

COVID Risk Mitigation in Large Retail Settings

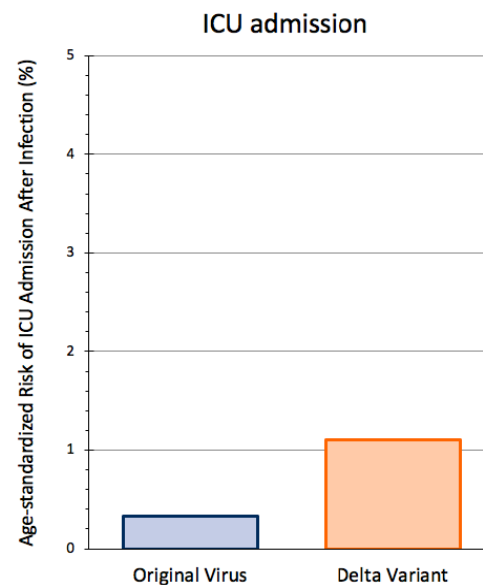
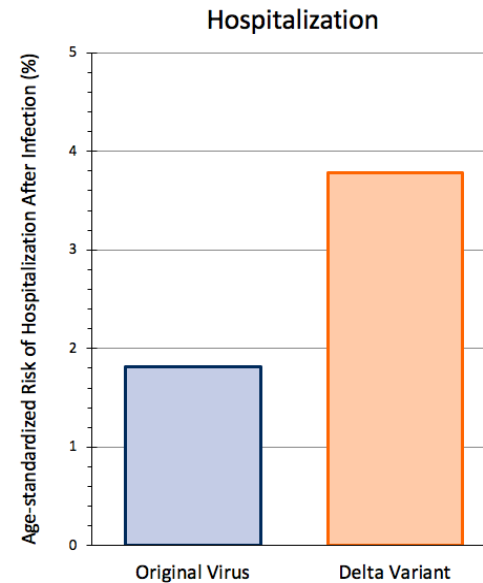
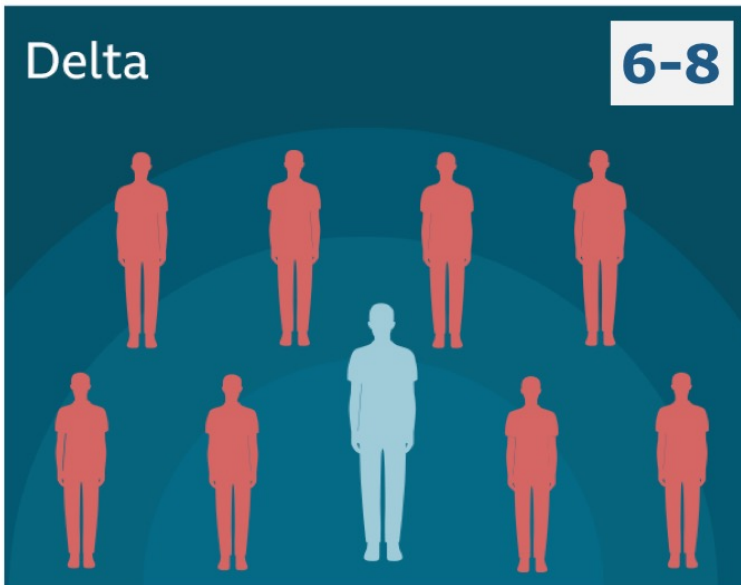
This slide deck is based on a presentation to the Retail Council of Canada, at their invitation, on September 30, 2021. It has been updated to include more recent information.



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



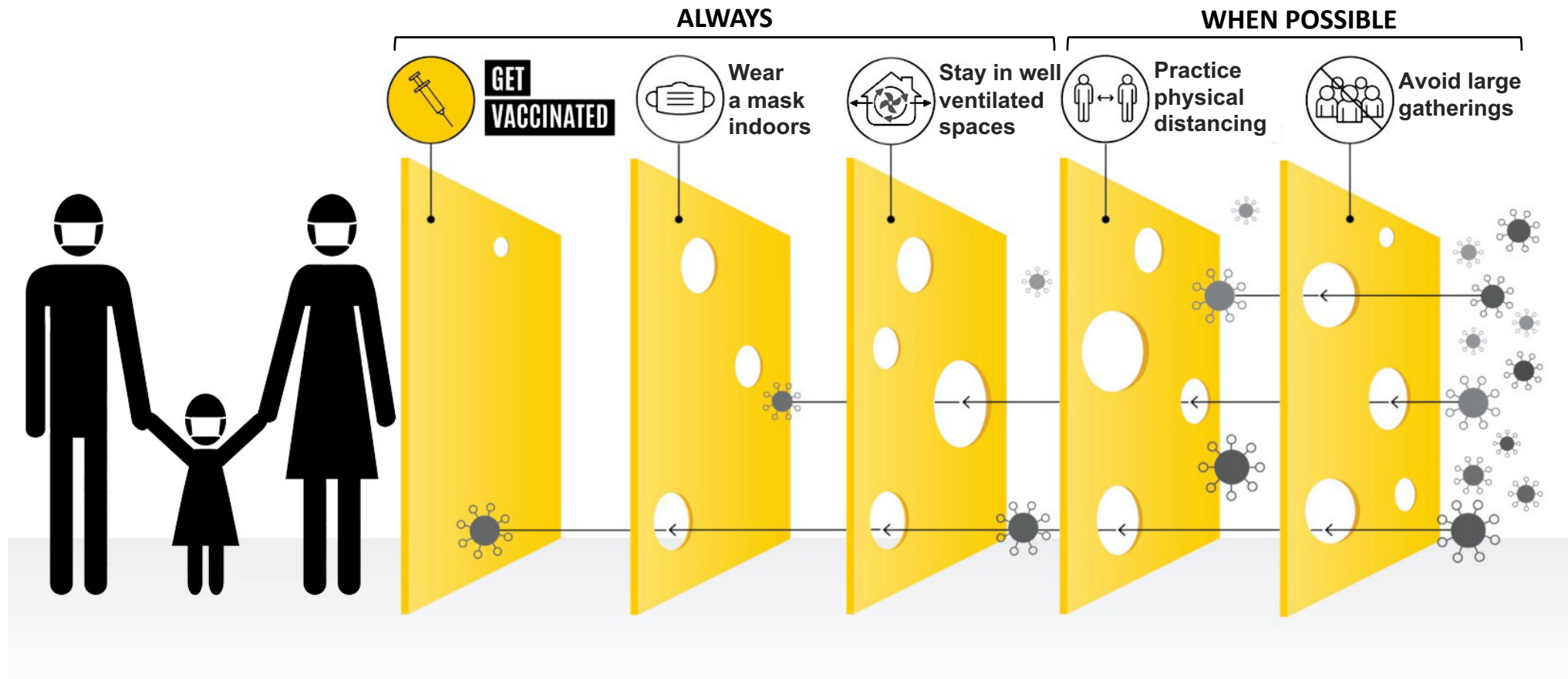
- The Delta variant is more than twice as transmissible than the original SARS-CoV-2 virus
- For delta, R_0 is 6-8: one infected individual (blue) is expected to infect 6-8 additional people without control measures
- The risk of hospital and ICU admission after infection is 2 to 3 times higher after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

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

	Percent fully vaccinated	Maximally possible Rt	Minimally possible doubling time
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	50%	4.22	2.5
	60%	3.65	2.8
	70%	3.08	3.2
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	80%	2.50	3.9
	85%	2.26	4.4
	90%	1.94	5.4
	95%	1.67	7.1
Settings with vaccine certificates: risk strongly decreased, but additional measures still necessary to avoid any case growth	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)

Type and level of group activity	Low occupancy			High occupancy		
	Outdoors and well ventilated	Indoors and well ventilated	Poorly ventilated	Outdoors and well ventilated	Indoors and well ventilated	Poorly ventilated
Wearing masks, contact for short time						
Silent	Low	Low	Low	Low	Low	Medium
Speaking	Low	Low	Low	Low	Low	Medium
Shouting, singing	Low	Medium	Medium	Low	Medium	High
Wearing masks, contact for prolonged time						
Silent	Low	Low	Medium	Low	Low	High
Speaking	Low	*	Medium	*	Low	High
Shouting, singing	Low	Medium	High	Low	Medium	High
No masks, contact for short time						
Silent	Low	Medium	Medium	Medium	Medium	High
Speaking	Low	Medium	Medium	Medium	High	High
Shouting, singing	Medium	Medium	High	Medium	High	High
No masks, contact for prolonged time						
Silent	Low	Medium	High	Medium	High	High
Speaking	Medium	Medium	High	Medium	High	High
Shouting, singing	Medium	High	High	Medium	High	High

Risk of transmission

Low ■ Medium ■ High ■

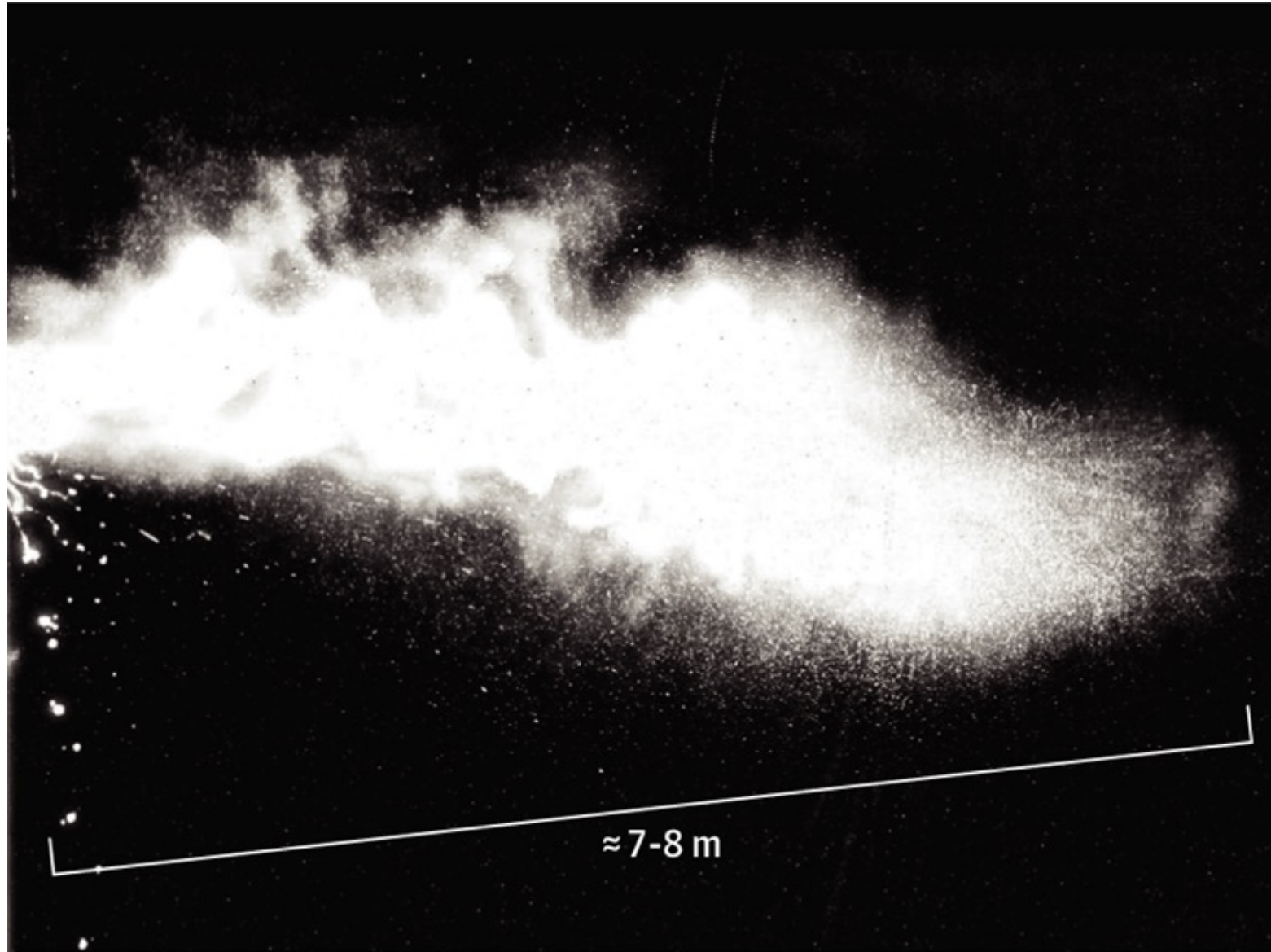
* Borderline case that is highly dependent on quantitative definitions of distancing, number of individuals, and time of exposure

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

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 (CO₂) 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

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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

- Ontario Workplace Safety Plan Builder: <https://www.workplacesafetyplanbuilder.labour.gov.on.ca>
- 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/>