

# COVID-19 PANDEMIC

## RAEB'S Evidence Update

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

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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.

### Indoor vs. Outdoor COVID-19 Transmission

Research evidence suggests the risk of SARS-CoV-2 transmission is lower in outdoor than indoor settings.

- **Factors Associated with Outdoor Transmission:** These include duration and frequency of personal contact, lack of personal protective equipment, and occasional indoor gathering during a largely outdoor experience. However, there are significant research gaps in understanding the specific pathways including factors such as the weather. Weather likely influences COVID-19 transmission, but not at a scale sufficient to outweigh the effects of lockdowns or re-openings in populations. Indoor transmission remains likely everywhere the virus is spreading, and outdoor transmission is still possible if other precautions (social distancing, mask use, etc.) are not taken.
- **Transmission at Large Gatherings or Events:** Due to a lack of surveillance and tracing systems, and confounding factors and variables, there has been no evidence of robustly tested transmission at outdoor mass gatherings (10,000+ people). Research

on motorcycle rallies, political rallies, religious gatherings, professional sporting events, amateur outdoor sports, and indoor concerts suggest that large gatherings have been linked to increased case numbers, locally and beyond. Research on pedestrian traffic reported that street cafés present the largest average rate of new infections, followed by busy outdoor markets, and then metro and train stations. In comparison, the risk associated with walking on busy streets (average density around 0.1 person/m<sup>2</sup>) is comparatively quite low.

## Evidence Products from Our Evidence Synthesis Network

### Partners

Ministry research partners are actively working with leading agencies and organizations on COVID-19 topics and tools. The following tools have been developed to provide risk assessments based on users' occupations, activities, location, and other relevant factors. COVID-END in Canada, through the McMaster Health Forum recently completed a Rapid Evidence Profile:

#### [Lifting Public Health Measures as Vaccination Rates and Seasonal Temperatures Rise](#)

To inform plans for lifting public health measures, this Rapid Evidence Profile identified evidence and experiences from eight countries (Australia, China, France, Germany, Israel, New Zealand, the UK, and the US) that are advanced in their roll-out of the COVID-19 vaccine and/or are ahead of Canada in seasonal temperature increases, as well as from all Canadian provinces and territories.

## 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.

## Point-of-Care Testing in Non-Traditional Settings

(Produced in collaboration with the SPOR Evidence Alliance)

Rapid point-of-care (POC) COVID-19 tests (e.g., rapid antigen tests, reverse transcription-polymerase chain reaction test [RT-PCR]) are used in the following non-traditional test settings:

borders and points of entry, community settings, Indigenous and First Nations communities, correctional facilities, schools, and other settings (i.e., homeless shelters, rural communities, airports, schools, and community centre). A study reported that mass rapid antigen testing pop-up sites in 45 European Union countries reduced the prevalence of COVID-19 by 50-80% across three time points. However, the quality of evidence on the implementation, use, and outcomes of rapid POC testing for COVID-19 in non-traditional settings is limited, and the impact and outcomes of testing programs across jurisdictions are largely unknown.

## COVID-19 Testing Strategies in Schools

(Produced in collaboration with McMaster Health Forum)

A living rapid review (March 19, 2021) noted that while surveillance reports are identifying COVID-19 cases among staff, students, and children in schools and daycares, these commonly include single cases or a small number of cases (typically less than five). A growing number of studies have randomly selected schools/classes/individuals to undergo testing for active infection (via RT-PCR) or antibodies; consistent across studies, few additional cases are detected, suggesting that widespread asymptomatic transmission is not commonly occurring in these settings.

US and Canadian guidance generally recommend molecular tests for students and staff, with saliva/nasal samples, sample pooling, or rapid tests as options for more accessible and faster testing approaches. Community prevalence should guide testing frequency (e.g., once per week in areas of moderate-to-high community transmission).

School testing strategies were identified from Winnipeg, Montreal, Saskatchewan, the US (e.g., Los Angeles, New York City, Massachusetts), England, and Berlin (Germany).

- **Administration:** Strategies are implemented via collaborations within government, industry, hospitals, and/or research institutions. Testing teams include trained health care providers, support staff, or existing staff resources, with options for supervised self-administration.
- **Frequency:** Testing ranges from weekly to twice weekly, with options for pooled or random sampling, and results are obtained within 15 minutes to 72 hours.
- **Test Type:** Molecular PCR (nasal swab or saliva) or rapid tests, with the latter option most commonly used.
- **Settings:** Primarily schools, but also childcare centres, homes, community test centres, and mobile teams.

- **Population Targets:** Primarily students, teachers, and other staff, but a few strategies only target staff or include parents/guardians/household bubbles of students participating in school-based learning.
- **Outcomes:** The Rockefeller Foundation’s COVID-19 Antigen Testing pilot program in six US states was the only initiative identified that reported outcomes on the first four months of planning and implementing rapid testing programs in K-12 schools. Weekly screening of all students and staff was found to reduce in-school infections by 50%, making it more effective than masking but less effective than social distancing. However, less frequent or widespread testing added limited value above and beyond other mitigation strategies. In communities that already have a robust testing program, schools should consider whether they need a school-based program or if they could encourage students and teachers to have regular testing at existing community sites.
- **Implementation Implications:** School testing strategies should be driven by the local context, including testing capacity, community prevalence, and vaccination status of students and staff. Screening and surveillance protocols should be piloted to test the impact of such testing. Alongside testing, existing preventative practices should continue in schools (e.g., symptom screening, masks). Cost, access, logistics burden, and lag time in receiving test results may be key barriers to testing strategies.

## 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.

### Public Health Measures

#### **Nature: Socioeconomic impacts of COVID-19 in low-income countries**

**March 30, 2021.** Using household and telephone survey data, this study analyzed the socioeconomic impacts of the pandemic of households, adults, and children in low-income countries (Ethiopia, Malawi, Nigeria, and Uganda). An estimated 256 million individuals (77% of the population) live in households that lost income during the pandemic resulting in food insecurity and an inability to access medicine and stable foods. Additionally, student-teacher contact dropped from a pre-COVID-19 rate of 96% to 17% in households with school-aged children. These findings can inform decisions by governments and international organizations on measures mitigating the effects of the COVID-19 pandemic. [Article](#).

## **Nature: AI-assisted tracking of worldwide non-pharmaceutical interventions for COVID-19**

**March 25, 2021.** This study presents the Worldwide Non-pharmaceutical Interventions Tracker for COVID-19 (WNTRAC), a comprehensive dataset consisting of over 6,000 NPIs implemented worldwide since the start of the pandemic. WNTRAC covers NPIs implemented across 261 countries and territories, and classifies NPIs into a taxonomy of 16 NPI types. NPIs are automatically extracted daily from Wikipedia articles using natural language processing techniques and then manually validated to ensure accuracy and veracity. [Article](#).

## Understanding the Disease

### **The Lancet: Prescription of glucose-lowering therapies and risk of COVID-19 mortality in people with type II diabetes in England**

**March 30, 2021.** This study investigated the association between classes of glucose-lowering drugs (e.g., metformin, insulin) and the risk of COVID-19-related mortality in people with type II diabetes. Results provide evidence of associations between prescription of some glucose-lowering drugs and COVID-19-related mortality, although the differences in risk are small and these findings are likely to be due to confounding by indication. In the context of the COVID-19 pandemic, there is no clear indication to change prescribing of glucose-lowering drugs in people with type II diabetes. [Article](#).

### **Journal of the American Medical Association: How COVID-19 affects the brain**

**March 26, 2021.** This article discusses possible pathogenic mechanisms of brain dysfunction in patients with COVID-19. Understanding cellular and molecular aspects of COVID-19 brain damage could direct interventions to reduce long-term neuropsychiatric symptoms. Interventions may involve antagonists of cytokines, NMDA receptor, anti-inflammatory pathways, and kynurenine pathway modulators. Mitigating long-term post-COVID-19 cognitive, emotional, and behavioural sequelae would decrease disease burden. [Article](#).

## Disease Management

### **The Lancet: Efficacy of AZD1222 vaccine against SARS-CoV-2 variant of concern B.1.1.7**

**March 30, 2021.** This UK study conducted a post-hoc analysis of the efficacy of the adenoviral vector vaccine, ChAdOx1 nCoV-19 (AZD1222; colloquially known as the AstraZeneca vaccine), against the SARS-CoV-2 B.1.1.7 variant (colloquially known as the UK variant). ChAdOx1 nCoV-19 reported reduced neutralization activity against the B.1.1.7 variant compared with a non-B.1.1.7 variant in vitro, but the vaccine showed efficacy against the B.1.1.7 variant of SARS-CoV-

2. Clinical vaccine efficacy against symptomatic positive infection was 70.4% for B.1.1.7 and 81.5% for non-B.1.1.7 lineages. [Article](#).

### **British Medical Journal: Remote management of COVID-19 using home pulse oximetry and virtual ward support**

**March 25, 2021.** This UK review on remote COVID-19 management reports that finger pulse oximeters used at home can detect the low blood oxygen levels (hypoxia) associated with acute COVID-19. Home oximetry, however, requires clinical support, such as regular phone contact from a health professional in a virtual ward setting. The authors suggest that additional research is needed to understand the safety and effectiveness of home oximetry and to optimize service models and referral pathways. [Article](#).

### **The Lancet: Effect of seasonal respiratory virus transmission on syndromic surveillance for COVID-19 in Ontario**

**March 25, 2021.** This study investigated the role of test positivity for non-SARS-CoV-2 respiratory viruses on two independent COVID-19 syndromic surveillance systems in Ontario (i.e., self-reported symptoms from Outbreaks Near Me, and visits to emergency departments for respiratory infection from the Acute Care Enhanced Surveillance system). These two methods showed strong positive correlations with COVID-19 confirmed case counts before and during a rise in circulating enterovirus or rhinovirus. However, as positivity for enterovirus or rhinovirus fell in late September 2020, syndromic signals became uncoupled from COVID-19 cases and instead tracked the fall in entero/rhinovirus. This finding provides proof-of-principle that regional transmission of seasonal respiratory viruses may complicate the interpretation of COVID-19 surveillance data. [Article](#).

## **Health Equity and Vulnerable Populations**

### **Nature: Obesity and COVID-19 outcomes**

**March 30, 2021.** This systematic review, including 22 studies from seven countries in North America, Europe, and Asia, found that reported data from the first six months of the pandemic suggested that obesity is associated with a more severe COVID-19 disease course (i.e., more severe symptoms, developing acute respiratory distress syndrome, requiring hospitalization, being admitted to an intensive care unit, and undergoing mechanical ventilation) as compared with non-obese patients, but may not be associated with increased mortality. [Article](#).

## **Obesity: Protecting individuals living with overweight and obesity**

**March 28, 2021.** Using surveys conducted between June 22 and October 9, 2020, this Canadian study examined attitudes toward COVID-19 vaccination and fear of COVID-19 among those living with obesity. Approximately one-third of respondents were not comfortable receiving a vaccination and half of the respondents expressed moderate or greater perceived risks of vaccination. Confidence in vaccinations was extremely low and females were less comfortable receiving the vaccine and perceived more risks than males. Results suggest the need for patient-centred counseling with a focus on shared decision-making to strengthen confidence and reduce perceived risk. [Article](#).

## **Data Analytics, Modelling and Measurement**

### **Nature: Potential early warning system: National Health Service Pathways England**

**March 29, 2021.** An analysis of NHS Pathways triage system data (i.e., self-reports of COVID-19 symptoms made by the public through the emergency [999] and non-emergency [111] phone line services) in England from March 18 to May 14, 2020 suggests that trends in such reports over time potentially captures valuable information across a broader profile of cases than hospital admission data. The study assessed the correlation between NHS Pathways reports and COVID-19-associated deaths in England finding that enquiries to 111/999 were strongly associated with daily deaths reported 16 days later. This result highlights the potential of NHS Pathways as the basis of an early warning system, but further investigation is required. [Article](#).

## **Case Testing and Screening**

### **Cochrane Review: Rapid, point-of-care antigen, and molecular-based tests for diagnosis of SARS-CoV-2 infection**

**March 24, 2021.** This updated review reported that some antigen tests are accurate enough to replace RT-PCR when used in symptomatic people. This would be most useful when quick decisions are needed about patient care, or if RT-PCR is not available. Antigen tests may be most useful to identify outbreaks, or to select people with symptoms for further testing with PCR, allowing self-isolation or contact tracing and reducing the burden on laboratory services. Several point-of-care molecular tests show very high accuracy and potential for use, but more evidence of their performance when evaluated in real life settings is required. [Article](#).

## Infection Prevention and Control in Specific Settings

### **The Lancet: The first and second waves of the COVID-19 pandemic in Africa**

**March 24, 2021.** Using reported COVID-19 epidemiology data, this study examined the pandemic's progression in Africa. At the peak of the first wave (July 2020), the mean daily number of new cases was 18,273. As of December 31, 2020, 40 (73%) countries had experienced or were experiencing their second wave of cases with the continent reporting a mean of 23,790 daily new cases for week 53. Nine of the 55 countries accounted for more than 82.6% (2,283,613) of reported cases. A total of 17 countries reported test per case ratios less than the recommended 10 to 30 tests per case ratio range. The analysis showed that the African continent had a more severe second wave of the COVID-19 pandemic than the first, which highlights the importance of examining multiple epidemiological variables down to the regional and country levels over time. [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 March, contributing evidence-synthesis teams in

[Canada](#) shared 14 completed evidence syntheses and four questions that they have newly taken on, 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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