COVID-19 PANDEMIC – RAEB'S EVIDENCE UPDATE
Highlights of health research evidence synthesized by the Research, Analysis and Evaluation Branch (RAEB)
• November 30, 2020 •

FEATURED

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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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.

- Strategies to Encourage Vaccine Acceptance and Address Vaccine Hesitancy
  (Produced in collaboration with McMaster Health Forum).

  - Research evidence suggests that vaccine acceptance is encouraged and hesitancy reduced through: 1) multi-component community-based strategies that typically include information, education, and reminder and recall interventions; and 2) the availability of vaccines through familiar and accessible locations (e.g., pharmacies). Targeting interventions for specific population groups may be useful, for example:
    - General Public: Global surveys reported several facilitators for uptake of a COVID-19 vaccine, including political support, high levels of trust in information from government sources, and messages emphasizing personal health risks and collective health consequences of not vaccinating.
    - Parents and Children: To promote vaccine uptake in children, parents benefit from access to balanced and accessible information about harms and risks, as they may find it difficult to know which information sources to trust. Parents tend to view health workers as important sources of information, but poor communication and negative relationships can impact vaccination decisions.
    - People Who Are Hesitant/Opposed to Vaccination: Setting up vaccination clinics in familiar and accessible locations and leveraging community partners for reach-out may be effective.
  - Expert recommendations to address vaccine hesitancy and improve vaccine uptake include public education and transparency, convenient locations for vaccination that build on existing vaccination programs, ethical allocation, accountability for reporting misinformation, intersectoral partnerships, and health provider training.
  - Canada (including Ontario), Australia, China, New Zealand, the United Kingdom, and the United States have launched vaccination campaigns through common modalities (e.g., in-person, television, social media), engaged health providers to provide information and address concerns during clinic visits, and combatted misinformation through community engagement and transparency.

EVIDENCE PRODUCTS PRODUCED WITH OUR PARTNERS cont'd

- Contact Tracing for COVID-19 (updated from June 2020)
  (Produced in collaboration with North American Observatory, The Canadian Agency for Drugs and Technologies in Health, Ontario Health, and Unity Health).

  Best practices that appear to improve the effectiveness of contact tracing include:
  - Response Times: Swift response times (e.g., two to three days) in isolating cases and quarantining at least 80% of contacts may be associated with better control of COVID-19. When the number of new cases has been controlled, it is necessary to maintain contact tracing for several months and to do so in combination with other public measures.
  - High Surveillance and Contact Tracing Capacity: Well-trained and adequately staffed contact tracing teams are crucial for mounting a proactive pandemic response. Although manual contact tracing is the preferred approach, it is very resource-intensive and may rapidly become overwhelmed. Human resource capacity for contact tracing in most jurisdictions is achieved through redeploying and training employees and volunteers across sectors (e.g., health care workers, armed forces, police).
  - Digital Contact Tracing Approaches: Bluetooth, global positioning systems, and cloud-based technologies may serve as useful tools for supporting contact tracing, particularly in densely populated areas where the infected individual may not know all contacts. The efficacy of these approaches is largely unknown, but they may help curb epidemic growth if combined with robust public health efforts. Due to uptake, privacy, and usability concerns, digital tools may best serve as supplementary measures to traditional contact tracing approaches, in which contacts are identified through a thorough review of available data (e.g., telephone interviews with the infected individual; medical, travel, or police records).

  Enabling contextual factors that may improve the effectiveness of contact tracing across jurisdictions include:
  - Emergency Preparedness: Pre-existing pandemic or natural disaster emergency infrastructure facilitates a rapid whole-of-government response.
  - Cross-Sectoral Collaboration: An "all hands-on deck" approach facilitates a rapid and comprehensive response and supports human resource/redeployment needs for contact tracing.
  - Local Public Health Units: These units are essential for implementing contact tracing protocols, maintaining the number of cases within a manageable range, building rapport with the community, and piloting new outreach approaches (e.g., home-based testing or symptom monitoring).
  - Science-Focused Strategic Communication: Transparent, evidence-informed public communication, delivered by experts, builds public trust and may facilitate public cooperation with contact tracing strategies.

  Implementation Implications:
  - Large-scale manual contact tracing is key in most contexts, but can be further supplemented with digital contact tracing approaches if privacy and usability limitations are addressed.

EVIDENCE PRODUCTS PRODUCED WITH OUR PARTNERS cont'd

- Quick Response (QR) Codes as an Approach to Contact Tracing for COVID-19 (updated from July 2020)
  (Produced in collaboration with North American Observatory and McMaster Health Forum).

  QR codes, barcodes that can be scanned by smartphones, are a type of location-based digital contract tracing approach. Some research findings suggest that QR codes may be effective with sufficient population uptake and usage and/or when they are used in combination with other strategies. They are easy to deploy and have high locational accuracy. They may be most effective when they are required to be used by all patrons of a specific location or service and tied to a specific exchange (e.g., ticket to enter a venue, fare for public transport). Potential limitations primarily relate to user adoption, for example: users may not be comfortable with an application that tracks their real-time location; users may become fatigued over time from having to scan multiple entry/exit points and choose to discontinue or be dissuaded from participating at the onset; and failures to regularly scan and log codes can lead to false negatives. Seven identified jurisdictions use QR codes as part of their case management and contact tracing strategies:
  - Method: In Australia (New South Wales), China, Netherlands, New Zealand, and Singapore, users scan QR codes with their smartphones at entry/exit checkpoints to keep track of places visited and/or to verify permission to enter public venues based on their low- or high-risk COVID-19 profile. In Israel, four stationary testing centres in major metropolitan areas and eight drive-in testing centres use QR codes to identify patients. In Taiwan, travelers flying to Taiwan have to complete a COVID-19 health declaration form when arriving at airports by scanning a QR code.
  - Mandatory/Voluntary Use: Mandatory in Australia, China, Singapore, and Taiwan, and voluntary in New Zealand.
  - Locations Used: Ranges from: office buildings, shopping centres, transportation systems (e.g., taxis, buses, trains, airports), hospitality sector, schools/universities, parks, hospitals, and testing centres.
  - Information Collected: Ranges from: name, phone number, email, home address, self-reported health status, travel history, relationship to confirmed or suspected cases, and date of visit to public venue.
  - Governance: Governments authorize and oversee the contract tracing approach, often in partnership with technology companies who developed the QR code applications.
  - Privacy: Singapore abides by their personal data protection act, and New Zealand's system was developed in consultation with the privacy commissioner, has password authentication protocols, enables automatic deletion of information, and requires users' permission to share information with the government.

EVIDENCE PRODUCTS FROM OUR PARTNERS

Ministry research partners are actively working with leading agencies and organizations on questions related to COVID-19. CADTH recently produced one product:

- Briefing Note on CADTH Health Technology Review of Heating, Ventilation, and Air Conditioning (HVAC) Systems in Public Spaces

  - HVAC systems are a common and important part of building operations for both health care and non-health care settings.
  - HVAC systems impact the distribution of air and can therefore impact the transmission of airborne infectious diseases, while simultaneously decreasing risk through particle dilution, particularly in closed spaces such as elevators and 'dead zones' in room corners, atria, or hallways.
  - Adding air purification strategies to ventilation can further decrease risks. Filtering, natural ventilation, ultraviolet light, and photocatalytic oxidation and ionization may have roles in air purification. However, more research is needed to ensure emerging air purification options do not include harmful by-products with unintended health effects.
  - SARS-CoV-2 is found in a spectrum -concentrated in large droplets and dispersed in small droplets or aerosols. The larger the droplet, the greater the response to gravity, falling near their source, and are then infectious to others through close contact and surface contact. Aerosols may travel farther distances and stay diluted and suspended in the air for a period of time, and the significance of their role is an active area of study and debate.
  - A significant amount of the available evidence comes from studies in experimental laboratories and may not necessarily mimic what is seen in clinical practice. More robust, published, peer-reviewed evidence will help clarify the potential role that HVAC systems play in mitigating the risk of the virus's transmission and provide more concrete evidence-based recommendations.
  - Until the evidence base suggests otherwise, the most substantial risk of transmission of SARS-CoV-2 is from close personal contact. As such, public health recommendations regarding hand hygiene, respiratory etiquette, physical distancing, wearing non-medical masks or face coverings when physical distancing is not possible, and cleaning and disinfecting surfaces and objects with appropriate and safe products and methods remain critical.

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

- *JAMA*: Eye protection for patients with COVID-19 undergoing prolonged prone-position ventilation
  Nov 19, 2020. This study reported that prolonged prone positioning of patients with COVID-19 (i.e., patient's head rotated 45° laterally to accommodate the endotracheal tube making one eye more dependent position than the other for 16 or more hours) can be associated with elevated intraocular pressure from periorbital edema, direct compression on the eye, and increased orbital venous pressure. Orbital compartment syndrome can be avoided by the use of protective cushioning around the eyes and maintaining the patient's head position above heart level during prone positioning. Patients with COVID-19 may also develop papillophlebitis with optic disc edema and retinal hemorrhages, which may be associated with a hypercoagulable state caused by COVID-19. These observations suggest awareness for the possible presence of these ophthalmic findings while treating severely ill patients with COVID-19. *Read*.

DISEASE MANAGEMENT

- *NEJM*: A randomized trial of convalescent plasma in COVID-19 severe pneumonia
  Nov 24, 2020. This study on the use of convalescent plasma to treat hospitalized adult patients with severe COVID-19 pneumonia identified no significant differences in clinical status or overall mortality between patients treated with the convalescent plasma (median titer of 1:32000 total SARS-CoV-2 antibodies) and those who received placebo. Overall mortality was 10.96% in the convalescent plasma group and 11.43% in the placebo group, for a risk difference of −0.46 percentage points. Adverse events and serious adverse events were similar in the two groups. *Read*.
- *NEJM*: A randomized trial of hydroxychloroquine for prevention of COVID-19
  Nov 24, 2020. This study involving 2,314 asymptomatic contacts of 672 patients with polymerase-chain-reaction (PCR)-confirmed COVID-19 in Catalonia, Spain suggests that post-exposure therapy with hydroxychloroquine (i.e., 800 mg once, followed by 400 mg daily for six days) did not prevent the development of SARS-CoV-2 infection or symptomatic COVID-19 in healthy persons exposed to a PCR-positive case patient. In addition, hydroxychloroquine was not associated with a lower incidence of SARS-CoV-2 transmission than usual care (18.7% and 17.8%, respectively). *Read*.
- *NEJM*: Effect of hydroxychloroquine in hospitalized patients with COVID-19
  Nov 19, 2020. This randomized controlled trial compared a range of treatments with usual care in patients hospitalized with COVID-19 and found that patients hospitalized with COVID-19 who received hydroxychloroquine (n=1,561) did not have a lower incidence of death at 28 days than those who received usual care (n=3,155). *Read*.

RESEARCH EVIDENCE/JURISDICTIONAL EXPERIENCE cont'd

PUBLIC HEALTH MEASURES

- *BMC Public Health*: Impact of stay-at-home orders on time to reach the peak burden of COVID-19 and deaths
  Nov 23, 2020. This study, conducted from April to May 2020, analyzed the time between the date of the first reported case of COVID-19 to an implemented stay-at-home mandate across 43 US states and 41 countries with known stay-at-home orders. An association was found between the timing of stay-at-home orders and the time to peak case and death counts for both countries and US states. Regions where mandates were implemented late experienced a prolonged duration to reaching both peak daily case and death counts. *Read*.

INFECTION, PREVENTION AND CONTROL IN SPECIFIC SETTINGS

- *PLOS One*: An integrated view on society readiness and initial reaction to COVID-19
  Nov 23, 2020. This study proposed an integrated evaluation framework that encapsulates six dimensions of readiness and initial reactions (i.e., preparedness capacity, government interventions, health risk factors, testing policy, trust in institutions, and mobility reduction) across European countries. The findings suggest that only when a country's readiness is complemented by an appropriate societal reaction a less severe outcome can be expected. *Read*.
- *American Journal of Surgery*: Impact of hospital lockdown measures on surgeon and patient safety
  Nov 12, 2020. This systematic review examined 61 studies to assess post-operative patient outcomes and/or protection of surgical personnel during lockdown measures (i.e., cancellation of elective surgeries and outpatient clinics) and found that : 1) the pooled post-operative complication rate during worldwide epidemics, including COVID-19, was 21.0% among 2,095 surgeries; and 2) among 31 studies that followed the health of surgical workers, the majority found no adverse outcomes when proper safety measures were in place. *Read*.

HEALTH EQUITY AND VULNERABLE POPULATIONS

- *JAMA*: Assessment of pediatric patients tested for SARS-CoV-2 across the US
  Nov 23, 2020. Electronic health records for 135,794 US pediatric patients in seven children's health systems indicated that the risk of SARS-CoV-2 appears low for most patients, but higher concern may be warranted for patients with medically complex conditions or those of minority race/ethnicity. *Read*.
- *Clinical Obesity*: Effects of COVID-19 stay-at-home order on mental health in individuals with overweight
  Nov 20, 2020. Online data on health behaviour, mental health (i.e., anxiety, depression, self-esteem, sadness, and stress), and overall health collected from 1,857 Brazilian adults between May 5 and 17, 2020 suggests that women, particularly those who are overweight (i.e., body mass index $\geq 25\,Kg/m^2$), are more vulnerable to the deleterious effects of stay-at-home orders and social distancing on mental health during the COVID-19 pandemic. *Read*.

RESEARCH EVIDENCE/JURISDICTIONAL EXPERIENCE cont'd

FRONTLINE WORKERS

- *Preventive Medicine*: Workers at long-term care (LTC) facilities and their risk for severe COVID-19 illness in the US
  Nov 18, 2020. Using data from the nationally representative 2017 and 2018 US National Health Interview Surveys on adults who reported working in LTC facilities (1% or 552/52,159), this study examined the extent to which LTC workers are at increased risk for severe illness from COVID-19 including hospitalization, intubation, or death. Workers in LTC facilities were disproportionately Black, female, and low income. Half of LTC workers (50%) were at increased risk of severe illness from COVID-19 and another 19.6% were potentially at increased risk. Despite LTC residents' and workers' high degree of vulnerability to severe illness from COVID-19, many LTC facilities in the US still have inadequate supplies of personal protective equipment and COVID-19 tests. *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.
- 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.

* 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*