COVID-19: Improving indoor ventilation

Good ventilation helps protect against the spread of COVID-19. It replaces indoor air with outdoor air, which can reduce the number of infectious particles indoors. Air filtration can also help by removing particles from the air.

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How to improve indoor ventilation

The larger a gathering, the more likely it is that someone with COVID-19 is present. When they breathe, they release infectious particles into the air. These particles build up faster in small indoor spaces.

Natural and mechanical ventilation help to reduce levels of infectious
particles indoors. They do this by replacing indoor air with outdoor air. A well-ventilated room doesn't feel stuffy or smelly.

Combined with individual public health measures, good indoor ventilation helps prevent the spread of COVID-19.

For more information, refer to:

- Ventilation helps protect against the spread of COVID-19 (printable poster)
- Ways to improve ventilation and air filtration in your home (video)
- COVID-19: Individual public health measures
- COVID-19: Guidance on indoor ventilation during the pandemic
- Ventilation and the indoor environment

**Natural ventilation**

Open windows and doors regularly, when possible, to improve natural ventilation. Opening multiple windows can help by creating a crossflow of fresh air. If windows have openings at both the top and bottom, open both for maximum airflow.

In cold or wet environments, or if safety or air quality are a concern, open doors or windows:

- a small amount
- for a few minutes at a time

If there is cause for concern about the ventilation in a room or you can't open windows or doors:

- avoid the space
- maintain the greatest physical distance possible from others
- wear a mask
• consider mechanical ventilation

**Mechanical ventilation**

Many buildings use a central heating, ventilation and air conditioning (HVAC) system for mechanical ventilation. If your indoor space has vents in the ceiling, walls or floor, then it probably uses an HVAC system.

Consult an HVAC professional to:

• make sure the system is appropriate for the type of setting, activity, number of occupants and length of time the space will be occupied
• consider improvements to increase outdoor air exchange rates and filtration efficiency
  ○ for example, use the highest efficiency particulate filter (ideally MERV 13 filter rating or higher) that the system can handle

Do routine maintenance, such as:

• keep vents and fans clear
• change the filter as recommended by the manufacturer

If possible, run the HVAC system fan continuously. This will increase the delivery of clean air and reduce the number of infectious particles indoors.

For more information, refer to:

• COVID-19: Guidance on indoor ventilation during the pandemic

**How to improve ventilation in specific settings**

In addition to the general recommendations above, other measures can
improve ventilation in specific settings, such as homes, long-term care facilities and schools.

Homes

Most homes use natural or mechanical (HVAC system) ventilation and should follow the recommendations above. You may also consider the following measures, particularly when visitors are present.

- If your home has a heat recovery ventilator (HRV) or energy recovery ventilator (ERV), run it continuously.
- If your kitchen or bathroom has exhaust fans vented to the outside, run them at low speed. This will help remove contaminated air without creating significant pressure changes.

For more information, refer to:


Long-term care facilities

Most large buildings have an HVAC system. The maintenance staff and operators of these buildings should understand how the HVAC system works, and how to maintain it. In addition to the recommendations for natural and mechanical ventilation above, they should:

- avoid recirculating potentially contaminated air
- run equipment such as heat recovery ventilators (HRVs) or energy recovery ventilators (ERVs) continuously

For more information, refer to:


COVID-19 in long-term care homes

Schools

In addition to the recommendations above, staff may consider:

- opening windows and doors between different groups' use of a classroom or common space
- holding activities outdoors when possible

For more information, refer to:

- Planning for the 2021-22 school year in the context of COVID-19 vaccination
- Reducing COVID-19 risk in community settings: A tool for operators

Portable air purifiers

Air purifiers are also known as portable air filtration devices. When used properly, they can reduce the amount of some viruses in the air. When choosing an air purifier, select a unit that's:

- equipped with a high-efficiency particulate air (HEPA) filter
- the right size for the room in which it will be used
- certified by a recognized body, such as the Association of Home Appliance Manufacturers (AHAM)

Using an air purifier indoors may add an additional layer of protection. However, it should be used along with other individual public health measures.

For more information, refer to:

- COVID-19: Individual public health measures
- **Wildfire smoke 101: Using an air purifier to filter wildfire smoke**
- **Choosing a portable air purifier (printable poster)**

**Fans and single unit air conditioners**

Portable fans, ceiling fans, and single unit air conditioners typically circulate the air within a room, but they don't exchange air. They can propel the virus far from its source, thereby **increasing** the risk of infection transmission.

If using these units, make sure the air stream doesn't blow directly at or between people.

**Carbon dioxide (CO₂) monitors**

People are the main source of CO₂ indoors, beyond the background levels in our atmosphere. We release CO₂ into the air when we exhale. When indoor levels of CO₂ are high or increasing, it may mean that there isn't enough ventilation to clear exhaled air from a space.

Existing standards and guidelines for indoor CO₂ levels are based mostly on how the room smells and feels. They aren't based on the health effects of CO₂ or the risk of disease transmission.

A low level of CO₂ in an indoor space doesn’t necessarily mean transmission risks are low. CO₂ levels alone don't reflect all transmission risks. For example, they will not indicate if someone who has COVID-19 is present. Additionally, CO₂ levels will not reflect of the use of other public health measures, such as wearing a mask, or reflect ventilation improvements that may result from air filtration measures taken.

Appropriate CO₂ monitoring requires:
• an accurate device
• proper installation in a suitable place
• regular accuracy checks (calibration)
• frequent monitoring

For a CO₂ monitor to be a useful indoor air quality tool, you must act when levels are high or increasing. For example, you could:

• reduce the number of people
• avoid activities that involve singing, shouting or exercising
• move outdoors or to better ventilated spaces
• open windows or doors
• increase the amount of outdoor air supplied through the HVAC system
• use portable air purifiers

For more information, refer to:

• Indoor CO₂ sensors for COVID-19 risk mitigation: Current guidance and limitations

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