

# COVID-19 PANDEMIC

## RAEB'S Evidence Update

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

June 14, 2021

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### RAEB's Rapid Responses for Ontario's Health Sector

Please contact [Evidence Synthesis Unit](#) for the full read of these rapid responses.

#### **COVID-19 Immunization Policies for Hospitals and Health Care Workers (HCWs)**

- Two research articles were identified that support the use of vaccine mandates, with medical and religious exemptions, to protect staff and patients and reduce HCW shortages. A Canadian study argued that the legality of these mandates would likely be determined via labour law that considers the “reasonableness” of the employer’s directive, as is evident from case law related to mandatory influenza vaccination. Vaccine mandates may be challenged under the Canadian Charter of Rights and Freedoms, but these appeals likely will not succeed if medical and religious exemptions are made. Challengers may also argue that HCWs have the right to wear personal protective equipment (PPE) in lieu of receiving vaccination, which means that governments must support vaccine surveillance and monitor emerging evidence of the effectiveness and safety of vaccines relative to evidence of the effectiveness of PPE in reducing transmission of SARS-CoV-2.
- Two studies suggested that vaccine mandates may maximize vaccine uptake in HCWs, but risk exacerbating breakdowns in trust between them and their institutions. Instead, vaccine policies should focus on robust educational campaigns, strengthening HCWs’ trust in health care systems by addressing their concerns, and increasing vaccine access (e.g., on-site vaccine clinics, time off for vaccination).

- Lessons learned from vaccine mandates for influenza suggest that mandates, increased access, and increased awareness may be effective interventions to increase vaccine coverage in HCWs, while education and incentives may have limited impact.
- COVID-19 vaccine hesitancy in HCWs across jurisdictions revolve around safety, efficacy, and trust. Health systems in Quebec, the US (Texas, Indiana, Kentucky, New Jersey, and Pennsylvania), Iceland, Italy, and Victoria (Australia) have implemented COVID-19 vaccine mandates for their employees, with exemptions for medical and religious reasons. HCWs who refuse vaccination may be suspended, terminated, or transferred to duties that do not risk spreading the virus.
  - Some commentators suggest that future legal cases regarding vaccine mandates are likely. For example, at Texas' Houston Methodist, a lawsuit was filed by 117 employees to prevent the hospital from terminating unvaccinated employees.
- Ontario Analysis: Ministry of Health guidance strongly recommends COVID-19 vaccination for HCWs, but it is voluntary. An employer may choose to create their own policies regarding mandatory staff immunization as a protective measure for residents and patients.

## Evidence Products Produced with our Partners

The COVID-19 Evidence Synthesis Network is comprised of groups specializing in evidence synthesis and knowledge translation. The group has committed to provide their expertise to provide high-quality, relevant, and timely synthesized research evidence about COVID-19 to inform decision makers as the pandemic continues. Please contact [Evidence Synthesis Unit](#) for the full read of these evidence products.

## Design Strategies to Prevent Respiratory Infection in Congregate Care Settings

- Protecting residents during infectious disease events is best accommodated by including a mechanical system in facility planning and design, which provides adequate ventilation, filtration, and temperature and humidification controls. The Public Health Agency of Canada (PHAC) recommends that long-term care (LTC) homes invest in the highest-efficiency particulate filter possible for their heating, ventilation, and air conditioning (HVAC) systems to ensure that residents' rooms and common areas have adequate air exchanges, including natural ventilation to reduce aerosol transmission of COVID-19.
- When HVAC systems cannot be upgraded, LTC homes should invest in fans and single unit air conditioners to temporarily improve circulation. Portable units should be strategically located (e.g., positioned at patient-level or higher) to minimize risk of potential health-associated infections, and require routine cleaning and preventative maintenance. Other

temporary methods of airborne infection control include portable high-efficiency particulate air (HEPA) filtration systems, ventilated headboards, and negative pressure rooms.

- In addition to HVAC systems, decentralized small-cohort LTC facility design (i.e., household environments serving fewer than 20 residents), with private rooms and dedicated staff, reduce airborne disease transmission (e.g., reducing unnecessary staff travel around a larger building passing through unrelated resident areas or workspaces).

## 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: A single transcript for the prognosis of disease severity in COVID-19 patients**

**June 9, 2021.** This study investigated the potential of S100A12, a prominent marker gene for bacterial infection, in the prognosis of disease severity in COVID-19 patients. The study found that S100A12 expression was significantly elevated in the hospitalized COVID-19 group compared to the non-hospitalized COVID-19 group. Moreover, S100A12 expression at hospital admission was robustly correlated with future disease severity and outcomes in COVID-19 patients, superior to established prognostic markers. [Article.](#)

#### **The Public Library of Science One(PLOS One): End-stage kidney disease and COVID-19 in an urban safety-net hospital in Boston, Massachusetts**

**June 4, 2021.** This study aimed to compare the clinical characteristics, laboratory measures, and clinical outcomes of end-stage kidney disease (ESKD) patients (n=45) and non-ESKD patients (n=714) hospitalized with COVID-19 between March 4 and April 30, 2020. Findings indicated that ESKD patients had more co-morbidities and more robust inflammatory responses. The in-hospital mortality for ESKD and non-ESKD patients was 18% and 10%, but this difference did not reach statistical significance. [Article.](#)

## Case Testing and Screening

### **Expert Review of Molecular Diagnostics: The diagnostic accuracy of seven commercial molecular in vitro SARS-CoV-2 detection tests**

**June 1, 2021.** This rapid meta-analysis evaluated the accuracy of seven different commercial molecular diagnostic tests for detecting SARS-CoV-2 (Cepheid Xpert Xpress SARS-CoV-2 test, Simplexa COVID-19 Direct, Abbott ID NOW COVID-19, Cobas SARS-CoV-2, Allplex 2019-nCoV Assay, Panther Fusion SARS-CoV-2, and BioFire COVID-19 Test). The performances of commercial COVID-19 molecular in vitro diagnostic tests were high, with a summary sensitivity of 95.9% and specificity of 97.2%. The Abbott ID NOW COVID-19 and Simplexa COVID-19 Direct displayed lower sensitivity (91.6%, and 92%, respectively) for detecting COVID-19, which should be considered when deciding on a test platform. All evaluated tests demonstrated good accuracy in detecting COVID-19. [Article](#).

## Transmission

### **Proceedings of the National Academy of Sciences of the United States of America (PNAS): Temperature and population density influence SARS-CoV-2 transmission in the absence of non-pharmaceutical interventions**

**June 22, 2021.** This US study assessed the association between estimates of SARS-CoV-2 transmission rate and temperature, humidity, ultraviolet radiation, and population density. Findings indicate that policy interventions (i.e., "lockdown") and reductions in individuals' mobility are the major predictors of SARS-CoV-2 transmission rates. In their absence, and without behavioural changes, lower temperatures and higher population densities are correlated with increased SARS-CoV-2 transmission intensity. [Article](#).

### **Nature: Large variation in anti-SARS-CoV-2 antibody prevalence among essential workers**

**June 8, 2021.** This study compared SARS-CoV-2 infection rates among workers from 16 sectors and 32 occupations in Geneva, Switzerland between May 18 to September 18, 2020. Of the 10,513 participants tested for anti-SARS-CoV-2 IgG antibodies, 1,026 (9.8%) tested positive. The seropositivity rates ranged from 4.2% in the media sector to 14.3% in the nursing home sector. Findings indicated considerable within-sector variability: nursing home (0%-31.4%), home care (3.9%-12.6%), health care (0%-23.5%), public administration (2.6%-24.6%), and public security (0%-16.7%). [Article](#).

## **Nature: COVID-19 transmission in group living environments and households**

**June 2, 2021.** This study evaluated COVID-19 transmission risks in people (n=4,550) with a history of recent contact with patients at different places (dormitory/home/outside the residences) and levels (close/lower-risk) in group living environments between July 2020 and May 2021. The test-positivity rate for COVID-19 was highest in individuals who had contact in dormitories (27.5%) versus contact in households (12.6%) and outside the residences (11.3%), and concluded that a group living environment is a significant risk factor for secondary transmission of COVID-19. [Article](#).

## **Disease Management**

### **Journal of the American Medical Association (JAMA): Effect of Bamlanivimab on incidence of COVID-19 among residents and staff of skilled nursing facilities**

**June 3, 2021.** This randomized phase 3 clinical trial investigated the effect of a single intravenous dose of Bamlanivimab (a monoclonal antibody) on the incidence of COVID-19 among residents and staff of skilled nursing and assisted living facilities in the US. The incidence of COVID-19 infection among those treated with Bamlanivimab (n=588) vs. placebo (n=587) was 8.5% vs. 15.2%, respectively, a difference that was statistically significant. Further research is needed to assess preventive efficacy with current patterns of viral strains. [Article](#).

## **Public Health Measures**

### **Nature: Community-level evidence of SARS-CoV-2 vaccine protection of unvaccinated individuals**

**June 10, 2021.** This study analyzed vaccination records and test results collected during the rapid vaccine rollout in Israel and found that the rates of vaccination in 177 communities are associated with a substantial later decline in infections among a cohort of unvaccinated individuals aged under 16 years. On average, for each 20 percentage points of individuals who are vaccinated in a given population, the positive test fraction for the unvaccinated population decreased approximately two-fold. These results provide observational evidence that vaccination not only protects individuals who have been vaccinated, but also provides cross-protection to unvaccinated individuals in the community. [Article](#).

### **Nature: Impact of vaccination on new SARS-CoV-2 infections in the UK**

**June 9, 2021.** This large national survey in the UK found that being vaccinated for COVID-19 with either Pfizer-BioNTech or AstraZeneca reduced the number of new SARS-CoV-2 infections by 66% and 61%, respectively. The largest benefit was observed after two vaccinations (80%

and 79% reduction) and against symptomatic and high viral burden infections, with no evidence of a difference between the two types of vaccines. [Article](#).

### **MedRxiv: Job stress and loneliness among remote workers in Japan**

**June 3, 2021.** This preprint study examined the relationship between job stress and loneliness among remote full-time “desk” workers (n=4,052) during the COVID-19 pandemic in Japan. The frequency of remote work was moderately associated with feeling lonely, and low levels of co-worker and supervisor support were strongly associated with the likelihood of feeling loneliness. Support from co-workers and supervisors may be crucial factors to prevent loneliness caused by remote work. [Article](#).

## Data Analytics, Modelling and Measurement

### **Nature: Optimizing vaccine allocation for COVID-19 vaccines shows the potential role of single-dose vaccination**

**June 8, 2021.** This modelling study determined optimal allocation strategies with one and two doses of vaccine under various degrees of viral transmission. With high single-dose efficacy (72% effective at preventing disease), single-dose vaccination is optimal, preventing up to 22% more deaths than a strategy prioritizing two-dose vaccination for older adults. With low or moderate single-dose efficacy (18% and 42% effective at preventing disease, respectively), mixed vaccination campaigns with complete coverage of older adults are optimal. However, with modest or high transmission, vaccinating older adults first with two doses is best, preventing up to 41% more deaths than a single-dose vaccination given across all adult populations. [Article](#).

## Health Equity and Vulnerable Populations

### **Canadian Medical Association Journal (CMAJ): Postpartum mental illness during the COVID-19 pandemic in Ontario**

**June 7, 2021.** This Ontario-based study that examined the association between physician visit rates and postpartum mental illness reported an increase in visits for mental health conditions among postpartum people between March and November 2020. There were elevated visit rates across provider types and for diagnoses of anxiety, depression, and alcohol or substance use disorders. Results suggest an increased need for effective and accessible mental health care for this population as the pandemic progresses. [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 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](#).

## 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

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