Presentation to the Toronto Region Board of Trade

This slide deck was presented to the Toronto Region Board of Trade, at their invitation, on behalf of Ontario COVID-19 Science Advisory Table

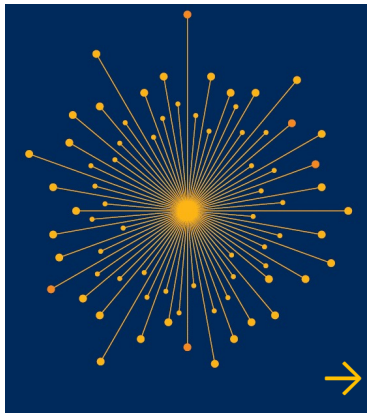
November 22, 2021

SCIENCE TABLE

COVID-19 ADVISORY FOR ONTARIO

Mobilizing scientific expertise: Ontario's COVID-19 Modelling Consensus Table (MCT)

- **Members:** Scientists (mathematicians, epidemiologists, health services researchers), practitioners, senior decision-makers
- **Considerations:** Confidentiality; academic freedom; interpretation of modelling estimates; transparency and trust



→ Science Table

Core objectives:

- Offer best guidance to decision-makers and health system leaders;
- Leverage latest knowledge and advances in techniques and data sources;
- Rapidly fulfill data needs from data partners across the health system;
- Rapidly respond to a prioritized research questions;
- Leverage collective analytic expertise of Ministry of Health, Ontario Health, and Public Health Ontario, along with scholars and experts working on COVID-19.

https://covid19-sciencetable.ca/our-partners/

MCT consensus process

- Several academic teams have developed models, which they run for regular analyses and/or specific questions
- All models have been presented to MCT (often multiple times), most are published in the peer-reviewed literature
- Different model-types: compartmental models, Hurricane model, agent-based models, other (forecasting); most are transmission models (+/- hospitalizations), one specific acute care system model
- Regular (bi-weekly updates)
  - Cases: Selected representative scenarios based on predictions by 3-5 academic modeling teams
  - ICU Occupancy: Based on predictions of acute care system model for selected case scenarios
- Specific questions, e.g., Variants of Concern (VOC), testing, vaccination rollout, ventilation
  - Often answered by 1-2 models by MCT members
  - Weekly presentations by guests

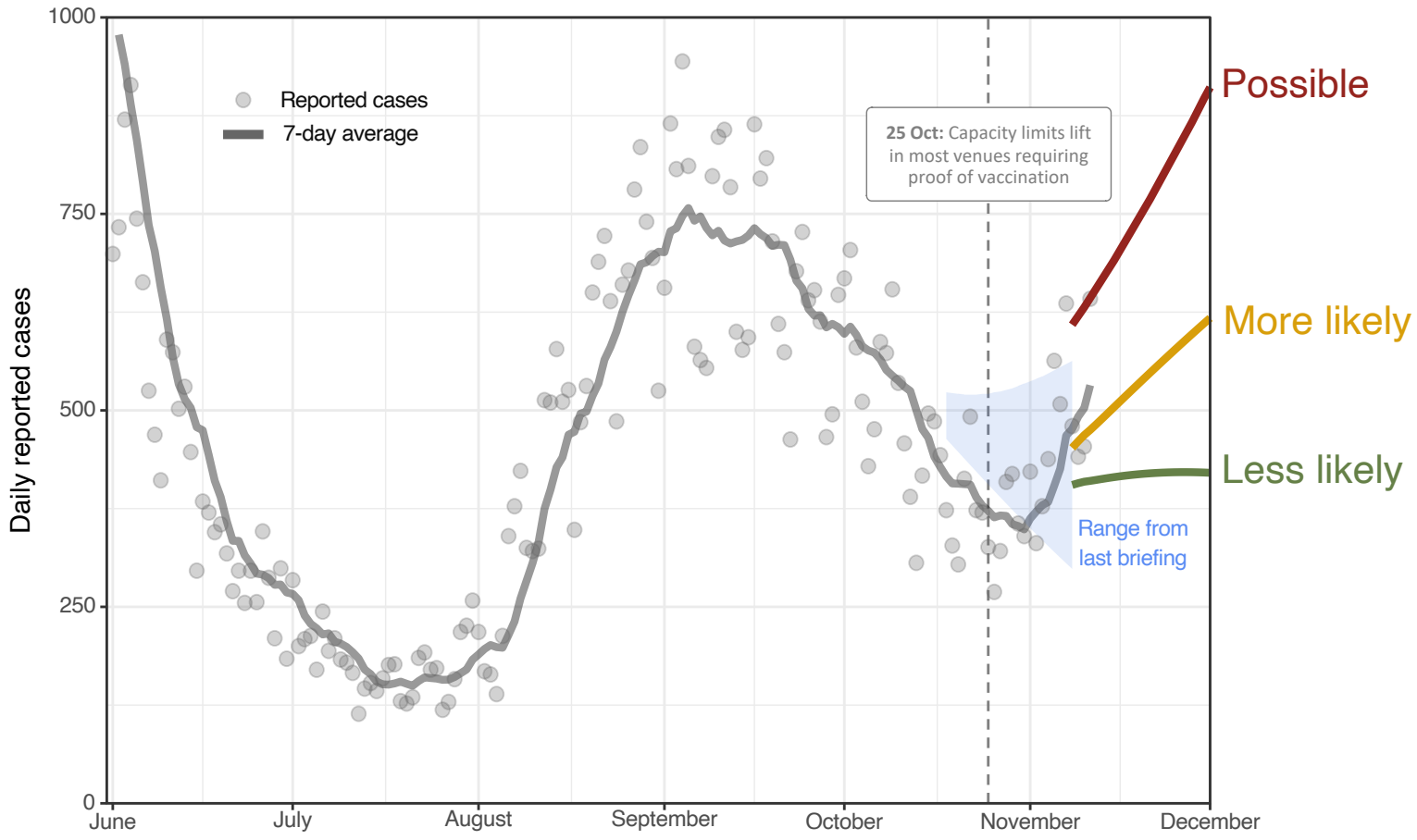
Ontario's case counts are rising, and the immediate future is uncertain

Figure shows predictions based on a consensus across models from 5 scientific teams.

- Current projections include Oct 25 opening but no further opening.
- All scenarios assume continued public health measures.
- Because current surge is very recent, predictions are unstable and may be conservative.

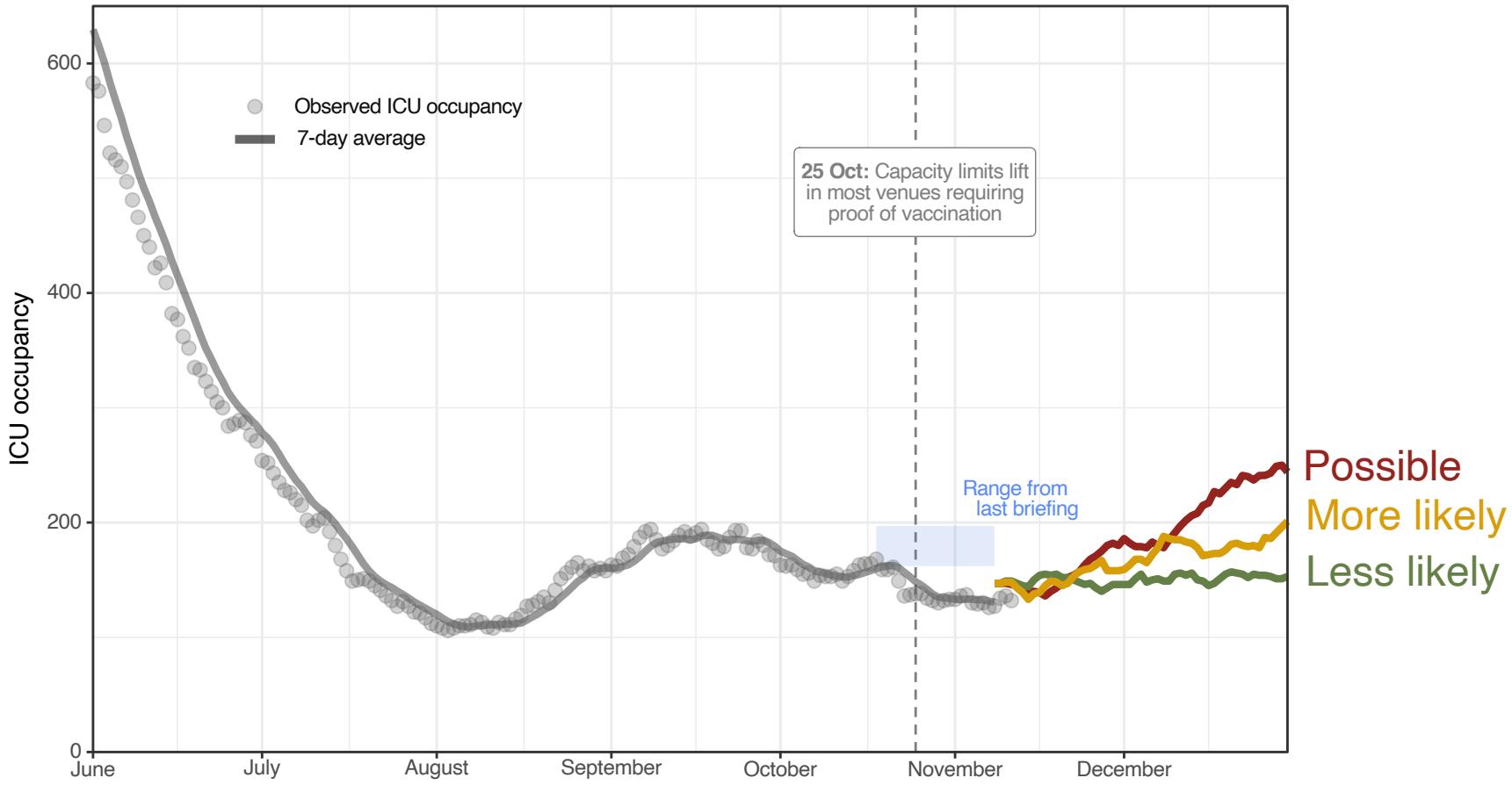
Sources of recent and ongoing increased transmission:

- Colder weather with more time indoors
- Lifting of capacity limits
- Indoor gatherings



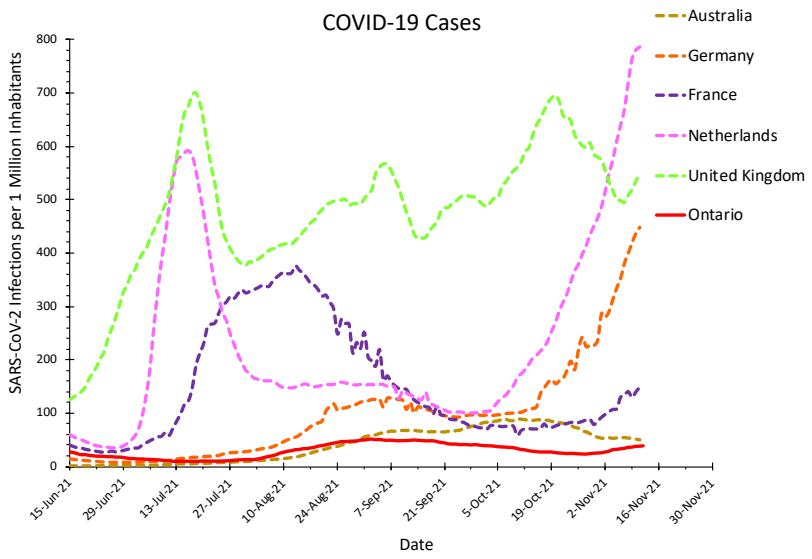
Predictions informed by modeling from COVID-19 ModCollab, Fields Institute, McMasterU, PHO, YorkU
Data (Observed Cases): covid-19.ontario.ca

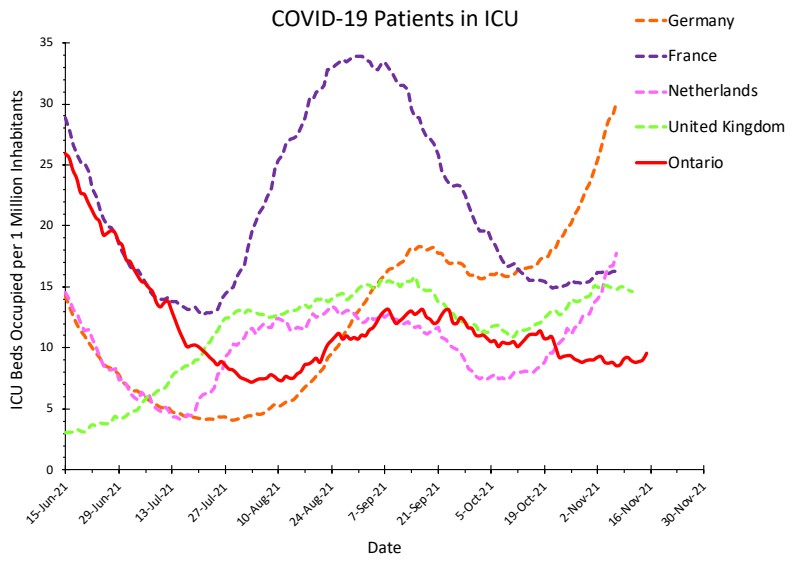
ICU occupancy is stable right now but as cases increase, ICU occupancy will also increase

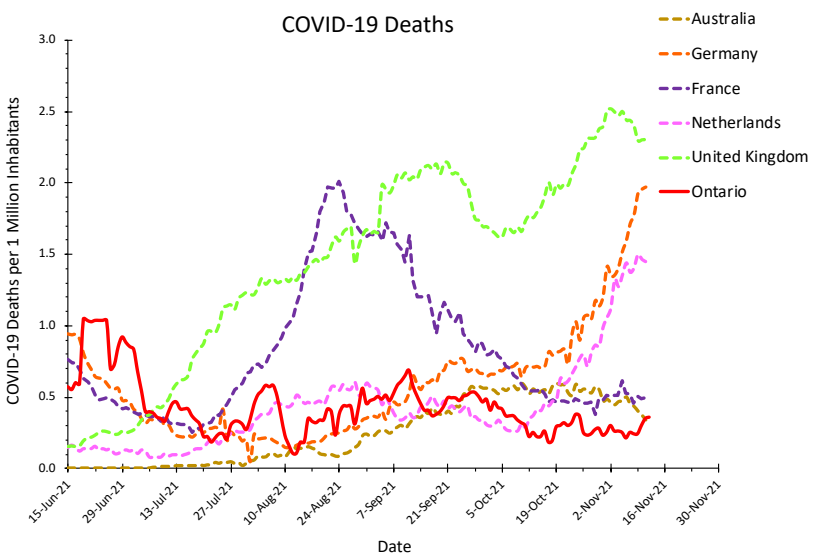


Predictions: COVID-19 ModCollab based on case predictions in previous slide.
Data (Observed ICU Occupancy): CCSO

Rising cases, ICU occupancy and deaths in European peer jurisdictions show potential risk







Ontario Stringency Index (43)

- Substantially lower than Australia and France (≥60).
- Lower/similar to Germany (44), Netherlands (42) and UK (41)

Ontario vaccine coverage (76% of population fully vaccinated) higher than

- Netherlands (73%)
- Australia (70%) and France (69%)
- Germany and UK (67%).

Analysis: Secretariat of the Science Advisory Table (https://covid19-sciencetable.ca/ontario-dashboard/)
Data: https://data.ontario.ca/ and https://ourworldindata.org/explorers/coronavirus-data-explorer

What business leaders can do to continue to mitigate risk in Ontario: drawing from behavioural science

Behavioural Science Working Group

Key Messages

- As Ontario businesses reopen, business leaders can continue to set the tone in supporting their staff and the public
- Business leaders can leverage this role to:
  - Foster trust and engagement in key public health and safety measures
  - Support ongoing efforts for workers and consumers to engage as safely as possible while minimizing disruptions
- Drawing from behavioural science can complement existing workplace policies and guidance

Background

- Ontario businesses have been hit hard by the pandemic. Business leaders and staff are working hard to ensure safe re-openings and operations

- Ontario business leaders continue to set the tone for what Ontarians *do* as workers and customers

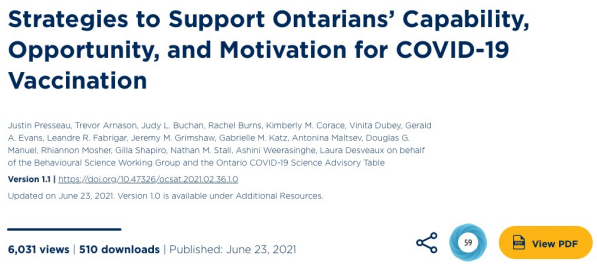
- Trust (and lack thereof) has been a key factor in the pandemic
  - Business leaders are positioned to make a difference by fostering trust in employees and customers in safe spaces and by reaching a broad diversity of Ontarians in ways and in places that others cannot

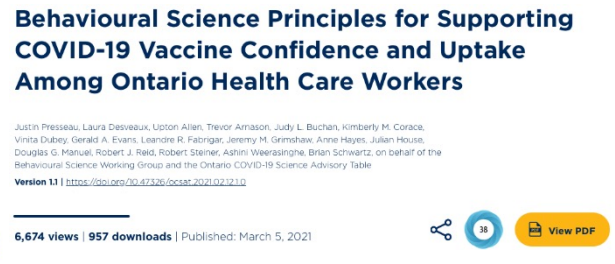
- Drawing from behavioural science can help to complement existing workplace policies and guidance

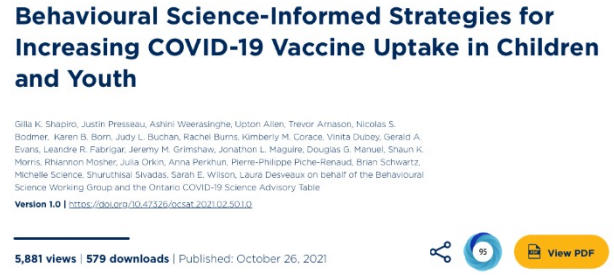
Ontario businesses are at the heart of our communities: Where Ontarians work, socialize, have fun

Ontario's business leaders are positioned to impact *staff* and *customers'* **capability**, **opportunity** and **motivation** to engage in daily life safely

We developed behavioural science-informed advice for decision makers to support Ontarians that business leaders can draw from to complement existing workplace policies







https://covid19-sciencetable.ca/sciencebrief/behavioural-science-principles-for-enhancing-adherence-to-public-health-measures/
https://covid19-sciencetable.ca/sciencebrief/strategies-to-support-ontarians-capability-opportunity-and-motivation-for-covid-19-vaccination/
https://covid19-sciencetable.ca/sciencebrief/behavioural-science-principles-for-supporting-covid-19-vaccine-confidence-and-uptake-among-ontario-health-care-workers/
https://covid19-sciencetable.ca/sciencebrief/behavioural-science-informed-strategies-for-increasing-covid-19-vaccine-uptake-in-children-and-youth/

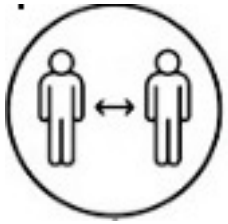
Drawing from behavioural science to support Ontarians

Preventing and managing COVID-19 has – and continues to – involve Ontarians *changing*, *adopting* and *maintaining* **what they do** to work and live as safely as possible, supported by the communities in which they live and work

Get vaccinated

Wear a mask indoors

Stay outdoors or in well-ventilated spaces



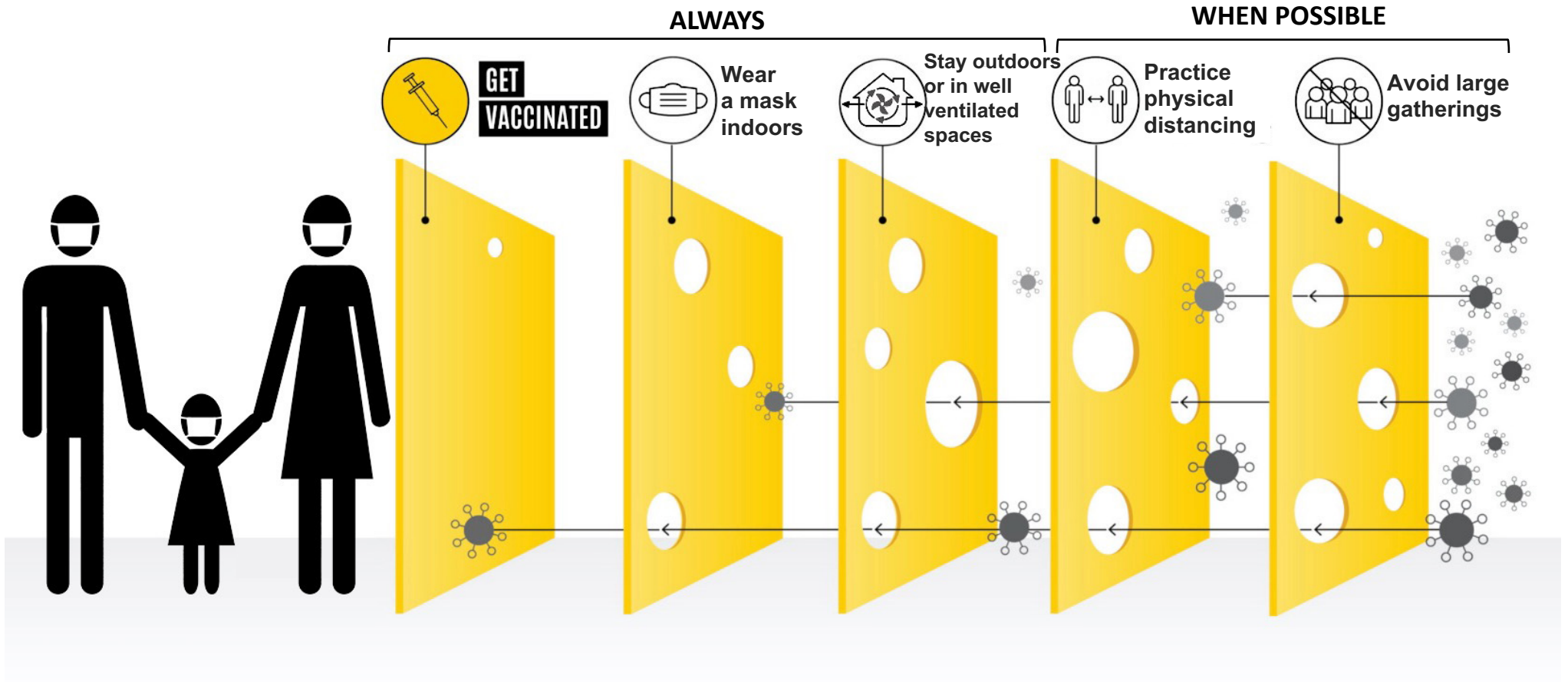
Practice physical distancing

Avoid large gatherings

3 key influences on people's **decisions** and **actions** that business leaders can support:

Capability + **Opportunity** + **Motivation**

Multiple layers of protection are needed to reduce transmission risks and protect those most vulnerable



- ✓ Each layer: involves starting and maintaining new behaviours over time and across relevant settings
- ✓ Behavioural science can help support your staff and customers to continue these behaviours to mitigate risk

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

Things you can do for STAFF

Get vaccinated

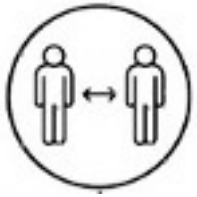
- **Train** customer-facing staff (if applicable) to check vaccine certificates, responding to questions. Empower staff to identify bottlenecks and solutions to verification process
- **Promote shared safety identity**: a 'we are in this together' identity through action across the organization
- **Amplify trusted information** and **opportunity for non-judgmental discussion** with trusted sources re: concerns
- **Make it easy**: allow staff to use paid work time to get vaccinated where feasible (or bring in pop-up clinic)
- **Incentivize** attendance to vaccination pop-up clinics (draws, vouchers, altruistic raffles)
- **Offer support** (e.g., paid time off) for staff to access vaccine appointments for their eligible children and family members eligible for boosters

Wear a mask indoors

- **Remind**: bring attention back to a now automatic behaviour
- **Upskill to mask better**: amplify videos, images and staff showing what we now know about effective mask wearing
- **Stay the course**: foster satisfaction with progress to date by making it clear how wearing a mask effectively is *making a difference* in keeping patrons and staff safe and businesses open

Stay outdoors or in well-ventilated spaces

- **Situate as layer of safety** alongside, not in replacement of other layers
- **Communicate ventilation/filtration updates** (if applicable): to reassure and set norm for air quality
- **Support use of indicators of poor ventilation** to prompt action (e.g., CO2 concentration monitors)



Practice physical distancing

- **Set the tone that physical distancing remains important**
- **Empower staff to review work environments** for opportunities to maintain physical distancing between staff, and between customers and to identify bottlenecks

Things you can do for CUSTOMERS

Get vaccinated

- **Leverage reach and familiarity of your locations**: Reach out to PHUs to host a pop-up vaccination at your locations for customers and staff, to reach under-served groups in the community
- **Describe benefits of vaccination checks:** to keep our most vulnerable safe indoors and to allow continued reopening
- **Contribute to positive vaccination social norms**: Amplify your own and a diversity of staff being vaccinated, and amplify the support you offer to staff (e.g., paid time off) for accessing vaccine appointments for eligible children and family members eligible for boosters

Wear a mask indoors

- **Appreciate effort**: Show appreciation for sustained effort in masking
- **Make reminders ok:** "we're doing our best, but we've all been caught with our masks on our chin, let's help each other out by making it ok to remind each other"
- **Make it as easy**: if possible, provide masks (especially if you serve communities where cost is an issue)
- **Promote positive social norm**: Show diversity of customers and staff wearing masks (e.g., those that look like me, have a similar job or life responsibilities, and do the things I do/want to do)
- **Update prompts**: Refresh/renew your masking prompts at key entry points to increase salience

Stay outdoors or in well-ventilated spaces

- **Consider outdoor options** (if applicable): e.g., winter holiday and other outdoor markets
- **Review and identify indoor locations with poorer ventilation** that may have higher risk of transmission + add prompts to ensure masking and distancing

Practice physical distancing

- **Leverage proof of vaccination**: when physical distancing more challenging and larger indoor crowds
- **Refresh signs**: new floor markings and signs to bring back to attention (faded signs = lack of importance)
- **Extend hours:** to prevent crowds (communicate peak and non-peak times to customers for holiday shopping)

Key Messages

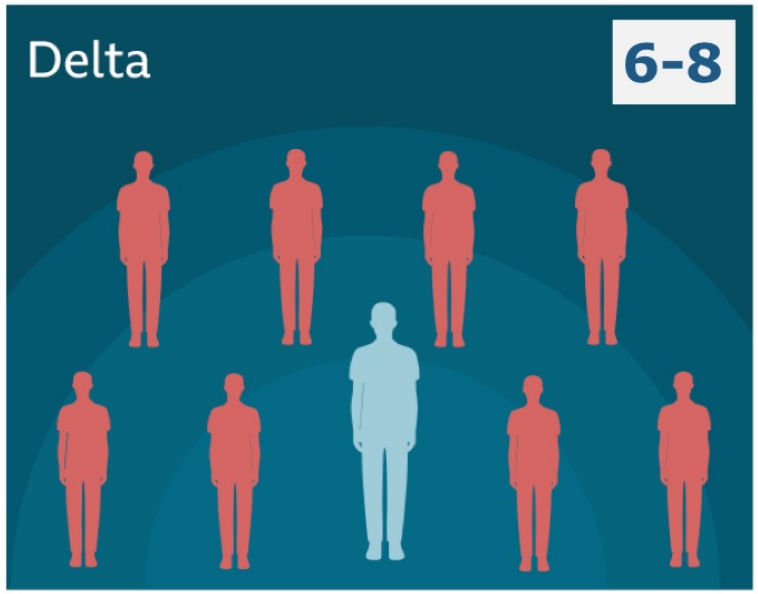
- As Ontario businesses reopen, business leaders can continue to set the tone in supporting their staff and the public
- Business leaders can leverage this role to:
  - Foster trust and engagement in key public health and safety measures
  - Support ongoing efforts for workers and consumers to engage as safely as possible while minimizing disruptions
- Drawing from behavioural science can complement existing workplace policies and guidance

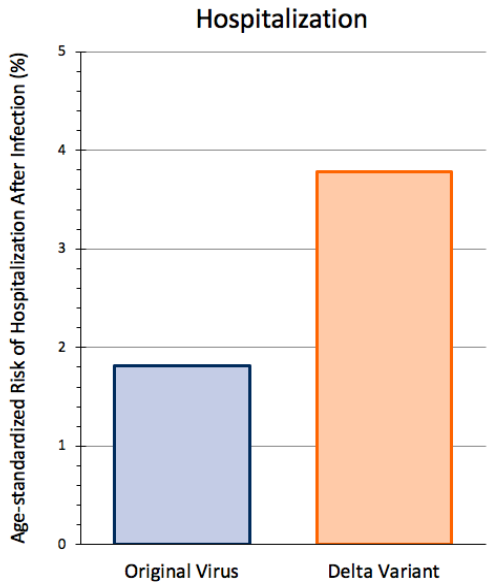
COVID Risk Mitigation in Large Retail Settings

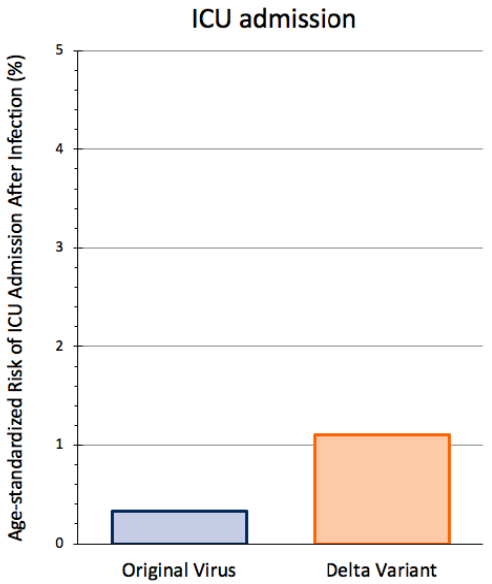
Key Messages

- COVID-19 vaccines are highly protective against infection and transmission, however public health measures are needed to protect vulnerable individuals and groups (e.g., immunocompromised, elderly, children) until vast majority of population has been vaccinated
- Risk of SARS-CoV-2 transmission depends on vaccination status of individuals, environmental factors and activity
- Risk of SARS-CoV-2 transmission can be reduced through multiple layers of protection
  - Supporting full dose of COVID-19 vaccination for all eligible individuals
  - Ongoing public health measures, such as masks, reduced indoor density, contact tracing and testing
  - Enhancing ventilation and filtration in indoor spaces
  - Taking into account nature of activity (e.g., singing, shouting, exercising, eating) and reducing duration of contact without a mask
- Businesses and retail should be familiar with legislation as well as resources provided by local public health units

The Delta Variant is more transmissible and result in a higher risk of severe disease







- The Delta variant is more than twice as transmissible than the original SARS-CoV-2 virus
- For delta, R_0 is 6-8: one infected individual (blue) is expected to infect 6-8 additional people without control measures
- The risk of hospital and ICU admission after infection is 2 to 3 times higher after infection with the Delta variant as compared with the original SARS-CoV-2 virus

Analysis: Secretariat of the Science Advisory Table
Data: https://data.ontario.ca/ and CCM plus, analysis based on Fisman & Tuite, medRxiv 2021

Without public health measures, the risk of explosive outbreaks remains large despite vaccination

Pockets of the population with low vaccine coverage: one infected individual expected to infect an additional 3.6 individuals on average, daily case numbers could double in less than 3 days

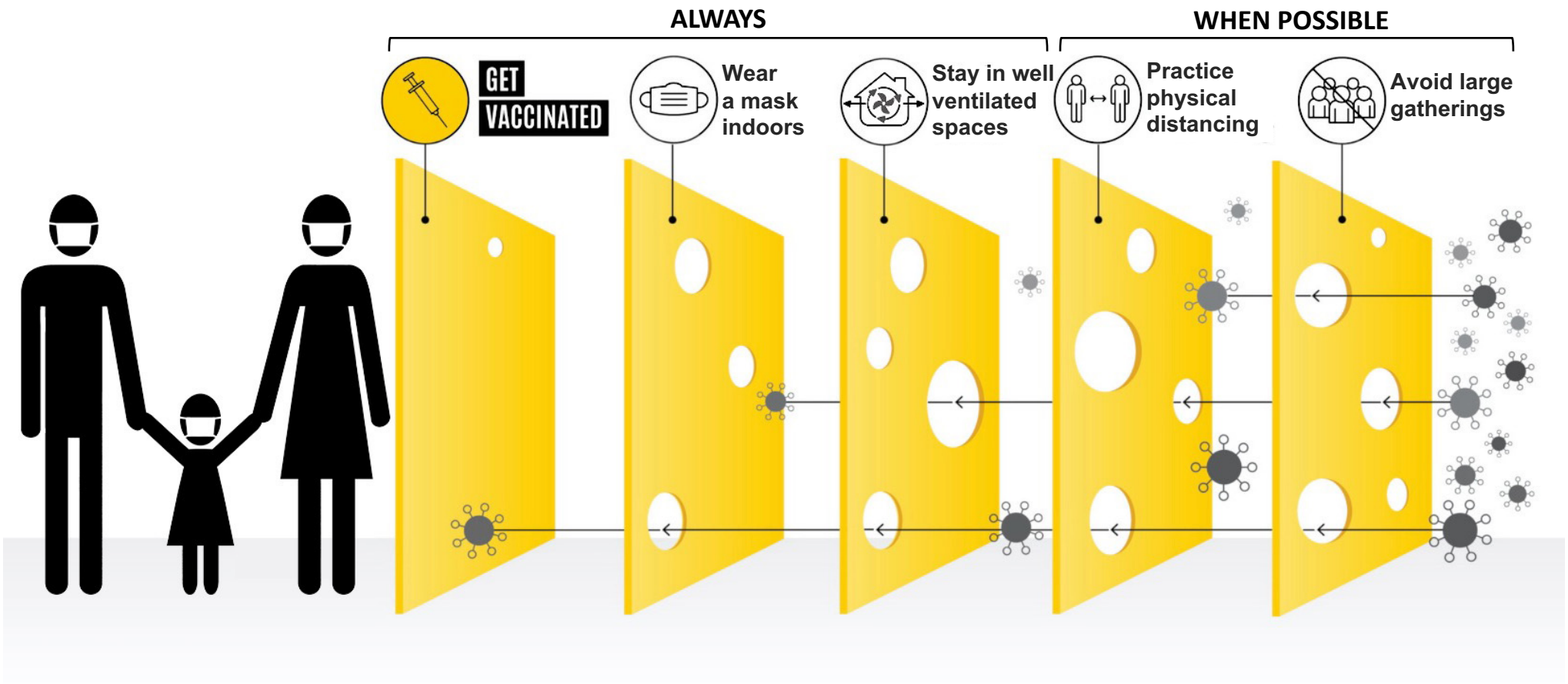
Population with high vaccine coverage: one infected individual expected to infect an additional 1.9 individuals on average, daily case numbers could still double in 5 to 6 days

Settings with vaccine certificates: risk strongly decreased, but additional measures still necessary to avoid any case growth

Percent fully vaccinated	Maximally possible Rt	Minimally possible doubling time
50%	4.22	2.5
60%	3.65	2.8
70%	3.08	3.2
80%	2.50	3.9
85%	2.26	4.4
90%	1.94	5.4
95%	1.67	7.1
100%	1.40	10.7

Rt: effective reproduction number; doubling time: the time required until a given daily number of cases doubles

Multiple layers of protection reduce transmission risks and protect vulnerable individuals and groups



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

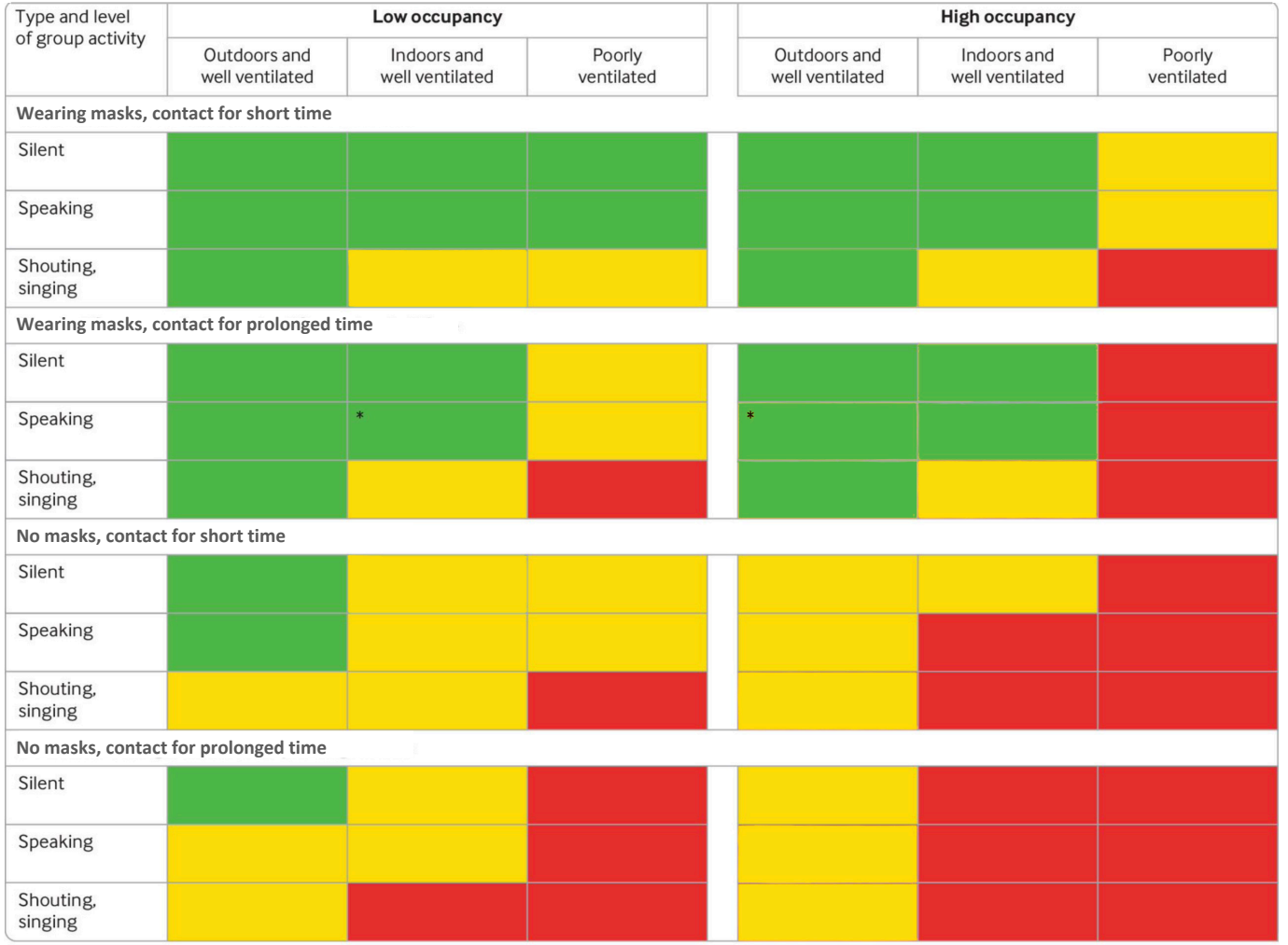
Multiple layers of protection can reduce transmission risk for vaccinated and unvaccinated populations and enhance safety

- Vaccines are highly protective, with nearly 11 million Ontarians fully vaccinated
  - There are approximately 4 million Ontarians who are not yet vaccinated or who are ineligible (children aged 11 years or younger)
- Vaccination reduces, but does not remove possibility of SARS-CoV-2 infection and transmission
  - 2 doses of vaccines: 85% reduction in the risk of SARS-CoV-2 infection and transmission, 97% reduction in the risk of serious illness due to COVID-19
  - Reduce the chance of developing Long COVID in breakthrough infections by about 50%
- Breakthrough SARS-CoV-2 infections and COVID-19 can be harmful to older and/or immunocompromised people

Risk of SARS-CoV-2 transmission considering activity, setting and duration of contact

Risk considerations include many factors:

- Vaccination status and vaccine mandates for indoor settings
- Prevalence of COVID-19 in wider community
- Mask fit and quality (surgical masks are more protective than single-layer cloth masks)
- Ventilation and filtration
- Nature of activity (e.g., exercise, singing, shouting)
- Presence of vulnerable populations (e.g., children ineligible for vaccines, elderly, immunocompromised)

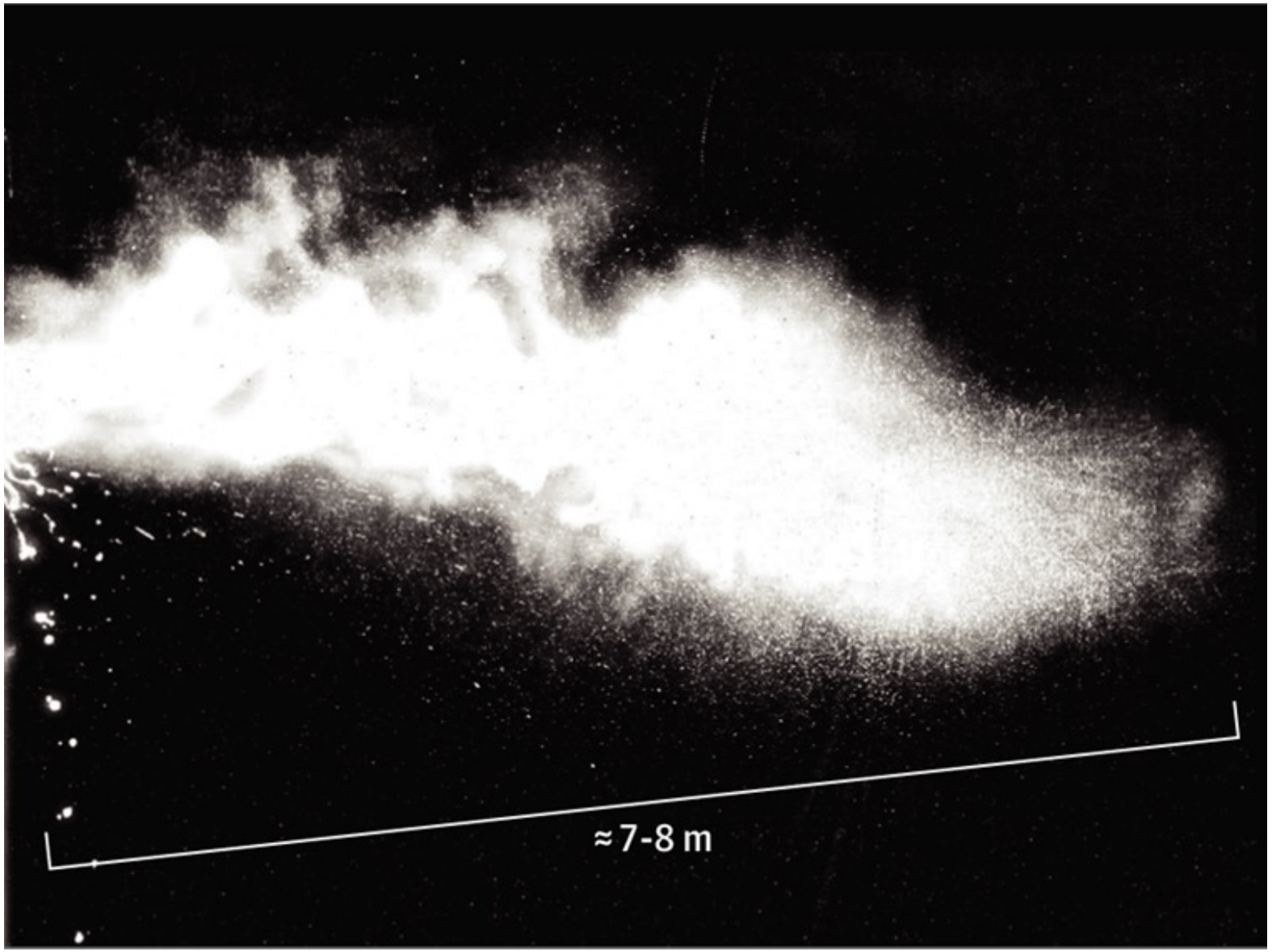


Adapted from Nicholas R Jones et al. BMJ 2020;370:bmj.m3223

Ventilation and filtration are important in reducing SARS-CoV-2 transmission

- SARS-CoV-2 transmission occurs through aerosols and respiratory droplets which linger in the air and are inhaled or are deposited
  - Delta variant increases viral load in upper respiratory tract and becomes infectious faster than previous strains of the virus, which increases transmission
- Ventilation and filtration to improve indoor air quality are particularly important for enclosed spaces and indoor settings where people are in close proximity
  - Ventilation supplies and distributes air from a space by natural (open windows or doors) or mechanical means (HVAC – heating ventilation and air conditioning – systems)
  - Filtration passes indoor air through filters to remove particles and recirculate filtered air
- Ventilation and filtration in combination with other protective strategies (e.g., vaccination, vaccine certificates, masking, physical distancing and hand hygiene, contact tracing and testing) can reduce COVID-19 transmission risk

Exhaled gas clouds with infectious particles can reach long distances without measures



Measures to ensure indoor spaces are kept safe:

- Masks
- Minimize crowding
- Ventilation
- Filtration if ventilation is insufficient

Bourouiba, JAMA 2020

Strategies to assess ventilation and reduce transmission through ventilation and filtration

- Assess existing HVAC system infrastructure and ensure regular maintenance
  - HVAC systems should be optimized for respiratory particle removal by using the highest rated Minimum Efficiency Reporting Value (MERV) filter
  - Filters should be regularly inspected and replaced
- Increase ventilation and filtration in spaces where respiratory aerosols and droplets are more likely to be generated, for example where people eat, sing or exercise indoors
- Digital sensors to measure indoor carbon dioxide (CO_2) concentrations can identify poor indoor air quality and measure the impact of ventilation strategies

Strategies to reduce SARS-CoV-2 transmission indoors

- De-densify indoor spaces when possible and limit unnecessary mixing and crowding in common areas
- Natural ventilation (open windows, doors) should be added to spaces whenever comfortable and possible
- In spaces where HVAC upgrades are not possible:
  - Portable air cleaners with high-efficiency particulate absorbing (HEPA) filters can be used
  - Ceiling fans can be used alongside fresh air ventilation with blades rotating counter-clockwise to draw air upwards
  - A window box fan with air exhausting outwards can be installed

Key Messages

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Appendices and references

Science Briefs of the Ontario COVID-19 Science Advisory Table:

- Thompson A, Stall NM, Born KB, et al. Benefits of paid sick leave during the COVID-19 pandemic: https://covid19-sciencetable.ca/sciencebrief/benefits-of-paid-sick-leave-during-the-covid-19-pandemic/
- Science M, Thampi N, Bitnun A, et al. School Operation for the 2021-2022 Academic Year in the Context of the COVID-19 Pandemic. https://covid19-sciencetable.ca/sciencebrief/school-operation-for-the-2021-2022-academic-year-in-the-context-of-the-covid-19-pandemic/

Additional References & Resources

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- Use of Portable Air Cleaners and Transmission of COVID- 19. Public Health Ontario. (Dec. 31, 2020). https://www.publichealthontario.ca/-/media/documents/ncov/ipac/2021/01/faq-covid-19-portable-air-cleaners.pdf?la=en
- Design Strategies To Prevent Respiratory Infection In Congregate Care Settings. Evidence Synthesis Unit, Research Analysis and Evaluation Branch, Ministry of Health. June 10, 2021. https://esnetwork.ca/briefings/design-strategies-to-prevent-respiratory-infectiotw-in-congregate-care-settings/?highlight=ventilation
- Rapid review: Does Toronto Public Health emphasize indoor air quality in its public COVID-19 advice to congregate settings? MAP Centre for Urban Health Solutions. https://maphealth.ca/public-health-ventilation/