Ventilation & Indoor Air Quality: Schools & Childcare Facilities



Take measures to improve indoor air quality and protect health

People spend most of their time indoors, including at school, home and work. The air we breathe indoors can affect our health. Indoor air can contain pollutants that come from both indoors and outdoors.

Common indoor air pollutants include:

- Particles such as those in wildfire smoke and traffic emissions
- Gases such as carbon monoxide
- Biological contaminants such as mould

Indoor air quality can be improved by:

- Eliminating and reducing air pollution sources
- Making sure ventilation is adequate
- Cleaning the air to remove pollutants

The role of ventilation

Ventilation makes sure that fresh outdoor air is brought into an indoor space, helping to dilute or remove stale indoor air. Ventilation can be done naturally (by opening windows and doors) or mechanically using heating, ventilation, and air conditioning (HVAC) systems.

Air pollutants can build up in spaces with inadequate ventilation. Improvements in indoor air quality are linked to better performance at schools and work. For more information, see the US Environmental Protection Agency site on Healthy School Environments.

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Ventilation air filtration and respiratory infections

Many respiratory infections are spread through the air from a person infected with a virus or bacteria. Improving ventilation and filtering air may help to reduce transmission of respiratory infections, especially in crowded or poorly ventilated spaces. Other measures are also important, including staying home when sick, appropriate vaccination and proper hand/respiratory hygiene.

For more information, see ASHRAE Standard 241: Control of Infectious Aerosols.

Carbon dioxide (CO_2) in indoor air

We release CO_2 gas into the air when we breathe out. Typical CO_2 levels in indoor air are not a health concern. However, elevated CO_2 levels can indicate that ventilation in a space is not adequate. Increased CO_2 concentrations may also indicate an increased risk of infectious disease transmission in a space. High levels of CO_2 and other air pollutants can contribute to:



Indoor CO_2 levels

Indoor CO_2 levels should ideally be below 1000 parts per million (ppm) and close to outdoor levels (400-500 ppm). Health Canada recommends keeping indoor CO_2 below 1000 ppm over a 24-hour period. CO_2 levels above 5000 ppm can cause serious health issues.

CO_2 levels can change throughout the day as people move in and out of a space. It may be helpful to monitor CO_2 levels over some time (e.g., one week) to understand patterns and take steps to improve ventilation where needed.

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Ways to improve indoor air quality

The following are recommended options, where feasible and appropriate:

- ❑ **Open windows and doors**: When outdoor air quality is good, fresh air from outdoors can remove pollutants in indoor air.
- ❑ **Consider your HVAC system**: Maintain your system. Make sure the system has the highest level of filtration suitable for the equipment. MERV 13 (MPR 1900) or higher is recommended. When outdoor air quality is poor, such as during wildfire smoke events, consider upgrading to more efficient filters and setting the system to recirculation mode. See the next page for more information.
- ❑ **Filter the indoor air**: When upgrading HVAC filters is not an option, consider using portable HEPA air cleaners or Do-It-Yourself (DIY) air cleaners to remove particles in the air.
- ❑ **Control dampness**: Damp conditions can lead to mould growth so fix leaks and water damage immediately.
- ❑ **Use exhaust fans**: Whenever possible, use exhaust fans when cooking or doing activities that use paints, glues and other products that release volatile organic compounds (VOCs).



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When outdoor air quality is poor

Outdoors, air pollution can come from sources such as wildfires and traffic emissions. Much of this pollution can move to indoor spaces.

Consider these actions:

Wildfire smoke:

- ❑ Before the season, consider ways to adjust ventilation and enhance air filtration for smoky periods. Upgrade the efficiency of HVAC filters (to MERV 13/MPR 1900 or higher) and/or use portable HEPA or DIY air cleaners to filter smoke particles.
- ❑ When it is smoky, keep windows and doors closed but ensure that it does not get too hot indoors. See our wildfire smoke factsheet for more information.

Other outdoor sources:

- ❑ For buildings in areas with poorer outdoor air quality (such as near busy roads), consider enhancing filtration in the HVAC system year-round (to MERV 13/MPR 1900 or higher).
- ❑ If that is not possible, consider opening windows for short periods throughout the day and running portable HEPA or DIY air cleaners the rest of the time. See our traffic-related air pollution factsheet for more information.



Want to learn more?

Check out these other documents for schools & childcare facilities

Wildfire Smoke Factsheet

Heat Factsheet

Traffic Related Air Pollution Factsheet

Indoor Air Quality Webpage