COVID-19: Transmission, Aerosols and Ventilation

COVID-19 is spread from a person who has the virus through:

- **Close contact** (being within 2 metres for 15 minutes or more), or having physical contact, such as hugging someone;
- Respiratory droplets that come out of your nose and mouth when you breathe, talk, cough or sneeze;
- Aerosols, which are tiny respiratory droplets that can stay in the air longer;
- Touching something with the virus on it, then touching your mouth, nose or eyes before washing your hands.

Close contact with a person who has COVID-19 is the most common way that the virus is spread, even if the person has no symptoms.

**Respiratory droplets and aerosols**

COVID-19 is spread by respiratory droplets and aerosols that are produced when a person who has the virus breathes, speaks, sings, laughs, sneezes or coughs. Respiratory droplets are larger and heavier so they fall to the ground more quickly due to gravity. Aerosols are smaller and lighter than respiratory droplets so they can stay in the air longer. Aerosols are also created during certain medical and dental procedures.

**Crowded indoor spaces increase the risk of COVID-19 spread**

COVID-19 spreads more easily through the air in crowded indoor spaces with poor ventilation. The risk increases the longer a person stays in the space, as well as when people are doing activities that cause heavy breathing, such as singing, dancing or exercising, especially without wearing a mask or keeping physical distance.

**Improving ventilation and filtration can help reduce the spread**

Good air ventilation and filtration help to prevent COVID-19 spread by reducing virus particles in the air. Ventilation increases the amount of fresh air that flows into a space. This is similar to opening windows to air out a smoky room. Filtration works by using a filter to remove virus particles from the air. The filtered air is then returned back into the room. Filters must be used and changed according to the product instructions.
Even when good ventilation and filtration is being used, it is still important to wear a mask, keep two metres of physical distance and avoid crowding.

**Avoid barriers that impact airflow and ventilation**
Business operators who have installed physical barriers such as plexiglass must be sure that the barriers do not negatively impact airflow and ventilation. Physical barriers should only be used for businesses that have a high number of short interactions with high-risk contacts, such as at cash registers or checkout counters, and are not suited for settings with poor ventilation.

**Wearing a high-quality, well-fitted mask prevents aerosols from entering the air**
Wearing a high quality, well-fitted mask protects others from our respiratory droplets and aerosols. This is called [source control](#), and can reduce the spread of germs in the air. Cloth masks should be made of at least three layers of tightly woven fabric (such as cotton or linen), or two layers with a filter layer for extra protection. Consider a medical mask or respirator for even better prevention. Masks should be changed when they get dirty or wet. [Learn more about face masks](#).

**Spaces with heating, ventilation and air conditioning (HVAC) systems**
HVACs and their filters reduce the amount of virus particles in the air. HVAC filtration can reduce the risk of COVID-19 transmission indoors when used with other public health measures such as physical distancing and wearing masks. Ensure HVAC systems are in good working condition and regularly inspected. For improved ventilation:

- Increase air-exchange settings on the HVAC system, if possible.
- Use the highest efficiency filters that are compatible with the HVAC system(s).
- Keep areas near HVAC inlets and outlets clear.
- Arrange furniture away from air vents and high airflow areas.
- Avoid re-circulating air.

There is no evidence that the COVID-19 virus can be transmitted through the air over long distances or through air ducts.

**Spaces without HVAC systems**
If possible and safe, open windows and doors in rooms without HVAC systems. If a room does not have ventilation (i.e. no windows or HVAC system), a portable air cleaner can be used. Portable fans, ceiling fans and single unit air conditioners help improve airflow, which is better than no ventilation at all. If a window air conditioner unit or fan is needed, make sure they do not blow directly toward...
anybody. When using a fan, it is important to put it near an open window or door to help bring outdoor air into the space.

**Use of portable air cleaners**

Using portable air cleaners in indoor spaces helps reduce virus particles in the air, especially when everyone is wearing a mask. Make sure that the air cleaner keeps running and does not blow directly at anyone. Proper filters should be used and changed regularly.

**Using proper personal protective equipment**

Healthcare workers doing procedures that generate aerosols and workers who have close contact with other should always wear proper personal protective equipment (PPE).

For more information, visit our website at or call us at 416-338-7600.

**References**


Public Health Ontario. (Updated May 20, 2021). COVID-19 Transmission through Large Respiratory Droplets and Aerosols... – What We Know So Far.
