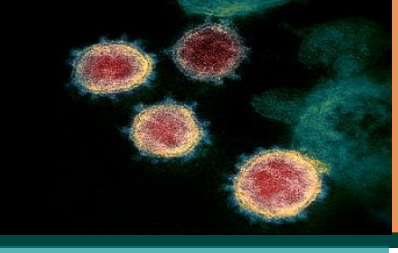
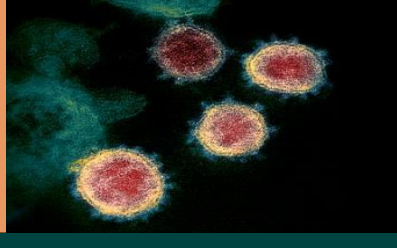


COVID-19 PANDEMIC – RAEB'S EVIDENCE UPDATE

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

• September 8, 2020 •



FEATURED

- RAEB's rapid responses for Ontario's health sector
- Evidence products produced with our partners
- 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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RAEB'S RAPID RESPONSES FOR ONTARIO'S HEALTH SECTOR

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

- Capacity and Planning Strategies for Hospital Beds during COVID-19

  Most of the identified literature on this topic reported limited high-quality evidence.
  - Statistics: According to the most recent data from the Organisation for Economic Co-operation and Development (OECD) in 2017, Japan and Korea have the highest number of acute care hospital beds per capita (seven beds per 1,000 people), followed by Germany (six beds per 1,000 people). Most countries have between 2.5 and five hospital beds per 1,000 people, but the numbers are lower in Canada, Mexico, Sweden, Spain, and the US, with less than 2.5 beds per 1,000 people. In many countries, a low supply of such hospital beds has been associated with a high occupancy rate during normal times, and this is the case in countries like Canada and the UK. Across 10 OECD countries, the variation in intensive care bed capacity is 10-fold, ranging from a high of 33.9 critical beds per 100,000 population in Germany to a low of 3.3 beds per 100,000 in Mexico.
  - Room Design: Current research evidence and jurisdictional best practices (from Alberta, New York, California, Italy, UK, Ireland, New Zealand, Queensland [Australia], and the World Health Organization) advocate for the isolation of suspected or confirmed COVID-19 patients in single rooms with dedicated bathrooms. If such rooms are unavailable, the next best option is to cohort similar patient cases in a shared room or ward with beds spaced apart (ranging from one to three metres).
  - Other Design Features for Infection Prevention and Control: Recommendations include: touch-free control mechanisms, copper building materials, e-switchable privacy glass windows, ultraviolet lighting, HEPA filtration, robotic deliveries, and onsite sleeping quarters for staff.
  - Jurisdictional Model: The Rush University Medical Center in Chicago is an example of how future hospitals can be designed to temporarily expand capacity in both the emergency department and the number of isolation rooms during emergencies. Built after the 9/11 attacks to handle large-scale natural and man-made emergencies, among other measures, the facility can expand its single bed capacity to 133% and control airflow throughout sections of the hospital.
  - Analogies for the COVID-19 Context: Similar capacity and planning strategies for hospital beds were also identified for hospital-acquired infections, severe acute respiratory syndrome (SARS), and Middle East respiratory syndrome (MERS).

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.

- Re-Opening, Operation, and Monitoring of Schools
  (Produced in collaboration with McMaster Health Forum).
  - Before Re-Opening Schools: It is important to base decisions on the local situation and current COVID-19 epidemiology. Schools are recommended to re-open only when community transmission is low.
  - Operation of Schools: There is a need to adopt remote-learning arrangements, but also note the limitations with remote learning (e.g., poorer educational outcomes for those from a lower socioeconomic status).
  - Accompanying Public Health Measures: Multifaceted approaches are needed to prevent COVID-19 by considering measures for infection prevention (e.g., cohorting, handwashing, face masking) and infection control (e.g., screening, testing, isolation).
  - Monitoring Measures as Re-Opening is Being Implemented: It is rare for children to be the index case in a COVID-19 outbreak and they do not appear to be a major source of transmission for COVID-19, but these findings are based on studies conducted prior to children returning to schools and while stay-at-home orders were still in place.
  - Clinical Outcomes among Children: While children can get COVID-19, it is rare to see severe symptoms or require hospitalization, and it is suggested (although widely debated) that younger children tend to be infected less than adolescents and adults.
  - Jurisdictional Review: While approaches to re-opening schools and accompanying public health measures may vary, there were similar themes that emerged across jurisdictions, such as the prioritization of younger grades and those in need of particular credits to move forward with post-secondary education. At the time of the review, Quebec was the only Canadian jurisdiction to allow children to go back to school, while the remaining provinces and territories have developed plans for returning to school in September 2020. In Ontario, there are innovative approaches to re-opening schools which include, but are not limited to: mix of home and campus-based education; school spaces with enhanced or new ventilation; creating adaptable plans for future waves; establishing a COVID-19 program coordinator at schools; permitting flexibility to the school day to allow for cohorting of students; rotation between online and in-person schooling; implementing exam-style seating where students are seated individually; enhancing online and remote learning through increasing access to devices and the internet; and creating social-distancing measures for the maximum capacity in a room.

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.

CASE TESTING AND SCREENING

- *Johns Hopkins University & Medicine*: COVID-19 testing tracker
  August 31, 2020. This website shows the all-time average of each country's daily positivity and daily tests conducted per capita. The size of the circles indicate the size of the epidemic in each location. Ideally, countries would have small circles and low positivity (i.e., below 5% per World Health Organization recommendations). As of August 31, 2020, Canada's daily positivity is 3.31% with 590 daily confirmed cases per 100,000 population. Some of the countries with the lowest daily positivity rates and daily confirmed cases are: Hong Kong (0.17%; 29 cases); New Zealand (0.41%; eight cases); Taiwan (0.42%; two cases); Australia (0.47%; 113 cases); and South Korea (1.09%; 89 cases). *Read*.
- *New England Journal of Medicine*: Saliva or nasopharyngeal swab specimens for detection of SARS-CoV-2
  August 28, 2020. This study detected more SARS-CoV-2 RNA copies in saliva specimens compared to nasopharyngeal swab specimens. A higher percentage of saliva samples were positive days after the initial COVID-19 diagnosis. With repeated sampling in individual patients, saliva samples produced less variation in levels of SARS-CoV-2 RNA. Altogether, the results suggested that saliva specimens and nasopharyngeal swab specimens have similar sensitivity in the detection of SARS-CoV-2. *Read*.
- *Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Weekly Report*: Preventing and mitigating SARS-CoV-2 transmission in four summer camps
  August 26, 2020. During the 2020 summer camp season, four overnight camps in Maine with 1,022 attendees implemented a multilayered prevention and mitigation strategy that was successful in identifying and isolating three asymptomatic COVID-19 cases and preventing secondary transmission. The strategy included pre-camp quarantine, pre- and post-arrival testing and symptom screening, cohorting, and physical distancing between cohorts. In addition, camps required use of face coverings, enhanced hygiene measures, enhanced cleaning and disinfecting, maximal outdoor programming, and early and rapid identification of infection and isolation. *Read*.

TRANSMISSION

- *Journal of the American Medical Association (JAMA)*: Community outbreak investigation of SARS-CoV-2 transmission among bus riders in Eastern China
  September 1, 2020. A study reported that of individuals who rode one of two buses to attend the same event, those who rode a bus with air recirculation and with a patient with COVID-19 had an increased risk of the SARS-CoV-2 infection compared with those who rode a different bus. The study noted that airborne transmission may partially explain the increased risk of SARS-CoV-2 infection among these bus riders. *Read*.

RESEARCH EVIDENCE/JURISDICTIONAL EXPERIENCE cont'd

DISEASE MANAGEMENT

- *JAMA*: Effect of dexamethasone on days alive and ventilator-free in patients with moderate or severe acute respiratory distress syndrome (ARDS) and COVID-19
  September 2, 2020. A randomized clinical trial of patients with COVID-19 and moderate to severe ARDS in Brazil reported that the use of intravenous dexamethasone plus standard care compared with standard care alone resulted in a statistically significant increase in the number of ventilator-free days (days alive and free of mechanical ventilation) over 28 days. *Read*.
- *Nature*: Sex differences in immune responses that underlie COVID-19 disease outcomes
  August 26, 2020. A US-based study examined sex differences in the viral loads, antibodies, and plasma of people with moderate cases of COVID-19 revealing that a poor T-cell response negatively correlated with patients' age and was associated with worse disease outcome in male patients, but not in female patients. These findings provide an important basis for the development of a sex-based approach to the treatment and care of men and women with COVID-19. *Read*.

DATA ANALYTICS, MODELLING AND MEASUREMENT

- *Canadian Medical Association Journal (CMAJ)*: A tool to support clearing the surgical backlog caused by COVID-19 in Ontario
  September 1, 2020. To assist hospitals in recovery planning, Ontario researchers developed an Excel-based tool using average inputs (e.g., type of procedure) to help regional partners plan for restarting surgeries. Hospital planners can use estimates of their upcoming surgery volumes in conjunction with the tool to assess the feasibility of Ontario Health-recommended criteria (e.g., having at least 10% acute bed occupancy within 48 hours and a minimum of 15 days of PPE onsite). *Read*.
- *JAMA*: Cell phone activity and associations with growth in cases of COVID-19 in the US
  August 31, 2020. A study suggests that greater reductions in cell phone activity in the workplace and retail locations, and greater increases in activity at residential places, are associated with less growth in COVID-19 cases. These data provide support for the value of monitoring cell phone location data to anticipate future trends of the pandemic. *Read*.
- *British Columbia Ministry of Health*: COVID-19 in BC – Going forward
  August 13, 2020. This report provides an overview of the COVID-19 pandemic in British Columbia. Dynamic models demonstrate that complete and prompt contact tracing must be conducted to prevent sustained transmission, given relaxed social distancing measures. *Read*.

RESEARCH EVIDENCE/JURISDICTIONAL EXPERIENCE cont'd

PUBLIC HEALTH MEASURES

- *Journal of Medical Internet Research*: Impact of public health measures on influenza, enterovirus, and all-cause pneumonia during COVID-19
  August 20, 2020. This study showed that wearing masks, hand hygiene, and social distancing may contribute to the prevention of COVID-19 and the decline of other respiratory infectious diseases in Taiwan. The influenza virus which usually peaks in winter and decreases around week 14, had a significant decrease after week six of 2020. A dramatic decrease in all-cause pneumonia was also reported. Enterovirus had increased by week 18 in 2017-19, but this was not observed in 2020. *Read*.

HEALTH EQUITY AND VULNERABLE POPULATIONS

- *JAMA*: Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic
  September 2, 2020. A survey reported that the prevalence of depression symptoms among adults in the US was more than threefold higher during COVID-19 compared with before the COVID-19 pandemic. Individuals with lower social resources, lower economic resources, and greater exposure to stressors (e.g., job loss) reported a greater burden of depression symptoms. *Read*.

FRONTLINE WORKERS

- *British Medical Journal:* Preparing medical students for a pandemic: A systematic review of student disaster training programs
  September 2, 2020. Implementing disaster training programs for medical students improves preparedness, knowledge, and skills that are important during times of pandemic. This review demonstrates that medical students undergoing appropriate training could play an essential role in pandemic management and suggests a course and assessment structure for medical student COVID-19 training. *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.
- An up-to-date and comprehensive list of sources, organized by type of research evidence, is available on McMaster Health Forum's COVID-19 Evidence Network to support Decision-making (COVID-END) website.

* 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*