Ontario ⚜

COVID-19 PANDEMIC

RAEB'S Evidence Update

Highlights of health research synthesized by the Research, Analysis and Evaluation Branch

May 30, 2022

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Research Evidence and Jurisdictional Experience

The research evidence profiled below was selected from highly esteemed academic journals and grey literature sources, based on date of publication and potential applicability or interest to the Ontario health sector.

Understanding the Disease

Nature: **Symptom burden correlates to impairment of diffusion capacity and exercise intolerance in long COVID patients**

May 25, 2022. This study found that initial disease severity is correlated with symptom burden after at least three months of follow-up in long COVID patients. Highly symptomatic long COVID patients showed impaired diffusion capacity and six-minute walk test despite average or mildly affected mechanical lung parameters. *Article*.

Disease Management

New England Journal of Medicine (NEJM): **Protection and waning of natural and hybrid immunity to SARS-CoV-2**

May 25, 2022. Using the Israeli Ministry of Health database, this study explored the effect of two Pfizer vaccine doses, three Pfizer vaccine doses, and previous SARS-CoV-2 infection (without vaccination and before or after vaccination) on subsequent SARS-CoV-2 infection and progression to severe illness. Previous immunity-conferring events (vaccination or infection) were identified as being protective, but all protection waned with time. *Article*.

Nature: **Long COVID after breakthrough SARS-CoV-2 infection (BTI) in the US**

May 25, 2022. This study found that six months after infection, people with BTI exhibited a higher risk of death and incident post-acute sequelae, including cardiovascular, coagulation and hematologic, gastrointestinal, kidney, mental health, metabolic, musculoskeletal, and neurologic disorders. The findings suggest that vaccination before infection confers only partial protection in the post-acute phase of the disease; reliance on it as a sole mitigation strategy may not optimally reduce long-term health consequences of SARS-CoV-2 infection. *Article*.

The Lancet: **COVID-19 vaccine booster dose needed to achieve Omicron-specific neutralization in nursing home (NH) residents**

May 20, 2022. This study sampled NH residents (n=85) and health care workers (HCWs; n=48) after the initial vaccination series; and just before and two weeks after booster vaccination. Booster vaccination significantly increased vaccine-specific anti-spike, anti-receptor binding domain, and neutralization levels above the pre-booster levels in NH residents and HCWs, both in those with and without prior SARS-CoV-2 infection. With boosting, the majority of NH residents and HCWs developed detectable Omicron-specific neutralizing activity. *Article*.

NEJM: **Safety and efficacy of a third dose of Pfizer vaccine**

May 19, 2022. This phase three randomized controlled trial found a third dose of the Pfizer vaccine administered a median of 10.8 months after the second dose provided 95.3% efficacy against COVID-19, as compared with two doses of the vaccine during a median follow-up of 2.5 months. *Article*.

British Medical Journal: **Trajectory of long COVID symptoms after COVID-19 vaccination in the UK**

May 18, 2022. This study found that the likelihood of long COVID symptoms decreased after COVID-19 vaccination and evidence suggested sustained improvement after a second dose, at least over the median follow-up of 67 days. Vaccination may contribute to a reduction in the population health burden of long COVID, although longer follow-up is needed. *Article*.

Nature: **Limited cross-variant immunity from SARS-CoV-2 Omicron without vaccination**

May 18, 2022. This study demonstrated that Omicron infection enhances pre-existing immunity elicited by vaccines but, on its own, may not confer broad protection against non-Omicron variants in unvaccinated individuals. *Article*.

Public Health Measures

***Nature:* A comprehensive evaluation of COVID-19 policies and outcomes in 50 countries and territories**

May 25, 2022. This longitudinal study evaluated COVID-19 containment across 50 governed regions between March 2020 and November 2021 finding that countries in Oceania and Asia outperformed countries in other regions for pandemic containment prior to vaccine development. Their success appears to be associated with non-pharmaceutical interventions (NPIs), acting early, and adjusting policies as needed. After vaccines have been distributed, maintaining NPIs is the best way to achieve protection from variant viral strains, breakthrough infections, waning vaccine efficacy, and vaccine hesitancy limiting of herd immunity. *Article*.

Transmission

***Journal of the American Medical Association:* Transmission and infectious SARS-CoV-2 shedding kinetics in vaccinated and unvaccinated individuals in South Korea**

May 24, 2022. This study found that although the initial genomic viral load was similar between vaccinated and unvaccinated individuals, fully vaccinated individuals had a shorter duration of viable viral shedding and a lower secondary attack rate than partially vaccinated or unvaccinated individuals. These findings provide important evidence that despite the possibility of breakthrough infections, COVID-19 vaccinations remain critically useful for controlling the spread of SARS-CoV-2. *Article*.

Health Equity and Vulnerable Populations

***Canadian Medical Association Journal:* Association between long-term exposure to ambient air pollution and COVID-19 severity**

May 24, 2022. Drawing on data collected from people with confirmed SARS-CoV-2 infection in 2020 (n=151,105), this Ontario-based study examined the impact of ambient air pollution (fine particulate matter, nitrogen dioxide, ground-level ozone [O3]) as a potential contributor to COVID-19 outcomes. Results suggest that chronic exposure, particularly exposure to O3, may contribute to severe outcomes (e.g., ICU admission, death) after SARS-CoV-2 infection. *Article*.

Data Analytics, Modelling and Measurement

***The Lancet:* Identifying who has long COVID in the US: A machine learning approach**

May 16, 2022. This study's models identified, with high accuracy, patients as potentially having long COVID, which can be interpreted as patients warranting care at a specialty clinic for long COVID and being involved in clinical trials. This is an essential proxy for long COVID diagnosis as its definition continues to evolve. As more data sources are identified, the models can be retrained and tuned based on the needs of individual studies. *Article*.

Trusted Resources

- The Evidence Synthesis Network (ESN) is a collaborative COVID-19 response initiative by Ontario's research and knowledge production community. The ESN website is a portal where research evidence requests can be made and includes previously completed ESN briefing notes.

- The Ontario COVID-19 Science Advisory Table is a group of scientific experts and health system leaders who evaluate and report on emerging evidence relevant to the COVID-19 pandemic, to inform Ontario's response to the pandemic.

- COVID-19 Evidence Network to support decision-making (COVID-END) in Canada:
  - COVID-END is a time-limited network that brings together more than 50 of the world's leading evidence-synthesis, technology-assessment, and guideline development groups to support decision-making. In addition to Living Evidence Profiles, COVID-END hosts an inventory of best COVID-19 evidence syntheses from around the world. An up-to-date and comprehensive list of sources, organized by type of research evidence, is available on McMaster Health Forum's COVID-END website.
  - The COVID-19 Evidence Spotlights from COVID-END provide updated information on COVID-19 responses with three types of products from COVID-END in Canada: 1) Canadian spotlights; 2) global spotlights; and 3) horizon scans. To receive an email containing hyperlinks to these products twice a month, subscribe here.
    - In the first half of May 2022, contributing Canadian evidence-synthesis teams shared six newly completed syntheses focusing on public health measures (n=4) and clinical management (n=2). Please visit Canadian Spotlight 17.1 to view the evidence, or browse past Canadian evidence spotlights. A complete list of the products is available here.

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Contact RAEB

Robert Francis, RAEB Director (A)

Andrea Proctor, Evidence Synthesis

Emre Yurga, Economic Analysis and Evaluation

Hadi Karsoho, Research Planning and Management