

# WILDFIRE SMOKE

## schools and childcare facilities



**Wildfire smoke events are becoming more frequent and severe** as the climate changes, resulting in more days with poor air quality that can impact health.

Wildfire smoke is a mixture of small particles and gases. The small particles in wildfire smoke, also known as fine particulate matter (PM<sub>2.5</sub>), can travel deep into the lungs when breathed in and cause inflammation throughout the body. This can have **both short-term and longer-lasting health impacts**.

**Children, infants and people with certain chronic health conditions** (e.g. asthma, heart disease, and diabetes) are particularly susceptible to the health effects of wildfire smoke.

It is also important to note that more wildfire smoke is inhaled as the intensity of physical activity increases. People breathe more quickly and deeply when they exercise.

**Reducing exposure to wildfire smoke can help protect health.**

### Wildfire smoke symptoms:

- Sore throat
- Eye irritation
- Phlegm
- Mild cough
- Runny nose
- Headaches



### Severe wildfire smoke symptoms:

- Shortness of breath
- Severe cough
- Heart palpitations
- Chest pain
- Wheezy breathing
- Dizziness



People with symptoms should be supported to promptly stop physical activity and seek cleaner air during smoky conditions. Those with severe symptoms should be supported to access medical attention.

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## How to prepare for the wildfire season?

The following are recommended *options* to help protect health from wildfire smoke, implement them where feasible and appropriate.

- Subscribe to **air quality advisories** and alerts for your region.
  - [WeatherCAN App](#)
  - [Metro Vancouver Air Quality and Climate Action Mailing List](#)
- Develop a “**Wildfire Smoke Readiness Plan**”, using public health guidance. Regional health authority programs can provide support. [ASHRAE Guideline 44P](#) provides information for the indoor air component of this plan.
- For outdoor activities, make sure a plan is in place for lower-intensity activities, and to move activities indoors if needed.
- Prepare staff to know and identify **signs of illness related to smoke exposure**, and know when medical attention is needed.
- Be aware of **children with chronic health conditions** that may make them **particularly vulnerable** to poor air quality and plan to provide protection during poor air quality events (e.g. supporting less strenuous activities while outdoors or allowing for indoor physical activities).
- Ensure that children with chronic health conditions who are prescribed medications have **easy access to their medications** (e.g. inhalers for asthma). Ensure children with asthma have an [asthma action plan](#) in place.
- Consider setting up air quality monitors for PM<sub>2.5</sub> at your facility. Contact your local health authority for support with monitor selection, data review, and guidance on thresholds for action. Monitor loans may be available. In general, indoor PM<sub>2.5</sub> levels should be as low as reasonably achievable.

**Heat and smoke can happen at the same time.** Heat can be dangerous. Make sure that indoor temperatures are measured and **indoor spaces do not get too hot**, especially when windows and doors need to be kept closed during wildfire smoke events. Temperatures below 26°C (79°F) are best, but may not be achievable at times. Be aware of signs of heat illness when temperatures are high.

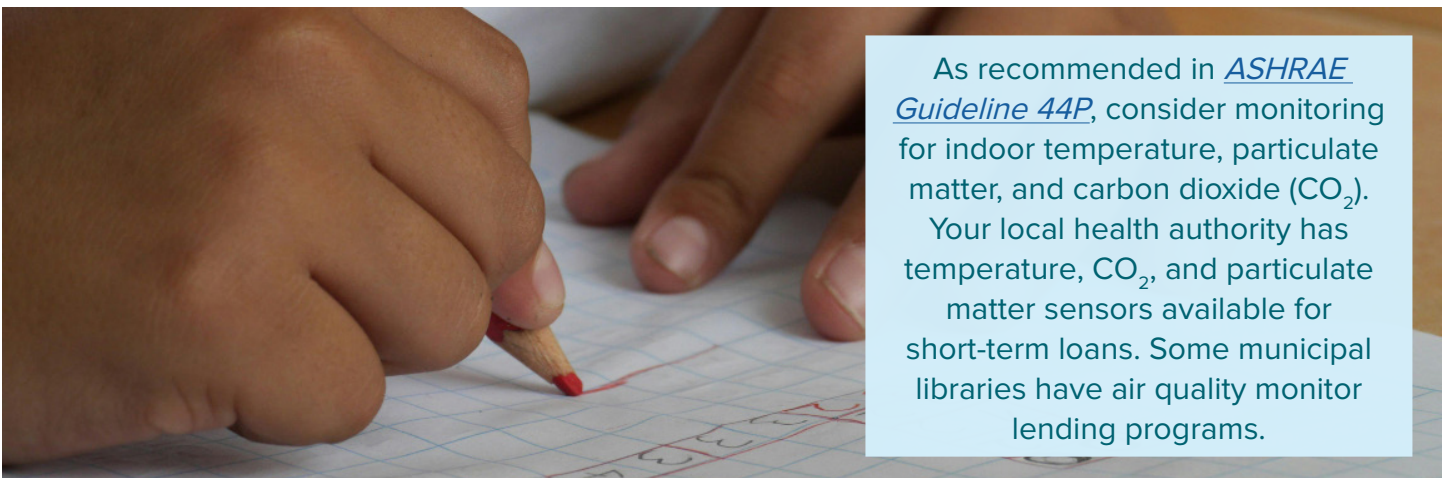
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### Prepare to maintain clean air inside your facility

The following are recommended *options* to help protect health from wildfire smoke, implement them where feasible and appropriate.

- Review, understand and use [ASHRAE Guideline 44P](#) to prepare the building for wildfire smoke. Work with an HVAC professional where appropriate.
- Ensure building ventilation and air filtration systems are maintained according to manufacturers' specifications and any repairs have been completed.
- Install the highest level of filtration possible in the HVAC system. Filters with a rating of **MERV 13 (MPR 1900)** or greater (**ideally MERV 16+ or HEPA filters**) are strongly recommended to improve the removal of small particles. If possible, add an absorbent media air filter to capture gaseous pollutants (e.g. activated carbon) and include a pre-filter for larger particles to extend the life of the other filters.
- Consider adding **additional air filtration** to the air intake vents where possible (see [ASHRAE Guideline 44P](#) for details).
- Assess if the ventilation system can be set to **reduce the introduction of air from outdoors** at times when outdoor air quality is poor (see [ASHRAE Guideline 44P](#) for details).
- Assess if the building air can be **recirculated through the HVAC system filter(s) continuously during smoke events** (i.e. not on auto on/off). The indoor air must pass through the system filter regularly to remove the small particles that are most concerning for health (for example a MERV 13 filter only removes about 50% of the smallest particles on the first pass).
- **Plan to use portable air cleaners with HEPA filters and activated carbon pre-filters** during smoky periods. See advice below on how to choose and use portable air cleaners.
  - If you are not able to buy or access commercial portable HEPA filter air cleaners, consider “**do-it-yourself**” (**DIY**) **air cleaners** using directions from the [BC Centre for Disease Control](#).
- Purchase extra replacement air filters in advance of a smoke event.



As recommended in [ASHRAE Guideline 44P](#), consider monitoring for indoor temperature, particulate matter, and carbon dioxide (CO<sub>2</sub>). Your local health authority has temperature, CO<sub>2</sub>, and particulate matter sensors available for short-term loans. Some municipal libraries have air quality monitor lending programs.



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School or childcare closures for health reasons, including wildfire smoke exposure, should only be implemented in discussion with public health authorities.

## What to do during a wildfire event?

The following are recommended *options* to help protect health from wildfire smoke, implement them where feasible and appropriate.

- Check your local [Air Quality Health Index \(AQHI\)](#) regularly. Note that air quality can vary significantly throughout the day and by location. It can be helpful to look at the air quality data near you using the **low-cost sensor PM<sub>2.5</sub> air quality map** found on the resources page.
- Be alert to symptoms among children. Take action to reduce their exposure to wildfire smoke and **seek medical attention if they have severe symptoms**.
- Encourage and support children to stay well hydrated.
- Improve indoor air quality as much as possible.
  - Use enhanced indoor air filtration to clean indoor air (see page 3).
  - If possible, adjust the ventilation system to reduce the introduction of air from outdoors at times when the outdoor air quality is poor.
  - If possible, set the HVAC system so that the building air is recirculated through the HVAC system filter(s) continuously during smoke events (i.e. not on auto on/off).
  - Close windows and doors if it is safe to do so without overheating (see page 2 heat section).
- **Monitor the Air Quality Health Index, and follow public health guidance.** Consider postponing outdoor activities if the AQHI is 7 or higher and support outdoor activities that are less intense for children sensitive to wildfire smoke when the AQHI is between 4 and 6. See the AQHI table with advice at the end of this document (on page 7).
- As an option to seek cool cleaner air, consider visiting **libraries, community centers or other public spaces** where there is air conditioning and filtration.

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### How to choose portable air cleaners?

When buying a portable air cleaner, ensure the following specifications are met:

- Has **HEPA air filters** — removes the small particles in wildfire smoke.
- Has an **activated carbon filter** — removes some gaseous pollutants.
- Is **certified by AHAM** (Association of Home Appliance Manufacturers).
- **Is appropriate for the room size** — check the recommended maximum room size to make sure the one you buy is sized for your space. Multiple devices may be needed for larger rooms. See the [BCCDC Portable Air Cleaners for Wildfire Smoke resource](#).
- **Does not produce ozone**, a lung irritant. Some units use electrostatic precipitation or ionizing technologies that can create ozone gas. If the unit has these features, make sure it has been tested for ozone production or is certified for low ozone production by the [California Air Resources Board](#).
- Has **ENERGY STAR** designation to maximize energy efficiency.
- **"Do-it-yourself" (DIY) air cleaners**, such as box fans with high-quality filters, are a cheaper and effective alternative to lower indoor concentrations of small particles. See the [BCCDC resource on Do-It-Yourself Air Cleaners](#) to learn how to make one.





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### How to use portable air cleaners?

#### Portable air cleaner tips:

- Use air cleaners in the room(s) where people spend most of their time.
- Place the air cleaner(s) in a location(s) where the **airflow is not restricted** by walls, furniture, curtains and/or other objects.
- **Run the air cleaners continuously** throughout the day, as well as for an hour before the start of the day if possible.
- Air cleaners work best when the **windows/doors are closed**. Ensure indoor temperatures are measured and the space does not get too hot.
- Operate the air cleaner at the **highest setting** feasible. If the unit(s) is too loud, consider using a lower setting.
- Set up a **maintenance plan** to replace air filters in the units regularly (as directed by the manufacturer).

#### Smoke infiltration:

Smoke can enter a building through ventilation systems, windows, doors, cracks in walls and other openings.

It is important for schools and childcare facilities to filter indoor air during wildfire smoke events.

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### AQHI and Recommended Actions

1-HOUR PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PROVINCIAL AQHI	AQHI RISK CATEGORY	ACTIONS TO IMPROVE INDOOR AIR QUALITY	ACTIONS FOR OUTDOOR ACTIVITIES
0 - 10	1	LOW	Normal air quality in British Columbia.	Encourage outdoor play as much as possible.
11 - 20	2			
21 - 30	3			
31 - 40	4	MODERATE	Keep exterior <b>windows and doors closed</b> . Make sure the indoor environment does not get too hot.  Run <b>portable HEPA / DIY air cleaners</b> continuously in spaces used by children.	Allow children who experience symptoms to modify their activities or stay indoors.
41 - 50	5			For younger children (under 5) consider limiting their time outdoors.
51 - 60	6			Check-in on all kids especially those with asthma*.
61 - 70	7	HIGH	Enhance filtration in the building ventilation system (minimum of MERV 13 or higher).  Run the building ventilation system in the “re-circulation” mode.	Move activities indoors whenever possible. If outdoor activities are required, limit them to <b>low intensity activities</b> .
71 - 80	8			Cancel or postpone high physical exertion activities outdoors.
81 - 90	9			Check-in on all kids especially those with asthma*.
91 - 100	10			Move all outdoor activities indoors.
101+	10+	VERY HIGH	When possible, <b>monitor</b> for temperature, particulate matter, and CO <sub>2</sub> indoors.	Limit the intensity of activities indoors, if indoor PM <sub>2.5</sub> is elevated. Check-in on all kids especially those with asthma*.

\* While asthma is mentioned as the most common chronic lung disease of childhood, these considerations are also applicable to children with other respiratory diseases or ongoing respiratory symptoms from a resolving viral infection.

### Wildfire Smoke Resources

<a href="#">Vancouver Coastal Health: Wildfire Smoke</a> <a href="#">Fraser Health: Wildfire Smoke</a>	Information for the public, community partners and health professionals regarding wildfire smoke, including a number of links to fact sheets and resources.
<a href="#">BCCDC: Wildfire Smoke Fact Sheets</a>	Fact sheets about the health effects of wildfire smoke, tips on how to prepare for the wildfire season, choose <b>portable air cleaners</b> , <b>DIY air cleaners</b> , and use the AQHI.
<a href="#">Air Quality Health Index</a>	Current air quality health index based on regulatory air quality monitors across BC.
<a href="#">Low-cost Sensor PM<sub>2.5</sub> Air Quality Map</a>	Current PM <sub>2.5</sub> data from low-cost air quality monitors to monitor outdoor air quality nearby.

### Want to learn more?

Check out these other guidance documents for schools and childcare facilities:

