The Canadian Partnership for Tomorrow’s Health

Philip Awadalla, National Scientific Director
Canada’s largest population health research platform

CanPath is Canada’s largest population health study and a national platform for health research.

By studying the biology, behaviour and environments of over 330,000 Canadians for many years, CanPath is revealing hidden causes of common and rare chronic diseases and cancer.
Canada’s largest population health research platform

330,000+ Canadians + 7 Cohorts + 10 Provinces

Nationally harmonized data and biosamples are made available to researchers.
CanPath brings together seven cohorts across ten provinces

CanPath is hosted by the University of Toronto in partnership with the Ontario Institute for Cancer Research
National Leadership Team

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SUPPORT-Canada: A national COVID-19 serological surveillance study

Collection of COVID-19 related data and outcomes from over 100,000 Canadians

Longitudinal serological surveillance of SARS-CoV-2 antibodies in diagnosed, symptomatic, asymptomatic and susceptible Canadians

Supporting pre- and post-vaccine immune profiling
CanPath is well-positioned to study the serology of COVID-19 in high-risk groups.

Demographic breakdown of CanPath in relation to Canadian Population

- Jewish: 1.7% (CanPath) vs. 0.1% (Canada 2016 Census)
- East Asian: 3.2% (CanPath) vs. 0.6% (Canada 2016 Census)
- White: 76% (CanPath) vs. 72.9% (Canada 2016 Census)
- S. Asian: 5.6% (CanPath) vs. 2.4% (Canada 2016 Census)
- Aboriginal: 4.9% (CanPath) vs. 3.5% (Canada 2016 Census)
- Other: 4.6% (CanPath) vs. 4.6% (Canada 2016 Census)
- Black: 3.5% (CanPath) vs. 1.3% (Canada 2016 Census)
- Filipino: 2.3% (CanPath) vs. 0.5% (Canada 2016 Census)
- Arab: 1.5% (CanPath) vs. 0.7% (Canada 2016 Census)
- Latin: 1.3% (CanPath) vs. 0.8% (Canada 2016 Census)
- SE. Asian: 0.9% (CanPath) vs. 0.4% (Canada 2016 Census)
- W. Asian: 0.8% (CanPath) vs. 0.3% (Canada 2016 Census)

*East Asian and Jewish were not captured as unique categories in the Canadian census*

Priority populations (n=20,000)

- High prevalence regions
- Newcomers to Canada
- Self-declared Indigenous
  *With guidance from CITF Indigenous Advisory Circle*
- Long term care residents
CanPath baseline COVID-19 questionnaire designed to align with international efforts

- COVID-19 test result/ suspected infection
- Symptoms experienced (if any)
- Participant hospitalized or received medical care
- Current health status and risk factors for COVID-19
- Potential source of exposure
- Impact of pandemic on job status
- Impact of the pandemic on mental, emotional, social and financial wellbeing
Behavioral response to public health best practices (guidelines vary over qx)

Some precautions vary by groups:

Women are more likely to:

- wear masks (75% vs 69%)
- stay home (90% vs 84%)
- stock-up on essentials (69% vs 61%)
- avoid visiting with people outside the home (77% vs 71%)
Racial inequities of COVID-19

- Ethnic minorities were 2.1x more likely to be infected (95% CI: 1.34 – 3.14)

- Proportion of ethnic minorities responding to COVID-19 questionnaire is reduced in comparison to cohort demographics
Racial inequities of COVID-19

Socio-economic factors

- Loss of employment
- Reduced wages/hours
- Received financial gov't support
- Financial resources don't meet needs
- Worry about money
- Received psychological support

CanPath
• Nationwide women are overrepresented in industries — hospitality and food services, retail trade, educational services, health care and social assistance — most affected by closures, earnings losses and layoffs
• 61% of the essential workers are women
• Men and women have similar odds of contracting the virus: \( OR_{\text{women vs. men}} = 1.2 \) (95% CI: 0.82 – 1.85) but men face a higher risk of death, across the globe
Blood type and COVID-19 susceptibility

- Current body of evidence suggests that O and Rh- blood types may protect against infection, and possibly, severe COVID-19 illness
- SARS-CoV-2 may be reacting differently to surface factors and antibodies

<table>
<thead>
<tr>
<th>Blood type</th>
<th>N</th>
<th>%</th>
<th>Odds Ratio (95% CI)</th>
<th>Infection</th>
<th>Hospitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>9651</td>
<td>35%</td>
<td>1.12 (0.66 - 1.92)</td>
<td>0.66 (0.14 - 3.07)</td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td>1678</td>
<td>6%</td>
<td>0.48 (0.27 - 0.60)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3793</td>
<td>14%</td>
<td>1.60 (0.85 - 3.03)</td>
<td>0.39 (0.04 - 3.51)</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>12549</td>
<td>45%</td>
<td>Referent</td>
<td>Referent</td>
<td></td>
</tr>
</tbody>
</table>

- Effect size seen in other studies is small and shouldn’t undermine importance of other public health and therapeutic measures
Risk factors for severe COVID-19

Risk factors | N   | %    | Odds Ratio (95% CI)  |
--------------|-----|------|---------------------|
Older age (≧ 65 years) | 18021 | 43%  | 2.19 (0.64 - 7.43)  |
CVD           | 11598 | 28%  | 3.66 (1.05 - 12.81) |
Obesity (BMI ≧ 30.0) | 9204  | 25%  | 3.50 (1.00 - 12.21) |

- **Immune response** to the viral infection key and **immune function** declines with age
- **Chronic health** conditions have been associated with increased risk
- **Obesity** is the most significant risk factor, after only older age, for being hospitalized
### Symptoms, exposures and COVID-19 positivity

**Covid +ve:**
- 86% fatigue
- 83% shortness of breath
- 82% loss of taste
- 80% fever
- 80% headache
- 78% loss of smell
- 60% dry cough

<table>
<thead>
<tr>
<th>Symptom or Exposure</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection (+ve test)</td>
<td></td>
</tr>
<tr>
<td>Loss of smell (ref: no loss of smell, no fever, no headache)</td>
<td>78.3 (42.20 - 145.10)</td>
</tr>
<tr>
<td>Loss of smell &amp; headache (ref: no loss of smell, no fever)</td>
<td>101.80 (54.63 - 189.69)</td>
</tr>
<tr>
<td>Loss of taste</td>
<td>27.35 (3.5 - 212.92)</td>
</tr>
<tr>
<td>Fever (ref: no loss of smell, no headache)</td>
<td>12.0 (6.12 - 23.41)</td>
</tr>
<tr>
<td>Contact with a COVID-19 case</td>
<td>41.74 (27.81 - 62.67)</td>
</tr>
<tr>
<td>Medical worker</td>
<td>6.50 (4.20 - 10.0)</td>
</tr>
</tbody>
</table>
Chronic Comorbidities

Number of conditions currently being treated for

- 0: 59%
- 1: 23%
- 2: 4%
- 3: 4%
- 4+: 10%

<table>
<thead>
<tr>
<th>Condition</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Blood Pressure</td>
<td>10062</td>
<td>7767</td>
</tr>
<tr>
<td>Obesity (BMI ≥ 30)</td>
<td>9792</td>
<td>4969</td>
</tr>
<tr>
<td>Arthritis</td>
<td>1495</td>
<td>4629</td>
</tr>
<tr>
<td>Lung disease</td>
<td>4198</td>
<td>2458</td>
</tr>
<tr>
<td>Diabetes</td>
<td>2508</td>
<td>3680</td>
</tr>
<tr>
<td>Asthma</td>
<td>1064</td>
<td>1763</td>
</tr>
<tr>
<td>Cardiovascular Disease</td>
<td>2556</td>
<td>1900</td>
</tr>
<tr>
<td>Immunocomprised</td>
<td>433</td>
<td>707</td>
</tr>
<tr>
<td>Gastrointestinal disease</td>
<td>319</td>
<td>1310</td>
</tr>
<tr>
<td>Cancer</td>
<td>164</td>
<td>100</td>
</tr>
<tr>
<td>Liver disease</td>
<td>106</td>
<td>0.4%</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>130</td>
<td>0.3%</td>
</tr>
</tbody>
</table>
Medication Use

- **Ace-inhibitors**: 89%
- **Angiotension II Receptor Blockers**: 93%
- **NSAIDS**: 72%
- **Immunosuppressive or immunomodulatory**: 97%
- **Antivirals**: 99%

Legend:
- Orange: Currently taking each day
- Yellow: Taken before Jan 2020 but not currently
- Green: Taken during the pandemic but not every day
- Light blue: Non-user
Long-term effects of COVID-19 infection

- Most recover completely within a few weeks
  - 77% recovered mostly or completely
  - those not fully recovered reported persistent difficulties, some for more than 30 days, with 2-16 symptoms

Days to Recovery

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 7 days</td>
<td>16.9%</td>
</tr>
<tr>
<td>8-14 days</td>
<td>33.8%</td>
</tr>
<tr>
<td>15-29 days</td>
<td>35.21%</td>
</tr>
<tr>
<td>More than 30 days</td>
<td>14.08%</td>
</tr>
</tbody>
</table>

Symptom Recovery

- 77% completely/mostly/NA
- 12% a bit
- 9% not really
- 2% not at all
CanPath serology COVID-19 questionnaire built off baseline COVID-19 questionnaire

Unique variables not collected in initial COVID-19 Questionnaire

- More detailed **job classifications** for front-line workers likely to have occupational exposures:
  - Passenger and delivery drivers, including taxi/uber drivers, restaurant and package delivery drivers
  - Services requiring entry into private homes, including Personal Support Workers, nurses, community aid/shelter workers, tradespeople, movers and cleaners

- **COVID-19 Vaccines:**
  - Participant vaccination status (which one and date), vaccine availability, and willingness to receive COVID-19 vaccine
CanPath COVID-19 Serological Studies

The study is collecting dried blood spots using kits mailed to participants.

Target populations (n=20,000, 90% participation rates!)

- Residents of long-term care homes
- Areas with a high prevalence of COVID-19
- People living in underserved urban and rural communities
Antibodies are steadily increasing with vaccinations across Canada

68% of CanPath now has at least one dose of Pfizer, Moderna or Astra Zeneca

As of March 26th (8 week lag between invitation to test), 20% show antibodies across 3 antibody tests (RBD, NP and SmT1)

NP (viral specific) is waning with time.
Accessing CanPath Data

CanPath Portal

The Canadian Partnership for Tomorrow’s Health (CanPath) Portal provides the research community with the necessary resources to identify epidemiological and biological data available from five participating cohorts to answer innovative research questions. A request for access to CanPath data is initiated directly through the CanPath Portal.

Cohort
Data
Biosamples
Access

Find out more about the five regional cohorts of the CanPath.
Read More

Find out more about the CanPath datasets and data harmonization approach.
Read More

Find out more about CanPath’s biological sample collection and its upcoming availability.
Read More

Find out more about CanPath Access Policy, the access process, and approved research projects.
Read More
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National Biosample Coordinator
Profile
Thank you to CanPath participants across the regional cohorts who generously donate their time, information and biological samples. CanPath is a success because of the participants’ ongoing commitment.