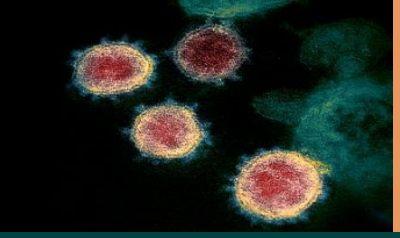
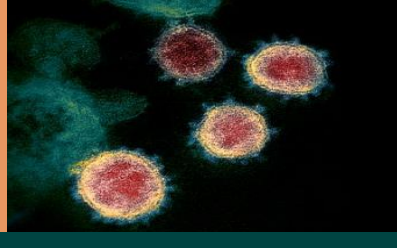


COVID-19 PANDEMIC – RAEB'S EVIDENCE UPDATE

Highlights of health research evidence synthesized by the Research, Analysis and Evaluation Branch (RAEB)

• June 7, 2021 •



FEATURED

- RAEB'S Rapid Responses for Ontario's health sector
- Research evidence and jurisdictional experience
- Trusted resources

ABOUT RAEB

Through research funding, brokering, translating, and sharing, we promote an enhanced evidence use capacity that supports all aspects of health policy, programming, and investment decision making. Services include:

- Literature reviews
- Jurisdictional scans
- Economic analysis
- Evaluation planning
- Research fund management
- Knowledge translation services

CONTACT RAEB

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Andrea Proctor, Evidence Synthesis
Emre Yurga, Economic Analysis and Evaluation
Research Planning and Management

RAEB'S RAPID RESPONSES FOR ONTARIO'S HEALTH SECTOR

Please contact Evidence Synthesis Unit for the full read of these rapid responses.

COVID-19 Post-Vaccine Risks, Activities, and Public Health Measures

- Likelihood of Transmission Post-Vaccination: A large Scottish study of health care workers suggested that vaccination (at least one dose) of a household member reduces the risk of infection in susceptible household members by at least 30%. A large UK study estimated the likelihood of transmission by individuals, who have received one dose of vaccine but still become infected with SARS-COV-2 up to 60 days after the first dose, is 40-50% lower for households, with similar effects for both Pfizer/BioNTech or AstraZeneca. Reported outbreaks in care homes in the US and Germany following the administration of one to two doses of the Pfizer/BioNTech vaccine highlights the continued risk for this population in the period immediately following the start of vaccination drives in care homes.
- Reduced Viral Load After Vaccination: There is evidence that vaccination significantly reduces viral load and symptomatic/asymptomatic infections in vaccinated individuals, which could translate into the potential for reduced transmission.
- Vaccine Effectiveness (VE) with Partial Vaccination: After a single dose (Pfizer/BioNTech or AstraZeneca), eight studies (Israel, Qatar, UK, and the US) found a high level of protection or reduced risk of infection after approximately three to four weeks, which provides support for national policies of extending the gap between doses up to two or three months (e.g., UK). Estimates of lower VE have been reported in vulnerable populations such as long-term care residents and immunocompromised patients (e.g., transplant recipients, people with cancer).
- VE with Full Vaccination: Several studies (Scotland, US, and Israel) have reported high VE after full vaccination leading to reduced risk of COVID-19-related hospital admissions, severe illness, and death.
- Public Health Measures Post-Vaccination: In British Columbia, Prince Edward Island, Australia, England, Hong Kong, and Singapore, public health measures (e.g., mask wearing, physical distancing) remain in place regardless of vaccination status. Parts of Europe, Israel, and the US have lifted restrictions for those who are vaccinated in some circumstances. In Quebec, vaccinated persons are advised to avoid behaviours that increase their risk of infection within the 14-28-day interval needed to reach optimal protection.

RESEARCH EVIDENCE/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:* SARS-CoV-2 variants, spike mutations and immune escape
  Jun 1, 2021. This review summarizes the literature on mutations of the SARS-CoV-2 spike protein, the primary antigen, focusing on their impacts on antigenicity and contextualizing them in the protein structure and discussing them in the context of observed mutation frequencies in global sequence datasets. *Read.*
- *CMAJ:* Short-term antibody response after one dose of BNT162b2 vaccines in patients receiving hemodialysis
  May 31, 2021. This study reported that a single dose of BNT162b2 vaccine failed to elicit a humoral immune response in most patients (75 of 131) receiving hemodialysis without previous SARS-CoV-2 infection, even after prolonged observation. In those with previous SARS-CoV-2 infection, the antibody response was delayed. No patient with non-detectable immune levels at four weeks developed any by eight weeks. *Read.*
- *British Journal of Haematology:* Alpha-defensins, risk factor for thrombosis in COVID-19 infection
  May 30, 2021. This study examined the inflammatory response to SARS-CoV-2 in 127 symptomatic adults with a positive PCR test for COVID-19 in Israel. Findings indicated that plasma levels of α-defensins were elevated, tracked with disease progression/mortality or resolution and with plasma levels of interleukin-6 (IL-6) and D-dimers. Interleukin-6 (IL-6) stimulates the release of α-defensins from neutrophils, which accelerates clot formation (coagulation) and inhibits fibrinolysis (breakdown of fibrin in blood clots) in human blood. These findings may describe a link between inflammation and the risk of thromboembolism. *Read.*
- *Lancet:* Outcomes for patients with a systemic rheumatic disease (SRD) admitted to hospital for COVID-19
  May 28, 2021. This study assessed whether patients with SRD might be at increased risk for hyperinflammation and respiratory failure from COVID-19, comparing 57 patients with and 232 patients without an SRD who were admitted to hospital between January 30 and July 7, 2020 at Mass General Brigham (Boston, US). Findings indicated that patients with an SRD who were admitted to hospital for COVID-19 had increased risk of hyperinflammation, kidney injury, admission to intensive care, and mechanical ventilation, yet post-discharge outcomes were not significantly different. *Read.*
- *JAMA:* Assessment of SARS-CoV-2 reinfection one year after primary infection in Lombardy, Italy
  May 28, 2021. This study investigated the incidence of SARS-CoV-2 primary infection and reinfection among individuals in Lombardy who tested positive during the first wave of the pandemic, including both symptomatic and asymptomatic patients. Five reinfections were identified out of a sample of 1,579 patients. The findings suggest that patients who have recovered from COVID-19 are at a lower risk of SARS-CoV-2 infection than those who have not. The study also found that natural immunity from prior infection appears to last at least one year. *Read.*

RESEARCH EVIDENCE/JURISDICTIONAL EXPERIENCE cont'd

TRANSMISSION

- *Nature:* COVID-19 transmission in group living environments and households in Japan
  Jun 2, 2021. This study evaluated the risk of COVID-19 transmission among 4,550 individuals living in group settings. The study found that the household transmission rate (12.6%) was as high as that of close contact outside of residences (11.3%) and accounted for an estimated >60% of the current rate of COVID-19 transmission among those < 18 years old. The study concluded that individuals living in group environments are at significantly elevated risk of COVID-19 via secondary transmission. *Read.*

CASE TESTING AND SCREENING

- *International Journal of Clinical Practice:* Use of radiological tests in COVID-19-positive child cases
  May 30, 2021. This study compared the radiographic findings of pediatric patients with their clinical and laboratory results to evaluate the frequency and necessity of utilizing chest computed tomography (CT) to diagnose COVID-19 infection. Findings indicated that 8.7% of chest radiographs and 12.8% of chest CT findings were pathological. Due to the milder clinical course of COVID-19 experienced within pediatric populations and high exposure of radiation from chest CT, these findings suggest that practitioners should consider the underlying diseases and severity of clinical findings in pediatric patients before requesting a chest CT. *Read.*
- *Lancet:* Same-day SARS-CoV-2 screening in an indoor mass-gathering in Barcelona, Spain
  May 30, 2021. This study assessed the effectiveness of mass screening during a live indoor concert on December 12, 2020. At baseline, 15 (3%) of 495 individuals in the control group and 13 (3%) of 465 in the experimental group tested positive on transcription-mediated amplification test (TMA) despite a negative antigen-detecting rapid diagnostic test (Ag-RDT) result. These findings provide preliminary evidence on the effectiveness of same-day point-of-care screening with Ag-RDT, combined with face mask-wearing and active air ventilation, to create safe indoor environments. *Read.*

DISEASE MANAGEMENT

- *NEJM:* Efficacy of the BNT162b2 COVID-19 vaccine in adolescents
  May 27, 2021. This multinational study that included 2,260 participants examined the efficacy and safety of the BNT162b2 COVID-19 vaccine in 12-to-15-year-old recipients. The results suggest the vaccine had a favourable safety profile, produced a greater immune response than in young adults, and was highly effective against COVID-19. The main side effects were transient mild-to-moderate reactogenicies, (e.g., injection-site pain, fatigue, and headache), and there were no vaccine-related serious adverse events and few overall severe adverse events. *Read.*

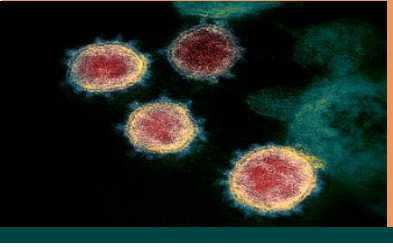
RESEARCH EVIDENCE/JURISDICTIONAL EXPERIENCE cont'd

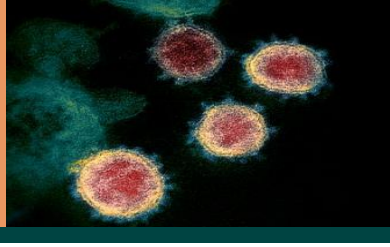
PUBLIC HEALTH MEASURES

- *Lancet:* Associations between changes in population mobility in response to the COVID-19 pandemic and socioeconomic factors
  Jun, 2021. This study assessed the association between socioeconomic factors and reductions in population mobility during the COVID-19 pandemic, at both the city level in China and at the country level worldwide. The reduction in intra-city movement in China was stronger in cities with a higher socioeconomic index (SEI) than in those with a lower SEI. Reductions in inter-city movement were only associated with government control measures and not SEI. Countries with higher sociodemographic and Universal Health Coverage indexes had greater reductions in population mobility following national emergency declarations. *Read.*
- *Journal of Endocrinological Investigation:* Impact of lockdown on cardiometabolic health
  May 26, 2021. This Italian study examined the lifestyle and social life changes associated with COVID-19 lockdowns on metabolic profile in hyperprolactinemic or osteoporotic patients (n=74; aged 51.8±17.8 years) suggested that the SARS-CoV-2 outbreak has led to a rapid increase in the prevalence of metabolic syndrome, potentially contributing to the increased COVID-19-related mortality. At the end of lockdown, prevalence of obesity (from 37.8% to 51.3%), dyslipidemia (from 28.4 to 48.6%), and metabolic syndrome (from 14.9 to 27%) significantly increased compared to pre-COVID evaluation. *Read.*

DATA ANALYTICS, MODELLING AND MEASUREMENT

- *WHO:* Landscape of observational study designs on the effectiveness of COVID-19 vaccination
  Jun 1, 2021. The document provides an overview of the different observational studies that are being conducted to assess the effectiveness of COVID-19 vaccination, including key features in terms of study design, sample size, study population, key outcomes measured, and location of study. *Read.*
- *Nature:* Impact of COVID-19 outbreaks and interventions on influenza in China and the US
  May 31, 2021. By comparing 2019-20 seasonal influenza activity through March 29, 2020 with the 2011-19 seasons, this modelling study found that COVID-19 outbreaks and related non-pharmaceutical interventions (NPIs) may have reduced influenza in Southern and Northern China and the US by 79.2%, 79.4%, and 67.2%, respectively. Decreases in influenza virus infection were also associated with the timing of NPIs. These findings provide evidence that NPIs can partially mitigate seasonal and, potentially, pandemic influenza. *Read.*





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 produces Canadian and global spotlights and horizon scans on emerging issues, as well as hosting 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. COVID-19 responses can include the full spectrum of public health measures, clinical management, health system arrangements, and economic and social responses. During the second half of April, contributing evidence-synthesis teams in Canada shared 12 completed evidence syntheses, and globally, there are a number of emergent issues related to COVID-19 for which evidence syntheses are or will be needed (see here). To receive an email containing hyperlinks to these products twice a month, subscribe here.

* Figures in the header: Transmission electron microscope image shows SARS-CoV-2, the virus that causes COVID-19, isolated from a patient in the United States. Virus particles are emerging from the surface of cells cultured in the lab. The spikes on the outer edge of the virus particles give coronaviruses their name, crown-like. *National Institutes of Health's National Institute of Allergy and Infectious Diseases – Rocky Mountain Laboratories*