

Rapid review: does Toronto Public Health emphasize indoor air quality in its public COVID-19 advice to congregate settings?

Publication information

Authors:

Amy Katz, MAP, St. Michael's Hospital, Unity Health Toronto

Amy (Tianyuan) Li, Department of Civil and Mineral Engineering, University of Toronto

LLana James, Centre for Health Innovation, School of Computing and Department of Biomedical and Molecular Sciences, Queen's University

Patricia O'Campo, Unity Health Toronto and Dalla Lana School of Public Health, University of Toronto

Jeff Siegel, Department of Civil and Mineral Engineering, University of Toronto

Correspondence: amy.katz@unityhealth.to

Published: September 17, 2021

To cite: Katz A, Li T, James L, O'Campo P & Siegel J. MAP Centre for Urban Health Solutions. September 17, 2021. Rapid review: does Toronto Public Health emphasize indoor air quality in its public COVID-19 advice to congregate settings? Available at: <https://maphealth.ca/public-health-ventilation>

Contents

- Review summary – p. 1
- Urgent recommendations for public health – p. 2
- Methods – p. 3
- References – p. 4
- Appendix 1 (all findings) – <https://maphealth.ca/wp-content/uploads/rapidreviewTPH-Appendix1.pdf>

Review summary

What we did: We conducted a detailed review of documents referenced in Toronto Public Health's "[Congregate Living Settings Toolkit](#)" (May 14, 2021) which "...provides an overview of resources for those working on COVID-19 prevention and response in congregate living settings (e.g., shelters, group homes, supportive housing)."¹ This toolkit lists resources developed by Toronto Public Health (TPH), Public Health Ontario (PHO) and the Ontario Ministry of Health (MOH).

What are congregate settings: According to PHO, "Congregate living settings refer to a range of facilities where people (most or all of whom are not related) live or stay overnight and use shared spaces..."² In the toolkit, TPH provides the specific examples of shelters, group homes and supportive housing.¹

Why we did it: Since 2020, scientists, engineers, and physicians have been sharing evidence demonstrating that COVID-19 transmission is airborne, and urging public health authorities in Ontario and around the world to take action.³⁻⁶ Improvements to indoor air quality are central to addressing airborne transmission. These improvements can be accomplished through ventilation, filtration and, in some cases, ultraviolet disinfection.³⁻¹³

Congregate settings are high-risk sites for COVID-19 infection, as demonstrated by outbreaks in facilities such as shelters, group homes for adults living with disabilities, and long-term care homes in Toronto, and across Ontario.¹⁴⁻¹⁶ While vaccination has reduced this risk, breakthrough infections and evolving variants require ongoing measures for COVID-19 infection prevention and control.¹⁷

As a result, we wanted to explore TPH's approach to indoor air quality in the spring of 2021, more than one year into the pandemic. In particular, we wanted to know if TPH was emphasizing indoor air quality in its public advice to congregate settings about COVID-19.

Improvements to indoor air quality also have the potential to reduce transmission of other respiratory illnesses such as tuberculosis and flu, help address symptoms of chronic conditions such as asthma, and mitigate impacts of future pandemics.^{18,19}

What we found: In the spring of 2021, TPH was not emphasizing indoor air quality in its public COVID-19 advice to congregate settings. **The resources listed in TPH's "Congregate Settings Toolkit" provide almost no guidance related to ventilation, HVAC systems, portable air filtration or ultraviolet disinfection.** As result, some congregate settings in Toronto such as shelters may not have the information or supports they need to implement evidence-based practices to help reduce airborne transmission of COVID-19.

While our detailed review focused on TPH's "Congregate Living Settings Toolkit," similar patterns exist in additional public COVID-19 guidance for congregate settings provided by TPH and other City of Toronto departments. As of August 11, 2021, resources listed on the City of Toronto's "COVID-19 Guidance: Homelessness Services & Congregate Living Settings" web page contain few mentions of ventilation, filtration, ultraviolet disinfection, or indoor air quality in general.²⁰

Please see [Appendix 1](#) for all findings. Table 1 lists each resource included for review, and notes the appearance of key words such as “aerosol,” “ventilation” and “window.” Table 2 notes the context in which key words appear.

Context for TPH guidance: The guidance and actions of TPH are likely heavily informed by PHO,²¹ an organization that has notably downplayed the risk of airborne transmission.^{22,23} Most of the materials cited in TPH’s toolkit are sourced from PHO, and most of these contain no references to airborne transmission outside of the context of aerosol-generating medical procedures (see detailed findings in Appendix 1). Other Public Health Units in Ontario also seem to be following the province’s lead, relying heavily on PHO and MOH materials in their public guidance for congregate settings.²⁴⁻²⁹

Future research should explore the different influences on the guidance, supports and inspections provided by local public health units in Ontario, and the capacity these units have to respond to evolving evidence and fulfill their mandates to protect public health.

Urgent recommendations for public health

In 2007, the SARS commission's final report found that denial of airborne transmission may have been a factor in generating preventable death in Ontario. The report urges decision-makers to adopt the precautionary principle in the context of public health pandemic measures, and makes explicit mention of the failure to adopt this principle in the context of potential airborne transmission of SARS.^{30, p.1157} Future inquiries may wish to explore the decisions, accountabilities and conditions in the Ministry of Health and Long-Term Care, at PHO and in Ontario’s public health units that led to similar dynamics during the COVID-19 pandemic.

As the pandemic continues, PHO and TPH should urgently and publicly:

1. Build capacity and retain permanent expertise related to indoor air quality.
2. Include metrics related to indoor air quality in all facility appraisals and inspections.
3. Inform congregate settings in Toronto and province-wide that improvements to indoor air quality are key infection prevention and control measures for COVID-19 and other respiratory illnesses.
4. Update all guidance to reflect the above and place caveats on outdated guidance.
5. Ensure that individual guidance documents are clear, accessible and comprehensive—our review revealed a maze of lists, hyperlinks and web pages, many of which led to outdated resources.
6. Ensure that all congregate settings receive and implement updated guidance. This includes providing practical supports to congregate settings to address indoor air quality and establishing evidence-based occupancy levels on an emergency basis.

7. Ensure that guidance aimed at congregate settings in Ontario, including IPAC trainings, emphasizes the importance of engineering controls, and builds capacity to implement these controls. At present, public COVID-19 guidance for congregate settings in Ontario largely places responsibility for infection prevention and control onto individual workers instead of onto facilities and systems. For example, while resources for congregate settings rarely mention building-related measures such as HVAC improvements and ultraviolet disinfection, they provide detailed advice on cleaning and disinfection, handwashing, distancing signage and PPE (excluding N95 masks, which PHO guidance indicates should be reserved for aerosol-generating procedures).

Methods

How we did it:

a. *Identifying and reviewing documents.*

- We started by looking through resources referenced in Toronto Public Health's "[Congregate Living Settings Toolkit](#)" (May 14, 2021) which "...provides an overview of resources for those working on COVID-19 prevention and response in congregate living settings..."
- We then identified resources that a) focused on congregate settings, and b) could reasonably be expected to reference measures related to indoor air quality. Through this process, we identified 13 primary resources for review.
- We explored hyperlinks in the primary resources to look for additional relevant materials. We did not explore reference sections. Where resources were identified as having been adapted directly from another document, we did not explore the source document. Through this process, we identified 16 secondary resources for review. We did not explore the hyperlinks in secondary resources.
- In total, 29 resources were included in our review. These included written documents, online training modules and webinar slides (we did not watch webinars).
- We excluded documents that focused on personal protective equipment, cleaning and disinfection, handwashing, screening and vaccination. We also excluded documents that were not developed specifically for congregate settings—for example, measures directed generally at individuals who may have been exposed to COVID-19. Finally, we excluded resources that were simply lists of other resources.

- #### b. *Choosing keywords.* We chose the following keywords: airborne, aerosol(s), HVAC, ventilation, ventilate, filtration, filter, HEPA, portable, exhaust, fan, window(s), ultraviolet and UV. We chose these keywords because best practices for reducing airborne transmission (also termed "aerosol" transmission) of COVID-19 through improvements to indoor air quality include ventilation, filtration, and, in some cases, ultraviolet disinfection.²⁻¹²

- c. *Exploring documents.* We searched for keywords in the 29 primary and secondary documents included for review. We did not search keywords in reference sections. We also audited primary and secondary resources for context, to make sure we weren't missing references to measures to address indoor air quality.
- d. *Storing documents.* All documents were vetted online in July and August, 2021. As content may change, we have downloaded and stored archived web pages and PDF copies of documents. These are available for reference by request.

Limitations:

This review provides a point-in-time snapshot of TPH guidance to a specific sector during the COVID-19 pandemic—a key step in identifying ways to improve current and future responses to airborne transmission of infectious disease. Our goal was to explore whether or not measures such as ventilation and filtration were prioritized—placed front and centre—in this guidance in the spring of 2021, more than one year into the COVID-19 pandemic. As a result, we focused only on documents listed on Toronto Public Health's "[Congregate Living Settings Toolkit.](#)"

This review does not offer a comprehensive view of all public health guidance to congregate settings in Ontario. In particular, it does not offer a comprehensive view of guidance tailored to specific types of congregate settings such as prisons or long-term care homes. For example, we found a web page from TPH specifically for long-term care homes that directs the reader to a resource from the Public Health Agency of Canada (PHAC) on ventilation and filtration.^{31, 10} This PHAC resource, however, was not listed in TPH's May 2021 tool kit for congregate settings.

References

1. Toronto Public Health. Congregate Living Setting Resources Toolkit. (May 14, 2021). Available at: <https://www.toronto.ca/wp-content/uploads/2021/05/8e64-Congregate-Living-Settings-Resources.pdf>
2. Public Health Ontario. COVID-19 resources for congregate living settings (web page). Accessed August 5, 2021. Available at: <https://www.publichealthontario.ca/en/diseases-and-conditions/infectious-diseases/respiratory-diseases/novel-coronavirus/congregate-living-settings-resources>
3. Greenhalgh T et al. Ten scientific reasons in support of airborne transmission of SARS-CoV-2. The Lancet. April 15, 2021. Available at: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)00869-2/fulltext#articleInformation](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00869-2/fulltext#articleInformation)
4. Glowacki L. Doctors, engineers call on Ontario to address airborne spread of COVID-19. CBC. November 26, 2020. Available at: <https://www.cbc.ca/news/canada/ottawa/ontario-doctors-engineers-letter-province-aerosols-covid-19-1.5816459>

5. Morawska L, Milton DK et al. It is time to address airborne transmission of Coronavirus Disease 2019 (COVID-19). *Clinical Infectious Diseases*, Volume 71, Issue 9. November 1, 2020. Available at: <https://doi.org/10.1093/cid/ciaa939>
6. Office of the Chief Science Advisor of Canada. The role of bioaerosols and indoor ventilation in COVID-19 transmission. September 28, 2020. Available at: [https://science.gc.ca/eic/site/063.nsf/vwapj/Report-bioaerosols-and-ventilation.pdf/\\$file/Report-bioaerosols-and-ventilation.pdf](https://science.gc.ca/eic/site/063.nsf/vwapj/Report-bioaerosols-and-ventilation.pdf/$file/Report-bioaerosols-and-ventilation.pdf)
7. Lindsley WG, Derk RC, Coyle JP, et al. Efficacy of portable air cleaners and masking for reducing indoor exposure to simulated exhaled SARS-CoV-2 aerosols. *MMWR Morb Mortal Wkly Rep*. July 2, 2021. Available at: <https://www.cdc.gov/mmwr/volumes/70/wr/mm7027e1.htm>
8. Centers for Disease Control. Upper-Room Ultraviolet Germicidal Irradiation (UVGI). May 20, 2021. Available at: https://www.cdc.gov/coronavirus/2019-ncov/downloads/community/323805-B-FS_UpRoom_UVGI_101.pdf
9. Peng Z, Bahnfleth W, Buonanno G, et al. May 7, 2021. Practical Indicators for risk of airborne transmission in shared indoor environments and their application to COVID-19 outbreaks. Pre-print available at: <https://doi.org/10.1101/2021.04.21.21255898>
10. Allen JG, Ibrahim AM. Indoor air changes and potential implications for SARS-CoV-2 transmission. *JAMA*. April 16, 2021. Available at: <https://jamanetwork.com/journals/jama/fullarticle/2779062>
11. Public Health Agency of Canada. COVID-19: Guidance on indoor ventilation during the pandemic. January 18, 2021. Available at: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/guidance-documents/guide-indoor-ventilation-covid-19-pandemic.html>
12. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Epidemic Task Force. Core recommendations for reducing airborne infectious aerosol exposure. January 6, 2021. Available at: <https://www.ashrae.org/file%20library/technical%20resources/covid-19/core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf5>
13. Morawska L, Tang JW, Bahnfleth W, et al. How can airborne transmission of COVID-19 indoors be minimised? September, 2020. *Environ Int*. Available at: <https://www.sciencedirect.com/science/article/pii/S0160412020317876>
14. Draaisma M. Toronto reports COVID-19 outbreaks at 20 homeless shelters, over 300 cases, 1 recent death. April 27, 2021. *CBC*. Available at: <https://www.cbc.ca/news/canada/toronto/toronto-shelters-in-outbreak-unhoused-people-one-death-covid-19-1.6003201>
15. Loreto N. The COVID outbreaks that Ontario wasn't counting. July 1, 2021. *Macleans*. Available at: <https://www.macleans.ca/news/canada/the-covid-outbreaks-that-ontario-wasnt-counting/>
16. Zlomislic D. At least 50 Ontario long-term-care homes have a COVID-19 outbreak. March 27, 2021. *Toronto Star*. Available at: <https://www.thestar.com/news/investigations/2021/03/27/at-least-45->

[ontario-long-term-care-homes-have-a-covid-19-outbreak-how-many-staff-in-the-homes-are-vaccinated-the-province-has-no-reliable-idea.html](#)

17. Public Health Ontario. Confirmed cases of COVID- 19 following vaccination in Ontario: December 14, 2020 to July 24, 2021. Available at: <https://www.publichealthontario.ca/-/media/documents/ncov/epi/covid-19-epi-confirmed-cases-post-vaccination.pdf?la=en>

18. Siegel J. Reducing transmission of respiratory illness in community spaces through improved indoor air quality—edited conversation with Dr. Jeffrey Siegel. July, 2021. MAP Centre for Urban Health Solutions. Available at: <https://maphealth.ca/wp-content/uploads/Ventilation-Summary.pdf>

19. James L, Siegel J, O’Campo P, Katz A. How safe are Ontario’s shelters and other shared living settings from airborne COVID-19? June 28, 2021. The Conversation. Available at: <https://theconversation.com/how-safe-are-ontarios-shelters-and-other-shared-living-settings-from-airborne-covid-19-163063>

20. City of Toronto. COVID-19 Guidance: Homelessness Services & Congregate Living Settings. Accessed and archived, August 11, 2021. Available at: <https://www.toronto.ca/home/covid-19/covid-19-reopening-recovery-rebuild/covid-19-reopening-guidelines-for-businesses-organizations/covid-19-guidance-homelessness-services-congregate-living-settings/>

21. Public Health Ontario. Ontario public health system. June 16, 2020. Available at: <https://www.publichealthontario.ca/en/about/blog/2020/ontario-public-health-system>

22. Bridge S, Roumeliotis I, Loiero J. Ontario health guidance downplays aerosol spread of COVID-19. Critics say this puts lives at risk. Jun 20, 2021. CBC. Available at: <https://www.cbc.ca/news/canada/toronto/covid-aerosol-transmission-ontario-1.6071665>

23. Wang, S. Public health units are giving outdated COVID-19 safety guidance. And experts say that could be dangerous. May 24, 2021. Toronto Star. Available at: <https://www.thestar.com/news/investigations/2021/05/24/public-health-units-are-giving-outdated-covid-19-safety-guidance-and-experts-say-that-could-be-dangerous.html>

24. Halton Region. Long-term Care and Retirement Homes - Infection Prevention and Control (IPAC). Accessed August 23, 2021. Available at: [https://www.halton.ca/For-Business/Professionals/Infection-Prevention-and-Control-\(IPAC\)/Long-term-Care-and-Retirement-Homes-Infection-Pr](https://www.halton.ca/For-Business/Professionals/Infection-Prevention-and-Control-(IPAC)/Long-term-Care-and-Retirement-Homes-Infection-Pr)

25. Public Health Sudbury. Congregate living settings (COVID-19). Accessed August 23, 2021. Available at: <https://www.phsd.ca/health-topics-programs/diseases-infections/coronavirus/congregate-living-settings-covid-19/>

26. Public Health Wellington-Dufferin-Guelph. Other congregate living settings. Accessed August 23, 2021. Available at: <https://www.wdgppublichealth.ca/your-health/covid-19-information-workplaces-and-living-spaces/other-congregate-living-settings>

27. Renfrew County and District Health Unit. Congregate living settings. Accessed August 23, 2021. Available at: <https://www.rcdhu.com/for-professionals/congregate-living-settings/>
28. Simcoe-Muskoka District Health Unit. COVID-19 public health guidance for shelters. Accessed August 23, 2021. Available at: <https://www.simcoemuskokahealth.org/docs/default-source/COVID-/Partners-and-Municipalities/guidance-for-shelters.pdf?sfvrsn=18>
29. Thunder Bay District Health Unit. COVID-19: Congregate living settings (sub-section, guidance documents for congregate living settings), Accessed August 23, 2021. Available at: <https://www.tbdhu.com/congregateliving>
30. Campbell, A. Spring of fear: the SARS Commission final report. 2006. Available at: http://www.archives.gov.on.ca/en/e_records/sars/report/v2.html
31. COVID-19 Guidance: Long-Term Care Homes. April 17, 2021. City of Toronto. Available at: <https://www.toronto.ca/home/covid-19/covid-19-reopening-recovery-rebuild/covid-19-reopening-guidelines-for-businesses-organizations/covid-19-guidance-long-term-care-homes/>.



MAP is part of the Li Ka Shing Knowledge Institute of St. Michael's Hospital and is fully affiliated with the University of Toronto. St. Michael's is a site of Unity Health Toronto, which also includes Providence Healthcare and St. Joseph's Health Centre.

Learn more at MAPhealth.ca