



The Ontario Health Study:

A resource for cancer, disease and health research in Ontario and Canada

OICR Corporate Services

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What is the Ontario Health Study?

The OHS is a **longitudinal cohort study**, which involves sampling a group of study participants over time through questionnaires, biological samples, and other forms of data collection.

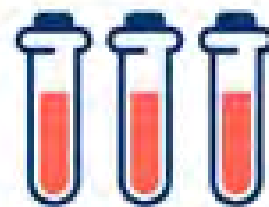
The Study examines how **lifestyle, the environment and genetics** affect people's health.

The OHS makes its data and biosamples of its **225,000 participants** available to researchers investigating cancer and other conditions.



225,000

Volunteer participants
across Ontario



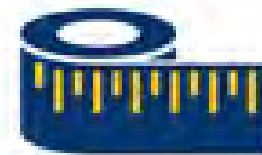
40,000

Non-fasting blood samples



12,600

Urine samples



13,400

Physical Measurements



3,100

MRIs

What is the Ontario Health Study?



Large-scale population health cohorts help assess disease risks.

As cohorts collect data on participants over time,

- some **develop diseases**,
- **some die** and
- some remain disease free.

Population laboratories are “invaluable for understanding gene-environment interactions in complex human disease.”*

Why is the OHS important?

- 3 in 5 adult Canadians have a chronic disease¹
 - Major chronic diseases cause two-thirds of all deaths annually in Canada²
- Chronic disease treatment consumes 67% of direct health care costs³
 - Costs the Canadian economy \$190 billion annually³
- 1 in 2 Canadians will develop cancer in their lifetime⁴
 - 1 in 4 will die of the disease⁴

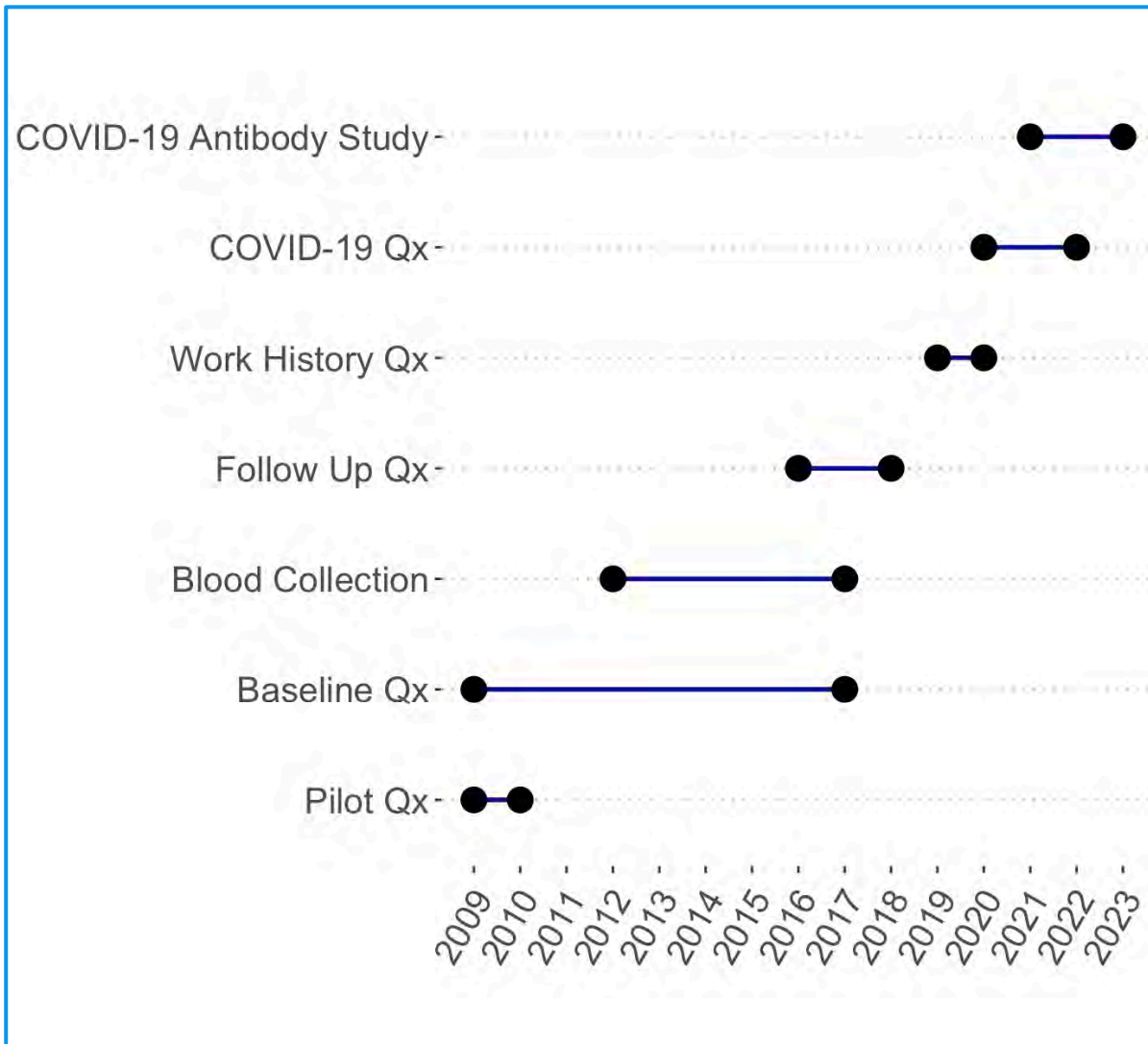
¹Elmslie, K (2016). Against the Growing Burden of Disease. Public Health Agency of Canada. Retrieved from <https://cagh-acsm.org/sites/default/files/resources/2016/10/elmslie.pdf>. Accessed 25 September 2023.









²Public Health Agency of Canada (2017). How Healthy Are Canadians? Retrieved from <https://www.canada.ca/en/public-health/services/publications/healthy-living/how-healthy-canadians.html>. Accessed 25 September 2023.

³Public Health Agency of Canada. Retrieved from <https://cagh-acsm.org/sites/default/files/resources/2016/10/elmslie.pdf>. Accessed 25 September 2023

⁴Canadian Cancer Statistics 2021. Retrieved from: www.cancer.ca/Canadian-Cancer-Statistics-2021-EN. Accessed 25 September 2023.

Detailed health and lifestyle information is routinely collected from OHS participants



-  Participant demographics
-  Health status
-  Medical history
-  Prescribed medication
-  Family health history
-  Anthropometric measurements
-  Working status
-  Household income
-  Behaviours (sleep, alcohol, tobacco, marijuana use, and e-cigarette use)

Health and lifestyle data in the OHS



Blood

General hematology	Hematocrit
Basophils	MCHC
Eosinophils	MCV
Lymphocytes	Packed cell volume
Monocytes	Platelets
Neutrophils	Red cells
White cells	RBCDW
Hb	HbA1C



Macro Measures

Cardiac function	Waist-hip circumference
Blood pressure	Depression
Lung function	Anxiety
Grip strength	Diseases / conditions
Weight	Imaging and MRI data
Height	
BMI	
Bioimpedance	



Environmental Measures

Smoking status	Income
Geographical location	Education level
Climate Measures	Rural / urban
Sun exposure	Siblings
Exercise / sedentariness	Medications
Residential history	Alcohol consumption
	Sleep

Linkages with OHS Data

188,000+ OHS participants recruited between 2009 and 2017 have been linked to Ontario Health and ICES data holdings



Ontario Health
Cancer Care Ontario

- Within OH holdings, the **Ontario Cancer Registry** captures:
 - Hospital admission and discharge information from CIHI
 - Pathology reports from hospitals and community labs
 - Consultation and treatment records of patients from regional cancer centres or their associated hospitals
 - Death certificates
- Incident cancer cases ascertained via record linkage and staged according to the TNM classification system



- Data sets available through ICES include:
 - Hospital Discharge Abstract Database (DAD)
 - National Ambulatory Care Reporting System (NACRS)
 - Continuing Care Reporting System (CCRS)
 - Ontario Drug Benefit Claims (ODB)
 - Ontario Health Insurance Plan Claims Database (OHIP)
 - Registered Persons Database (RPDB)
 - Ontario Cancer Registry (OCR)
 - Ontario Laboratory Information System (OLIS)

Part of Canada's largest population health research platform



The Ontario Health Study is the largest contributing member of **CanPath**, the Canadian Partnership for Tomorrow's Health.



CanPath is the sole Canadian representative of the **International HundredK+ Cohorts Consortium**, an association of large cohort studies.



OHS and OICR

- Part of OICR's mandate is to “enable research in Ontario and worldwide by building collaborative networks, securely sharing data, and making tools and resources available to the research community”.
- OHS is a unique research platform that offers investigators a ready-made platform to pursue their area of research.

Approved OHS Research Applications 2012-2023

- **Applications using OHS data: 59***
 - Applications investigating cancer: 21
 - Applications requesting biosamples: 5
 - Datasets requested: 57
- **ICES data linkage required: 19**
- **Ontario Health (Cancer Care Ontario) linkage required: 8**
- **Time to project approval (from a fully-complete application): ~60 days**

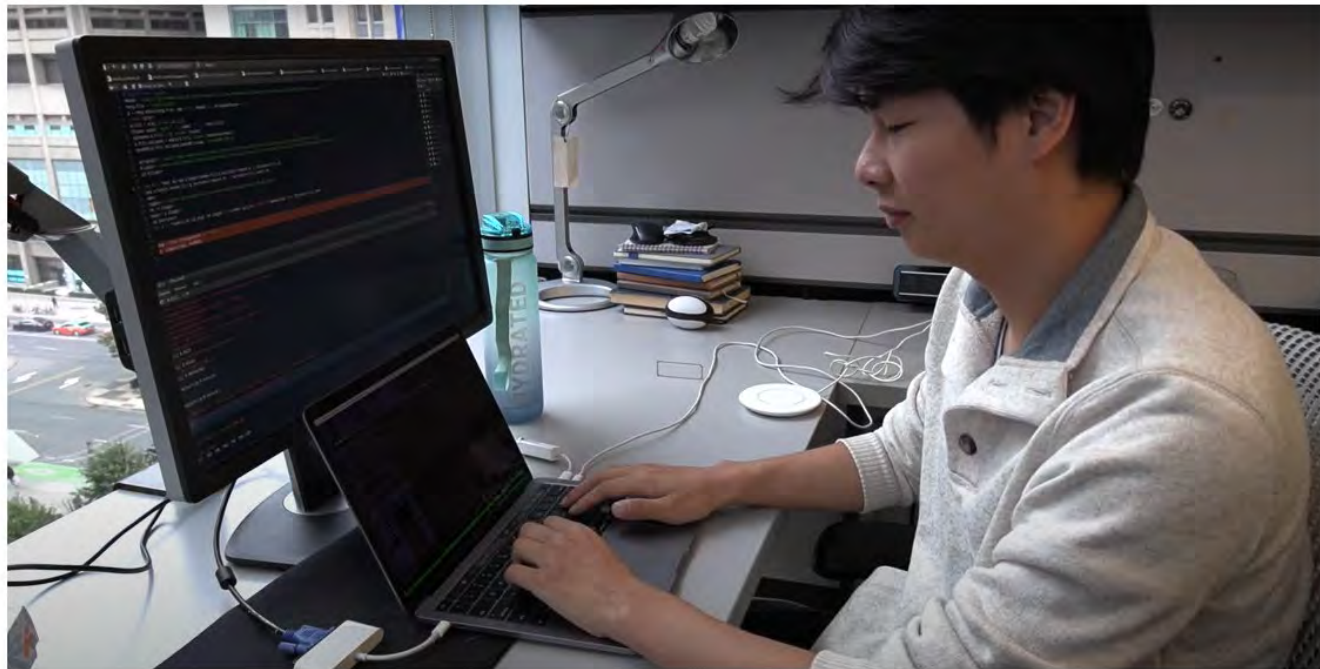
*Includes 19 applications to use OHS data via [CanPath](#)

OHS and OICR (Continued)

- Dr. Philip Awadalla is the Principal Investigator of the OHS, and co-leads CanPath as National Scientific Director
- The Awadalla Lab at OICR has several research projects going using OHS data:

PHD student using OHS data to look for early signs of cancer

Mar 3, 2023 // [Study Updates](#)



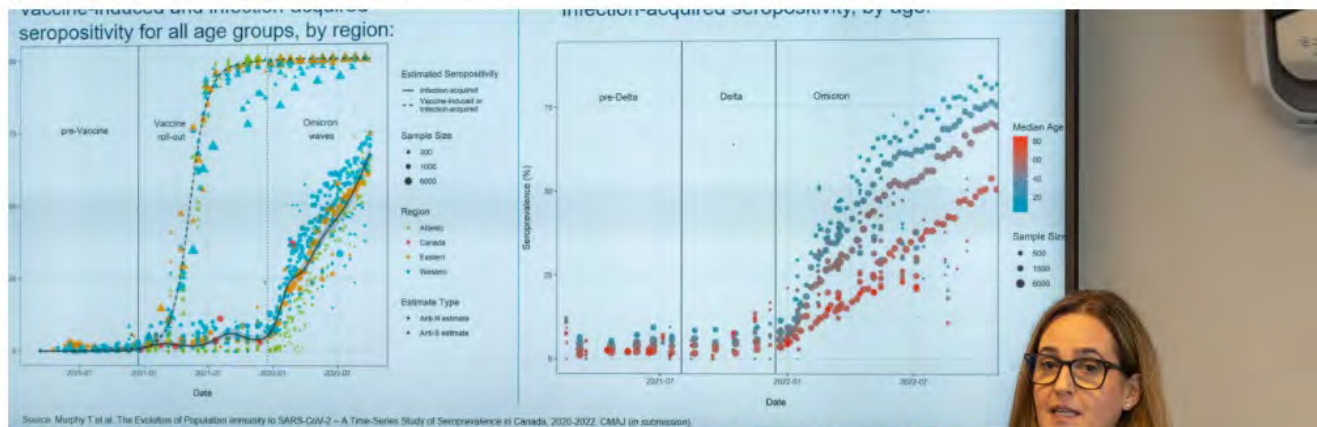
- Nicholas Cheng, a PhD student in the Awadalla Lab at OICR, used OHS data and biosamples to identify biomarkers in blood that allow for cancer detection up to **7 years earlier**



National research projects using the OHS Platform

Antibody Study shows a prior COVID-19 infection afforded protection against re-infection for 8 months

During the highly-infectious Omicron stage, a booster shot provided protection for just 4 months



CanPath

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Research

Research
The evolution of SARS-CoV-2 seroprevalence in Canada: a time-series study, 2020–2023

Tanya J. Murphy, Hanna Swati, Jaspreet Jahn, Maureen Anderson, Philip Awadalla, Lesley Beth, Patrick E. Brown, Carmen L. Charlton, Karen Colwell, Steven J. Drews, Anne-Claude Gingras, Deena Hershkov, Prashant Jha, Jamil N. Khan, Victoria A. Korsh, Amanda L.S. Lang, Marc-André Langlois, Stephen Lee, Antoine Lewis, Sheila F. O'Brien, Chantale Panzani, Kimberly Skead, David A. Stephens, Derek R. Stein, Graham Tipples, Paul G. Van Cesseste, Timothy G. Evans, Clivia Oxide, Bruce D. Mazur and David L. Buckridge
CMAJ August 14, 2023; 195(31):E1635-E1637; DOI: <https://doi.org/10.1503/cmaj.230249>

Article Figures & Tables Related Content Responses Metrics PDF

Abstract

Background: During the first year of the COVID-19 pandemic, the proportion of reported cases of COVID-19 among Canadians was under 6%. Although high vaccine coverage was achieved in Canada by fall 2021, the Omicron variant caused unprecedented numbers of infections, overwhelming testing capacity and making it difficult to quantify the trajectory of population immunity.

More than 2 million lines of data were analyzed for this study!

Research projects using the OHS platform

Is there a link between some physically demanding jobs and a risk for lung cancer?

OHS participant data well-suited to explore any connection

A Montreal researcher is using the Ontario Health Study to learn more about the impact that physical activity levels at work may have on a person's risk of developing lung cancer.

Lung cancer is a heavy burden in Canada – it is the most common cause of cancer death in the country and there are limited treatment options. Identifying modifiable risk factors for prevention is of interest to Professor in the Department of Social and Preventive Medicine at the University of Montreal.

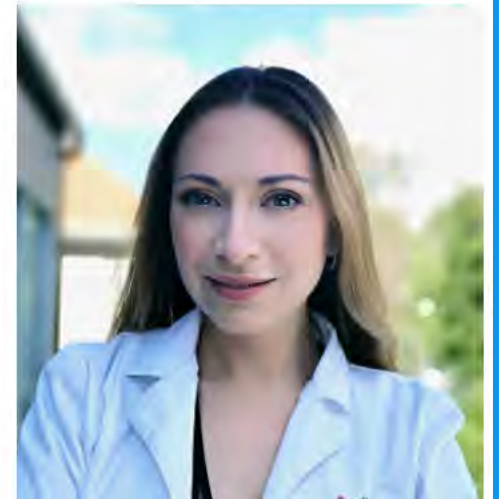
Many studies have shown that recreational physical activity can help to protect against lung cancer, but the science is less clear on work-related physical activity. Counterintuitively, some studies have shown that physically demanding jobs have a higher risk of lung cancer.

Maybe your job is setting you up for eczema or psoriasis

Questionnaire data provided by more than 36,000 OHS participants living with eczema or psoriasis are being used in a national study exploring whether certain jobs might predispose people to be diagnosed with these chronic skin conditions.

A dermatologist at McGill is using data from the research platform CanPath (of which the OHS is the largest contributor) to look at the impact of work on risks of having eczema, psoriasis, as well as lupus (systemic lupus erythematosus).

Dr. Elena Netchiporouk will be analyzing health questionnaire data about the types of jobs people performed, their work schedule, and whether certain exposures encountered at work may be associated with skin disease. Because the regional CanPath cohorts have followed their participants' health for years, CanPath was unique in offering her a wealth of details, from the age individuals were first diagnosed with skin disease, to which job they held prior to the diagnosis, and other work-related details such as irregular shift work (interrupted sleep stresses the body, and stress is a common trigger for eczema).



What's next?

- **More blood collection!**
- **Continued participant engagement**
- **Research community engagement**
- **CanPath's "Trusted Research Environment"**



Research, powered by volunteers



The OHS Team



How does our blood change as we age?



The OHS is made possible through:

Funders



Participants

The OHS thanks all its participants for generously donating their time, energy and data to make this research possible.



Visit us at www.ontariohealthstudy.ca