Update on COVID-19 Projections

Science Advisory and Modelling Consensus Tables
December 7, 2021
Key findings

• COVID-19 cases are rising in most Public Health Units due to the Delta variant. Testing has not increased, but positivity is rising. This is a real rise in cases.

• Vaccine effectiveness in Ontario remains very high but experience in other countries suggests we will need to boost immunity with third doses.

• Even without Omicron, ICU occupancy will likely grow to 250-400 beds in January, putting hospitals under strain again.

• To control cases and the impact on our health system, we need to increase vaccination (particularly 5-11 year-olds) and continue to use public health measures to reduce transmission now.

• Spread of the new Omicron variant will likely drive COVID-19 cases above current projections.

• In South African data, vaccination appears to protect against serious illness due to Omicron and most hospitalizations are in the unvaccinated. There is likely an increased risk of re-infection even amongst people those who have had COVID-19, emphasizing the importance of vaccination.

• Low global vaccine coverage means that we can expect new variants to arise.
Cases are increasing in most public health units while Delta is the dominant variant

Average weekly cases on:

- November 15
- November 28

14-day increases

14-day decreases

Data note: Data for the most recent day have been censored to account for reporting delays

Data: CCM
Analysis: Ontario Health
Testing rates are flat since mid-July

Data: OLIS via SAS VA, data up to November 26
Analysis: Ontario Health
Even with unchanged testing rates, test positivity is rising

The most recent 3 days have been removed to account for incomplete data. Data are smoothed.

Data: OLIS via SAS VA, data up to November 26
Analysis: Ontario Health
Vaccination continues to be highly effective

Unvaccinated people have a 5-fold higher risk of symptomatic COVID-19 disease, a 13-fold higher risk of being in the hospital and 23-fold higher risk of being in the ICU compared to the fully vaccinated.

Data: https://data.ontario.ca/ and CCM plus; estimates of patients in hospital and ICU are age standardized

Analysis: Secretariat of the Science Advisory Table (https://covid19-sciencetable.ca/ontario-dashboard/)
Ontario data shows vaccines maintaining high effectiveness

Effectiveness of 2 doses of mRNA vaccines over time*

- Hospitalization or death
- Symptomatic infection
- Infection (with or without symptoms)

* Ontario, test-negative design, ≥16 years, any SARS-CoV-2 lineage, data to 1 Nov 2021

Data Source and Analysis: ICES
Cases continue to rise substantially, even without Omicron. To flatten the curve, we need to reduce transmission by increasing vaccination and public health measures.

Figure shows predictions based on a consensus across models from 4 scientific teams.

- All scenarios assume continuing current public health measures.
- All scenarios include vaccinating kids 5-11 years of age, but differ on the proportion of kids vaccinated by end of December.
- Different models use different approaches and assumptions.
- Omicron not included in these scenarios, and would likely worsen these projections.

Predictions informed by modeling from McMasterU, PHO, WesternU, YorkU
Data (Observed Cases): covid-19.ontario.ca
COVID-19 hospitalizations and ICU admissions are stable for now

- Patients in ICU with COVID-related critical illness
- Patients in inpatient beds (incl. ICU) with active COVID19

Analysis: Ontario Health
As cases increase, ICU occupancy will also increase, likely exceeding 250 by end of December without accounting for Omicron.

![Graph showing ICU occupancy with predictions and data.](image)

**Predictions:** COVID-19 ModCollab based on case predictions in previous slide

**Data:** (Observed ICU Occupancy): CCSO
Ontario ICUs have been under unprecedented pressure and will have trouble responding to another surge in patients

- Due to the need for urgent non-COVID-19 patient care, fewer staff are available to be redeployed and fewer staffed surge spaces are available
- Number of patients on ventilators has been above average for over a year; the pressure on ICUs has not let up
- There is a growing crisis in staffing for critical care patients with significant contribution from health care worker burnout
- Despite new beds and strong management, ICUs will be challenged in responding to any new surge in patients because of staffing constraints

Source: Science Briefs of the Ontario COVID-19 Science Advisory Table (https://doi.org/10.47326/ocsat.2021.02.51.1.0)
Rising cases, ICU occupancy, and deaths in European peer jurisdictions show potential risk

The Ontario Stringency Index (44) is similar to UK (47); the Netherlands are at 56, Australia, France and Germany are at ≥67. Ontario vaccine coverage (77% of population fully vaccinated) similar to Netherlands and Australia (74%), higher than remaining peer countries (~68%).

Analysis: Secretariat of the Science Advisory Table (https://covid19-science-table.ca/ontario-dashboard/)
A new variant of concern called Omicron became rapidly dominant and caused a steep increase in cases in the province of Gauteng, South Africa

- Rapid increase in daily cases in Gauteng indicates that Omicron is more transmissible than Delta.
- Previously infected people have an increased risk of reinfection, suggesting partial evasion of immunity by Omicron.
- Hospital and ICU admissions are increasing because of steep increase in cases.
- Early data suggests vaccination protects against hospital admission caused by Omicron. Most patients admitted to hospital are unvaccinated.
- Omicron is transmitted exactly the same way as previous SARS-CoV-2 strains. Public health measures still work.


Analysis: Secretariat of the Science Advisory Table (https://covid19-sciencetable.ca/)
The current situation is very uncertain, but the potential impact of Omicron on cases could be substantial.

Predictions informed by modeling from McMasterU, WesternU

If Omicron is **much more** infectious and vaccines are **much less** effective

If Omicron is **moderately more** infectious and vaccines are **moderately less** effective

Current behaviour *(e.g., no change in contacts)* and 50% of 5–11 year-olds vaccinated by end of Dec

**Possible range of Omicron effect**
Current public health measures are effective against Omicron

Adapted from: https://uihc.org/health-topics/why-swiss-cheese-may-be-key-keeping-you-safe-covid-19
Key findings

• COVID-19 cases are rising in most Public Health Units due to the Delta variant. Testing has not increased, but positivity is rising. This is a real rise in cases.

• Vaccine effectiveness in Ontario remains very high but experience in other countries suggests we will need to boost immunity with third doses.

• Even without Omicron, ICU occupancy will likely grow to 250-400 beds in January, putting hospitals under strain again.

• To control cases and the impact on our health system, we need to increase vaccination (particularly 5-11 year-olds) and continue to use public health measures to reduce transmission now.

• Spread of the new Omicron variant will likely drive COVID-19 cases above current projections.

• In South African data, vaccination appears to protect against serious illness due to Omicron and most hospitalizations are in the unvaccinated. There is likely an increased risk of re-infection even amongst people those who have had COVID-19, emphasizing the importance of vaccination.

• Low global vaccine coverage means that we can expect new variants to arise.
Contributors

• **COVID-19 Modeling Collaborative:** Kali Barrett, Stephen Mac, David Naimark, Aysegul Erman, Yasin Khan, Raphael Ximenes, Sharmistha Mishra, Beate Sander

• **ICES:** Jeff Kwong, Hannah Chung, Sharifa Nasreen, Siyi He, Sarah Buchan, Deshayne Fell, Maria Sundaram, Peter Austin

• **McMasterU:** Irena Papst, Ben Bolker, Jonathan Dushoff, David Earn

• **Modeling Consensus Table:** Isha Berry

• **Our Health Counts Toronto ICES COVID-19 AHRQ linkage project:** Janet Smylie, Stephanie McConkey, Beth Rachlis, Lisa Avery, Graham Mercredi, Cheryllee Bourgeois, Mike Rotondi

• **Ontario Health:** Erik Hellsten, Stephen Petersen, Anna Lambrinos

• **PHO:** Kevin Brown, Sarah Buchan, Alyssa Parpia

• **Science Advisory Table:** Peter Jüni, Karen Born, Kali Barrett, Nicolas Bodmer, Pavlos Bobos, Shujun Yan

• **Western University/London Health Sciences Centre:** Lauren Cipriano, Wael Haddara

• **YorkU:** Jianhong Wu, Michael Glazer, Zack McCarthy
Content and review by Modelling Consensus and Scientific Advisory Table members and secretariat


*Chairs of Scientific Advisory, Evidence Synthesis, and Modelling Consensus Tables

For table membership and profiles, please visit the About and Partners pages on the Science Advisory Table website.