurately. - ICES has also made available open source code that enables a practical approach for population data quality assessment: the DataFit Toolkit is available **here.** - ICES published a public- facing report on COVID-19 testing in Ontario and associated dashboard that provides an overview of the sociodemographic and clinical characteristics of individuals tested and confirmed positive for COVID-19 in Ontario
NB IRDT	The New Brunswick Institute for Research, Data and Training (NB-IRDT) does not have linkable COVID test results data, but is performing COVID related studies/work: - Rapid response report on COVID-19 predictive modelling in New Brunswick: March 31, 2020 and April 14, 2020 – Open data (multiple sources) – NB - Rapid response report on dedicated resources for COVID-19: April 8, 2020 – Open data (PHAC) – NB - Rapid response report on lifting restrictions for COVID-19: April 16, 2020 – Open data (multiple sources) – NB - A project entitled "Planning for Community Resiliency in Recovery from COVID-19 in NB" was just funded by the New Brunswick Health Research Foundation/New Brunswick Innovation Foundation through a call for proposals on COVID-19 research

NLCHI	• COVID-19 Public Health Surveillance Application –designed for public health nurses to have a clinical documentation system to track suspected and confirmed cases of the virus. Built using VB.Net with an SQL Server Database, has already been shared with other provinces. Data capture includes COVID test results plus functionality for documenting contact tracing, travel exposure, risk factors, outcomes, symptoms, etc. NLCHI developed the application and has shared it with sites in ON (one site), BC (two sites trialing).
	• Provincial dashboard has been developed using data collected in the COVID Public Health tool and is automatically refreshed as data is entered into the tool. Dashboard also includes other available data (e.g. on hospitalizations) for individuals captured in the tool. The first release of the dashboard will include metrics such as cases by age and sex; daily, cumulative and active cases; # in self isolation; # hospitalizations, # deaths. The second release, will include additional information on symptoms, exposure, PUIs etc.
	• Employee Management Application - designed to assist Regional Health Authorities in managing employee exposure and or symptoms of the virus. Data capture includes COVID test results, employee demographics and work relationships, date absent and date of potential return, OHS call backs to employees, self-isolation or self-quarantine dates, and additional notes. Employee Application has been merged with Public Health Application. Separate provincial dashboard being developed with metrics from HR/OH&S perspective.
	• Swab Test Referral Application - designed to allow clinical telephone triage of patients into scheduling workflow for appointment booking. It is being used by both public health and occupational health in NL.
	• Negative Test Online Portal for Patients - secure website where patients can log in to see their negative test results (positive results are not currently available).
	• Personal Protective Equipment (PPE) Dashboard (New supply chain data developed in response to COVID-19). Captures N95, sanitizer, glove, mask, gowns and other info.
	• PPE Electronic Ordering Form
	• Virtual Care Telehealth Electronic Account Request Form – expedites the account request/approval/creation process for physicians wanting to use NL Virtual Care Telehealth program.
	• Virtual Care In Home Appointment Application - developed to allow physicians to easily schedule in home appointments with patients using the provincial telehealth technology platform.
	• COVID Lab Dashboard - Real-time view of testing being performed for Covid-19. Metrics on testing and results. Includes breakdown by RHA, age and sex and trending.
	• Assessment/Testing Clinics Dashboard – Includes number of scheduled appts, attended appts, canceled appt and no shows for COVID assessment & testing clinics. New clinics added as they come on.
	• Influenza Like Illness (ILI) Dashboard – Will provide ER visits and admits for ILI, daily trending, all ERs province wide.
	• **COVID-19 Data Hub**: **An online resource which provides accurate and timely information and data about the COVID-19 pandemic. The COVID-19 Data Hub is a partnership between NLCHI, the Department of Fisheries and Land Resources and the NL Stats Agency. This page is updated daily and includes an interactive map of the distribution of COVID-19 cases across the province, graphs displaying the spread of the virus, and information on the number of cases, hospitalization, recoveries, deaths, and tests completed. ESRI named this initiative their app for the month for May. Available at: https://covid-19-newfoundland-and-labrador-gnl.hub.arcgis.com/**

HDRN Canada Organization	Resource/Application and URLs where applicable
	• **Acute Care Report (Currently hardcopy 2x daily, automated dashboard under development): Inpatient and Critical Care Occupancy, Ventilator Usage, Admissions with Suspected COVID infections, Admissions with Confirmed COVID infections, discharges and deaths; number of employees on self-isolation, employees with confirmed COVID infections, number of employees recovered.**

BACKGROUND – ABOUT HDRN CANADA

HDRN Canada was created to make national, provincial and territorial health data accessible under strong governance so that data can be used for public benefit while privacy is protected. The more sites, provinces and territories that contribute health data to a study or analysis, the more we can learn about what is working well and what needs to change in our health systems.

Under HDRN Canada, federal, provincial and territorial organizations which hold health and health-related data for the entire population have come together to make it easier for researchers, analysts and policy makers to use data from multiple provinces and territories for benchmarking, research, health system planning and innovation (Figure 1). Many HDRN Canada organizations, have been responsible stewards of health and health-related

Figure 1: Some of the organization working together under HDRN Canada

data for decades. Individual HDRN Canada organizations have developed policies and practices to ensure the privacy of health data. For example, details like people's names, addresses and health card numbers are all removed or converted to confidential codes before vetted analysts and researchers are allowed to access data, and all HDRN Canada organizations have strict rules that all data users must follow.

In January 2020, HDRN Canada incorporated and launched the Data Access Support Hub (DASH) which has information about 380+ health and health-related datasets from across Canada to-date. HDRN Canada is setting up processes so that research studies can be performed through "distributed analysis." This is a proven way of doing data-intensive research that HDRN Canada will help spread and increase across Canada. Distributed analysis means that researchers send out their queries in the form of "code" which are applied to data held in multiple locations rather than requiring that the data "travel" to the location where the researcher is.

HDRN Canada activities are guided by the advice and values of patients and members of the public. The first major initiative of HDRN Canada is the SPOR Canadian Data Platform funded under Canada's Strategy for Patient-Oriented Research (SPOR). Before incorporation, HDRN Canada was called the Pan-Canadian Real-world Health Data Network (PRHDN).