

COVID-19: Transmission, Aerosols and Ventilation

Coronavirus disease 2019 (COVID-19) is a respiratory illness caused by a new coronavirus. Scientists and researchers are continually gathering new evidence about this disease, including routes of transmission. COVID-19 is commonly spread from an infected person through:

- prolonged close contact (defined as being within 2 metres for 15 minutes or more), or having physical contact, such as hugging someone;
- touching something with the virus on it, then touching your mouth, nose or eyes before washing your hands;
- respiratory droplets shared when you cough or sneeze; and
- aerosols, which are tiny droplets, that can stay in the air for longer.

Close proximity with an infected person remains the most common method of transmission, whether the infected person is showing symptoms or not.

Respiratory droplets and aerosols

The virus that causes COVID-19 is spread by respiratory droplets and aerosols that are produced when an infected person breathes, speaks, sings, laughs, sneezes or coughs. The larger, heavier respiratory droplets will fall more quickly to the ground due to gravity. The smaller, lighter aerosol droplets may stay suspended in the air longer than larger droplets. There are also certain medical and dental procedures such as intubation and suctioning that generate aerosols, which can remain suspended in the air for a time. Healthcare workers performing these procedures should always wear appropriate personal protective equipment (PPE).

Data suggests that COVID-19 can more easily spread through the air when there are a higher number of people indoors, for a longer period of time, with poor airflow or ventilation. Factors contributing to transmission may include activities that cause heavy breathing, such as singing, dancing or exercise, especially without precautions such as wearing a mask or keeping a physical distance.

The amount of virus in respiratory droplets and aerosols produced by a person may differ based on where in their respiratory tract they originate, and the stage of illness the person is in. A person is contagious two days before they begin to show symptoms. Environmental conditions such as humidity, temperature, and air flow may also affect virus survival, risk of exposure and movement of the particles carrying the virus.

Revised May 13, 2021

With proper airflow or ventilation, the smaller particles will become diluted and disperse faster, similar to what occurs when you open windows to air out a smoky room.

While aerosols may contribute to the spread of COVID-19, most infections are still linked to close contact with infected individuals, whether the infected individual shows symptoms or not.

Heating, ventilation and air conditioning (HVAC) systems

HVACs and their filters are designed to reduce airborne pollutants, including virus particles, when they circulate through the system. HVAC filtration can reduce the risk of transmission indoors when used with other public health measures such as physical distancing and wearing masks. It is important to ensure regular maintenance of the HVAC systems in your home, business, workplace or school.

- Ensure HVAC systems are in good working condition.
- 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.

At this time there is no evidence that the COVID-19 virus can transmit through the air over long distances or through air ducts.

Use of air purifiers

Presently, there is no evidence to show that air purifiers on their own are effective in reducing the spread of COVID-19 transmission. Portable air cleaners or air purifiers may be useful as a supplement to HVAC ventilation or if there is no outdoor air exchange. Ensure the exhaust air of the air purifier is not blowing directly at a person.

Airflow and ventilation

In larger spaces, such as classrooms or businesses, good ventilation or airflow can help reduce the spread of COVID-19. Open windows and doors in rooms without HVAC systems, weather permitting, and if doing so does not pose a safety risk. If a room does not have ventilation (i.e. no windows or HVAC system), a portable air cleaner/purifier can be considered, but make sure the air exhaust is not blowing directly at the people in the room. Portable fans, ceiling fans and single unit air conditioners

are not recommended, as they do not improve ventilation and may circulate the virus in a space. If used, make sure the airflow is upward, away from people.

Public health measures

While ventilation is important, it must be used along with other public health measures. There is not one public health measure that can guarantee protection from COVID-19; multiple strategies are needed. Other measures include symptom screening and self-isolation for people with symptoms, practicing physical distancing, wearing a mask at all times when indoors*, and practicing good hand hygiene and respiratory etiquette. Engineering control measures, such as physical barriers, can also be used, however be sure they do not negatively impact airflow and ventilation within the space.

* *Wearing a mask contains respiratory droplets, including from coughs and sneezes, which may emit droplets into the room.*

More information

For more information, visit our website at www.toronto.ca/COVID19 or call us at 416-338-7600.

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Revised May 13, 2021

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