



COVID-19

Updated February 2021

Enhanced Ventilation: *Prudent actions to help control airborne virus transmission*

Working indoors or in an enclosed environment? Concerned about exposure to the COVID-19 virus? Health and safety law says your employer must take every reasonable precaution to protect you. But what is reasonable in the circumstances?

Answers to this question have evolved over time. First, we saw the findings of researchers, then we eventually saw changes to guidance from most public health authorities including the U.S. Centers for Disease Control and Prevention (CDC), the World Health Organization and the Public Health Agency of Canada.

Since the outset of the COVID-19 pandemic, efforts to prevent transmission have focused on person-to-person close contact. In short, addressing situations where an infected person emits large respiratory droplets that quickly settle in the mouth, nose or eyes or inhaled directly into the lungs of anyone in the immediate vicinity. This route of transmission remains a common source of potential exposure and as such, at the heart of measures to prevent the spread of COVID-19.

Of lesser concern now however is direct contact with surfaces contaminated by large respiratory droplets or hands contaminated with the virus. The [U.S. CDC](#) for instance, have altered their advice stating transmission through contaminated surfaces is “not thought to be a common way that COVID-19 spreads.” This isn’t to say cleaning and disinfecting surfaces is no longer important, it just means in terms of priorities this route of transmission falls behind others.

GROWING CONSENSUS ON AEROSOL TRANSMISSION

Public health advice has also changed when it comes to small respiratory aerosols emitted by infected persons. According to scientists another [significant lesson](#) driven home through the experience of the pandemic is “the distinction between [large] ‘droplet’ and [small] ‘aerosol’ spread is a false dichotomy that is inconsistent with contemporary knowledge about respiratory aerosols.” Persons infected with the virus — even with no symptoms — can emit both large droplets and smaller aerosols, even when they talk or breathe and not just when they cough or sneeze. Smaller infectious viral particles can remain suspended and accumulate in the air, especially in poorly ventilated indoor spaces, for hours. They can also travel distances greater than six feet depending on the surrounding air flow.

So, while current public health directives (including physical distancing, wearing masks and respirators, proper sneeze/cough etiquette, hand hygiene and enhanced cleaning and disinfecting protocols) are critical, many are proposing further reasonable precautions in the form of enhanced ventilation to help prevent or reduce exposure and transmission.

Globally-recognized standards setting organizations, including the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), concur. [ASHRAE](#) has stated, “Transmission of SARS-CoV-2 [the virus that causes COVID-19 disease] through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures.”

MEASURES FOR SAFER, HEALTHIER BUILDING VENTILATION

In addition to ASHRAE, many other organizations including [U.S. Centres for Disease Control and Prevention](#) (CDC), [Occupational Safety and Health Administration](#) (OSHA), [Harvard University T.H. Chan School of Public Health](#), [Public Health Agency of Canada](#) and the [Canada's Chief Science Advisor Expert Panel on COVID-19](#) have recommended a range of precautionary actions, including measures to help reduce indoor airborne levels of the COVID-19 virus and thus the chance of transmission.

Consider the following:

- ◆ Assess and verify the heating, ventilation and air conditioning (HVAC) system to ensure it is functioning properly. (Consider duct work and all air purification systems and use a certified technician.)
- ◆ Introduce ventilation management program
- ◆ Increase ventilation rate and run ventilation system longer than normal (24/7 if possible).
- ◆ Use high efficiency filtration (minimum value MERV-13 or higher if system can accommodate).
- ◆ Ensure filters are within their service life, properly installed and fitted.
- ◆ Increase amount of clean outdoor air circulating into the system to reduce or dilute any contaminants.
 - ◆ Minimizing the effect of outdoor air dampers will help achieve this end.
 - ◆ Disabling demand-controlled ventilation so outdoor air intake is not reduced based on occupancy also helps.
 - ◆ Where possible, opening windows and doors to increase intake of outdoor air is beneficial too. (Although, consider external pollutants and any potential functional impacts on the HVAC system.)
- ◆ Ensure exhaust fans in bathrooms, change rooms, break or lunch rooms are operating at full capacity and running continuously.
- ◆ Use ultraviolet germicidal irradiation (UVGI) in the ventilation system where available. (This destroys or inactivates microorganisms.)
- ◆ Use single space air cleaner units, which may employ several air purification technologies, including high efficiency particulate air (HEPA), activated charcoal, and electrostatic filtration systems, as well as ultraviolet irradiation.
- ◆ Ensure relative humidity levels in the workplace are kept between 40 and 60 per cent, if possible.
- ◆ Clean and disinfect all HVAC intakes and returns daily.
- ◆ Ensure air from the breathing zone of one person is not flowing directly into the breathing zone of another. To help accomplish this, consider air flow from general and local exhaust ventilation systems along with windows, doors and fans. Workstations may need to be repositioned accordingly.
- ◆ Use of carbon dioxide (CO₂) monitor(s) as a surrogate measure of inadequate ventilation.

For more information, see the other source documents listed below.



HEALTH CARE-SPECIFIC VENTILATION MEASURES

When it comes to health care facilities, even greater care needs to be taken with building ventilation. The role proper ventilation plays in infection control has long been understood. Likely the [most comprehensive documents](#) developed for health care settings comes from ASHRAE. Requirements are many and considerably more complex, especially in hospital settings. In the wake of COVID-19, researchers and public health authorities have provided additional guidance for often overlooked health care settings like [long-term care facilities](#) and [dental offices](#). Although the following cannot replace these source documents, here are some important elements, in addition to those listed above, which will benefit everyone's health and safety.

- ◆ Consider establishing airborne infection isolation rooms (AIIR) for infectious residents in long-term care facilities, much as they are used for similar reasons in hospitals. Under slight negative pressure (compared to halls and adjacent rooms), they prevent movement of contaminated air to communal areas and adjacent rooms. Contaminated air needs to be exhausted to the outside. These rooms require at least 12 changes of air per hour, with two of those from outdoor air.
- ◆ Consider increasing air exchange rates in other rooms, such as soiled linen sorting and storage and janitors' closets to 12 air changes per hour as well.
- ◆ Keep infectious patient and resident room doors to hallways closed, if possible.
- ◆ If possible, install in dental and clinic offices for instance, ventilation systems such as those used in hospital emergency rooms, that provide air movement from a clean area (i.e., reception area, workstation) to contaminated area (clinical patient care area).

N.B. Wherever possible it is preferable to undertake aerosol generating procedures involving patients (and including dentist offices) in single, well ventilated, negative pressure rooms with closed doors. Following aerosol generating procedures cleaning and disinfection must be performed, but only following a period where the room is left empty with door closed to permit clearance or settling of aerosols. How long the room is left empty will depend on the air exchange rate and how many exchanges include outdoor air. For instance, where there are 12 air changes, two of which are from the outdoors, the room should be left empty for at least 35 minutes.



OTHER WHSC COVID-19 RESOURCES

Workers Health & Safety Centre (WHSC) [COVID-19 Training](#) is being offered in virtual classrooms to ensure access to quality training during these unprecedented times that call for us to practice social (physical) distancing. Training participants will gain essential information about routes of transmission, tell-tale symptoms, relevant legislation and public health directives along with critical insight into control measures to help prevent or reduce chances of infection and transmission.

Our library of [COVID-19 resources](#) is also available online to help ensure workers, supervisors, joint health and safety committee members, health and safety reps and others have ongoing access to a trusted source of information. **Feel free to download and share widely.**



OTHER INFO SOURCES

[CDC Interim Guidance for Businesses and Employers Responding to Coronavirus Disease 2019 \(COVID-19\)](#)

[CDC COVID-19 Employer Information for Office Buildings](#)

[ASHRAE Position Document on Infectious Aerosols](#)

[American Industrial Hygiene Association, Reopening: Guidance for General Office Setting](#)

[American Institute of Architects, Re-occupancy Assessment Tool](#)

[COVID-19: Guidance on indoor ventilation during the pandemic, Government of Canada](#)

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Visit: www.whsc.on.ca

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