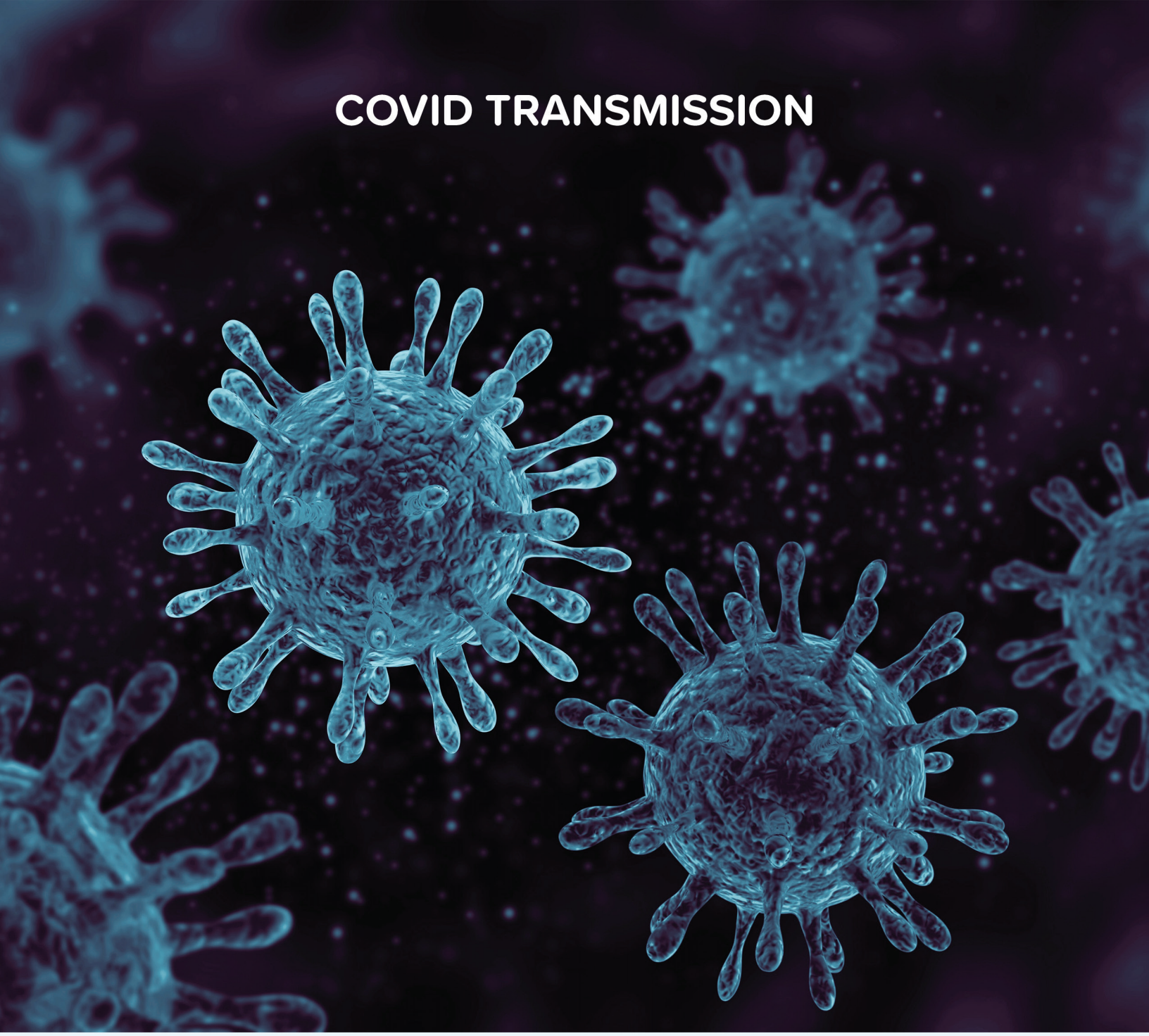
# COVID TRANSMISSION



## How COVID Spreads

**Published:**
December 2022

**www.ospe.on.ca**

ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

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## HOW COVID SPREADS

When a person breathes, talks, sings, coughs or sneezes, they release respiratory particles from their mouth or nose. When a person is infected with COVID-19, these respiratory particles can contain the virus that causes COVID-19. Larger respiratory particles fall to the floor quickly. Smaller respiratory particles, which are called aerosols, can float in the air from a few seconds to several hours.

The main way most people get infected with COVID-19 is by inhaling a sufficient dose of infectious respiratory aerosols over time. [1, 2, 3] This is known as airborne transmission, aerosol transmission or inhalation transmission. Transmission of airborne diseases happens when people share air. This typically occurs indoors in two situations:

- Short-range airborne transmission: when you are at short range (within two metres) from an infectious person.
- Shared-room airborne transmission: when you share a room with an infectious person. This is the cause of super-spreader events where many people can get infected at once. [4] Smaller rooms, crowded spaces and poorly ventilated areas create higher risk for transmission. When people sing, shout and engage in strenuous activities they release more aerosols, further increasing risk. The longer people remain in a shared space, the more aerosols are released and inhaled, in creasing the risk of infection.

The highest-risk situations for airborne transmission are indoors at short-range and when sharing a room for an extended period. However, there are additional, less common situations in which airborne transmission can also occur, such as in a recently vacated room; between connected rooms, for example through a door or along a hallway; through HVAC ducts; outdoors, usually at short-range; through aerosols landing in your eyes; as well as spray from human waste (also known as fecal-aerosol transmission).

In addition to airborne transmission, COVID-19 can be transmitted in other ways which occur less frequently. These include direct contact like kissing, or spray that lands in your mouth, eyes or nose (sometimes called droplet transmission). It is also possible to get infected by touching a contaminated surface and then touching your eyes, mouth or nose. Current evidence indicates this route is low risk [5, 6].

There are things that you can do to help reduce the risk of COVID-19 transmission:

- Wearing a mask will reduce the number of infectious aerosols you inhale. If you are infected with COVID-19, wearing a mask will also reduce the number of infectious aerosols that you release into the room. N95-type masks, referred to as respirators, can accomplish this to a much greater degree than surgical or cloth masks.
- Ventilation, filtration, or ultraviolet germicidal irradiation will reduce the number of infectious aerosols in the air.
- Physical distancing can help reduce the risk of short-range transmission but does not eliminate shared-room transmission (since aerosols can travel farther than two metres.)

## FREQUENTLY ASKED QUESTIONS

### What are droplets?

"Droplets" is a term that has multiple meanings. It sometimes refers to large respiratory particles which drop to the floor quickly and cannot be inhaled. When these particles spray out of someone's mouth or nose and land on someone else to infect them, it is called droplet transmission.

"Droplets" also has been used as another word for respiratory particles, which can be larger particles that fall to the floor or smaller particles, called aerosols, which can remain suspended in the air for an extended period of time. [7]

The main route for the transmission of COVID-19 is through inhalation of aerosols. Researchers who have investigated this issue have stated that "reviewing the literature on large droplet transmission, one can find no direct evidence for large droplets as the route of transmission of any disease." [8]

### If transmission occurs at close contact or short range, does that mean it is droplet transmission?

No. Airborne diseases are transmitted when an infectious dose of virus-laden aerosols is inhaled by a susceptible person. At short range, the concentration of respiratory aerosols is much higher, allowing for infection in a shorter period of time. Short-range transmission can occur through the impact of spray on eyes, nose, or mucous membranes (sometimes called "droplet transmission") or inhalation. Current evidence shows that transmission at short range is dominated by aerosol inhalation. [8]

### Is airborne transmission only long-range transmission?

No. Airborne transmission refers to transmission through inhalation. Airborne transmission can happen at close range, while sharing a room with an infectious person, or at long range. The highest-risk situations for the spread of airborne diseases are in the first two scenarios: close range and shared-room airborne transmission.

### Are all airborne diseases equally contagious?

No. Many diseases are transmitted through inhalation of infectious aerosols, but not all airborne diseases are equally contagious. The term "airborne" refers to the route of transmission and is not related to how contagious the disease is.

### Are airborne precautions for COVID-19 and other airborne diseases only necessary during aerosol generating medical procedures (AGMPs)?

No. Airborne precautions for COVID-19 and other airborne diseases are always necessary and not just during AGMPs. Procedures like intubation and extubation, which are done in medical settings, were once believed to generate a higher concentration of aerosols and increase the risk of airborne transmission of diseases which would not otherwise transmit via the airborne route. However, aerosol generation during common AGMPs is usually far less than aerosol generation during normal activities like shouting, singing and coughing. Risk of transmission can be high during aerosol generating procedures because of sustained close contact with the infectious patient, and not because of the procedure itself. [9] This risk can occur normally when two people are speaking close to each other.

### Is masking still required to protect yourself from COVID-19 when you can practise physical distancing?

Yes. Common guidance states that masking should be considered when physical distancing (two metres or more) cannot be maintained. However, physical distancing does not provide sufficient protection against airborne disease transmission since COVID-19 spreads through the air and can infect at greater distances than two metres. The concentration of respiratory aerosols emitted from a person is highest close to their face, so infection can occur more quickly at short range. But transmission at greater than two metres is also common and cannot be mitigated by staying two metres away from the other person. Masking would still be required to help mitigate against this. Ventilation, filtration or ultraviolet germicidal irradiation can also be used mitigate transmission at greater than two metres.

### Is masking still required to protect yourself from COVID-19 when plexiglass barriers are being used?

Yes. While plexiglass barriers can be used under specific situations to block spray or isolate spaces from each other, it has been shown to increase the risk of airborne transmission in schools. [10] This can occur by restricting the airflow in a room and trapping aerosols at face level. In settings where people occupy the same room for extended periods (like offices and classrooms), plexiglass barriers can limit the effects of ventilation and filtration and thus increase the risk of airborne transmission. Plexiglass barriers do not negate the need for masks.

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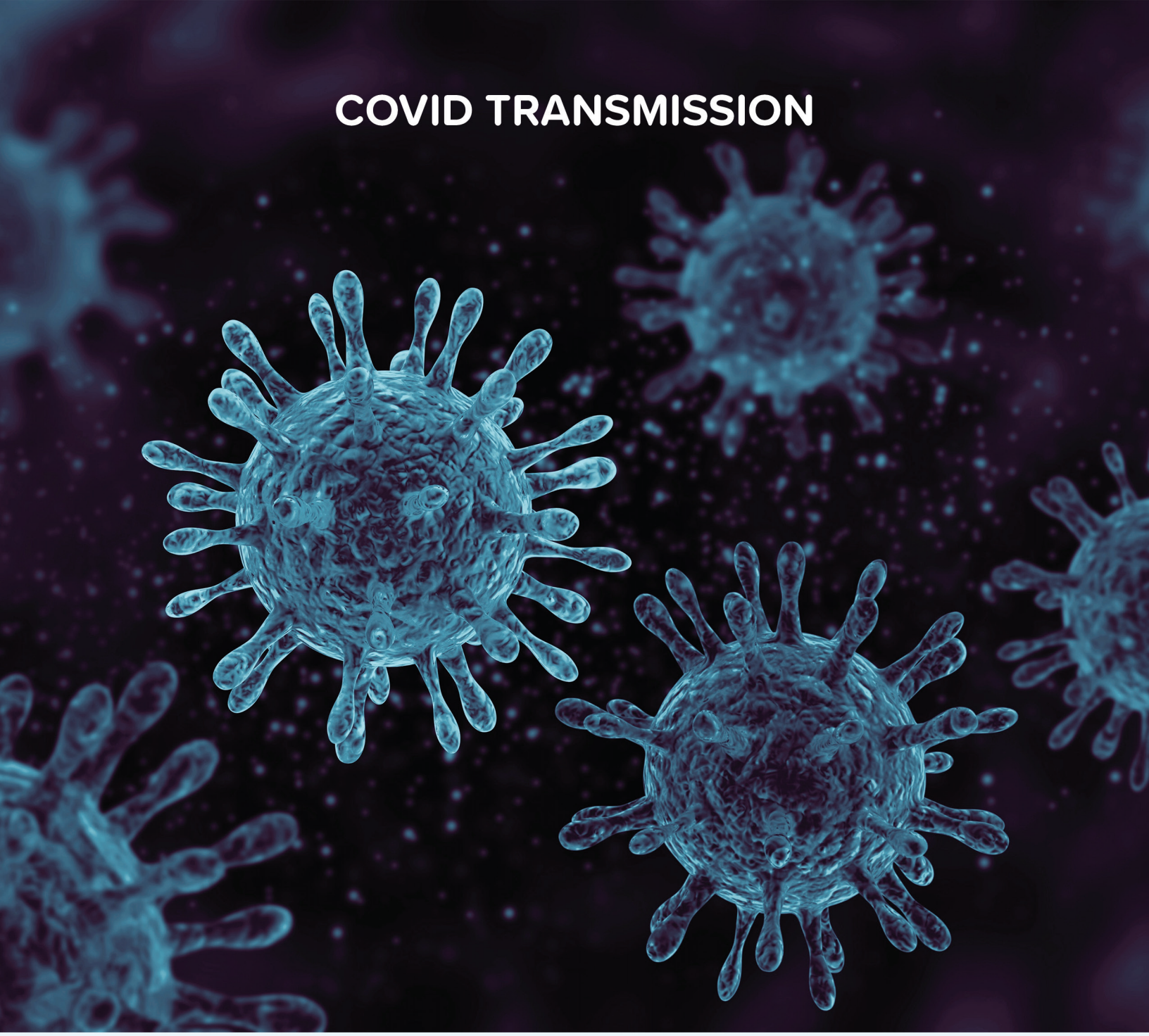


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