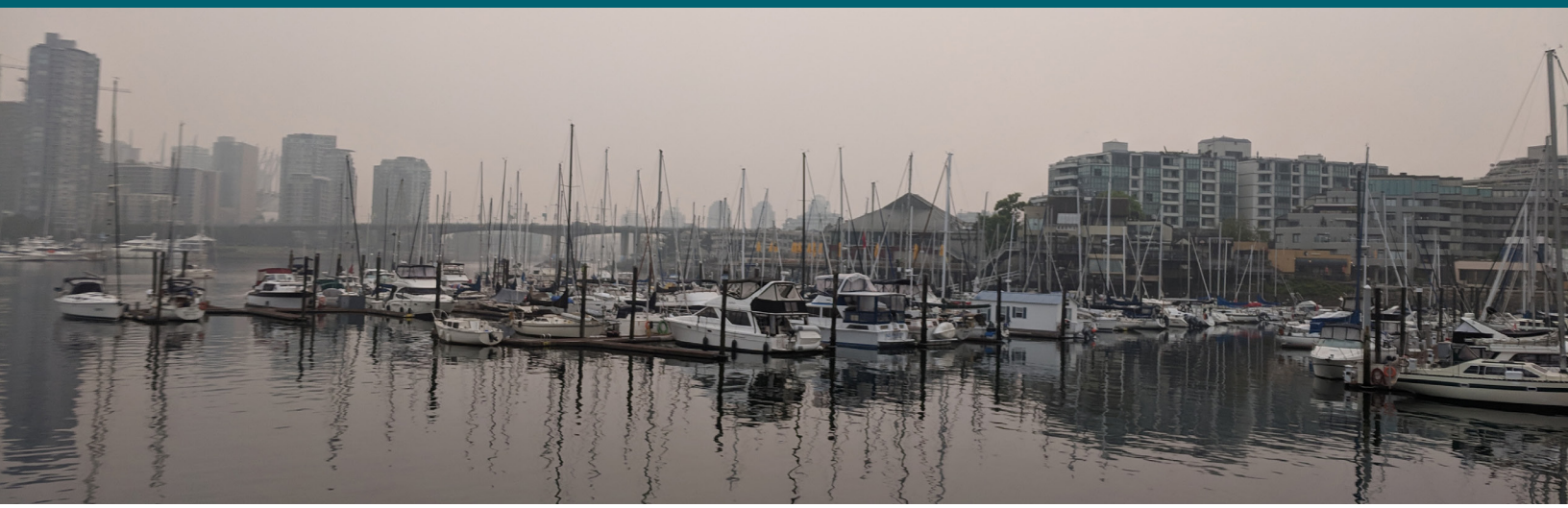
WILDFIRE SMOKE
schools and childcare facilities



Reducing exposure to wildfire smoke can help protect health

Wildfire smoke can worsen air quality in our communities and affect our health. Smoke from wildfires is a mixture of gases and fine particles ($PM_{2.5}$). Fine particles can be breathed down deep in our airways and lungs where they can cause damage. Breathing in wildfire smoke can have short and long-term effects on our lungs, heart, and other organs.

Children, infants and those with certain chronic health conditions, such as asthma, heart disease and diabetes, are especially vulnerable.

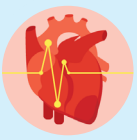
Wildfire smoke symptoms:

- 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 promptly stop physical activity and seek cleaner air during smoky conditions. Those with severe symptoms should seek medical attention.

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How to prepare your team for the wildfire season

Create a wildfire smoke readiness plan to protect health. Include the following options, where feasible and appropriate:

Air quality warning subscriptions: Ensure your team signs up for air quality warnings for your region.

- Metro Vancouver: WeatherCAN App or Metro Vancouver email notifications
- Outside Metro Vancouver: WeatherCAN App or provincial email notifications

Check local air quality: Ahead of the season, practice checking the local air quality by looking on the maps for the sensor closest to your facility. Remember to check it regularly during the smoky season.

- Regional air quality: Air Quality Health Index (AQHI)
- Neighbourhood air quality: aqmap.ca

Outdoor activities: Plan to adjust outdoor activities when it's smoky, including shifting to lighter activities and moving some activities indoors. The faster we move, the faster we breathe and the more smoke we breathe into our lungs.

Signs and symptoms: Before each season, ensure staff know the signs of smoke exposure and when medical attention may be needed (see page 1).

Children with chronic conditions: Be aware that children with chronic health conditions may be more vulnerable. Make sure that those who are prescribed medications have easy access to them (e.g., inhalers for asthma). Make sure children with asthma have an asthma action plan in place.

Hot and smoky weather: Heat waves and wildfire smoke can happen at the same time. Closing doors and windows to keep out the smoke may trap heat inside. High indoor temperatures can be dangerous so plan ways to keep students and staff cool. See our resource on Extreme Heat for more information.

How to prepare your building(s) for smoke

Create a wildfire smoke operation plan for each building with your building operator(s). Include the following options, where feasible and appropriate:

Expert guidance: Review, understand and use ASHRAE Guideline 44P and this EPA Guide to prepare the building for wildfire smoke. Work with an HVAC professional where appropriate.

HVAC and building maintenance: Maintain the building's heating, ventilation and air conditioning (HVAC) system and ensure all repairs have been completed. Evaluate the building for air leaks and repair them.

Ventilation: Regular HVAC settings may not keep smoke out. Assess if HVAC settings could be temporarily adjusted to safely reduce smoky air from coming indoors.

- Assess if the ventilation system can be set to reduce the intake of outdoor air safely. When reducing ventilation, ensure the building can maintain minimum ventilation for indoor occupants and maintain positive pressure to prevent smoke from entering through cracks and other openings. Do not close all outdoor air intakes completely.
- Assess if building air can be recirculated through the HVAC system filter(s) continuously during smoke events (i.e. not an “auto” setting). Buildings with MERV 13 filters only remove about 50% of the smallest particles on the first pass.

Filtration: Typical HVAC filters are not effective in filtering out wildfire smoke. Install the highest level of filtration possible in the HVAC system and plan to use portable air cleaners.

- Assess if filters with a rating of MERV 13 (MPR 1900) or greater can be used.
- MERV 13 filters will remove particulates from the air, but not harmful gases in smoke. Assess if a sorbent filter can also be added to remove gases (e.g. activated carbon filter).
- Consider adding additional air filtration to the air intake vents where possible.
- Plan to use portable air cleaners during smoky periods. See advice below on how to choose and use portable air cleaners.
- Purchase extra replacement air filters before the season.

Air quality monitoring: Monitor indoor and outdoor air quality to assess smoke infiltration and optimize ventilation and filtration. Measure $PM_{2.5}$ using low-cost sensors, along with CO_2 and temperature. Aim to minimize particulate matter while maintaining safe indoor temperatures and acceptable CO_2 levels. See our Heat and Ventilation guidance documents and contact us for more specific guidance.

No HVAC System? Plan to use portable air cleaners and keep windows and doors closed. Monitor the indoor temperatures (below 26°C or 79°F is best). If it gets too hot, visit a public space with air conditioning like a library or community centre.

What to do when it's smoky?

Activate your wildfire smoke readiness plan, including the following, where feasible and appropriate:

Monitor air quality: Check the Air Quality Health Index (AQHI) for regional conditions and aqmap.ca for neighbourhood levels. Smoke can shift quickly across the region, so check throughout the day, especially before outdoor activities.

Outdoor activities: Adjust activities based on current air quality levels and the table on page 5.

Monitor symptoms: Have staff monitor for smoke-related symptoms, especially in children with chronic health conditions (see page 1). Seek medical attention if any child has severe symptoms.

Adjust ventilation: Keep windows and doors closed while preventing indoor overheating (below 26°C / 79°F is best). If possible, adjust HVAC settings to safely reduce smoke entry and run air continuously through filters (see page 3).

Filter indoor air: Enhance building filtration (see page 3) and use portable HEPA air cleaners.

Seek cleaner and cooler air: If it is not possible to filter the air in your space or if it is too hot inside, consider visiting libraries, community centers, or other air-conditioned public spaces.

Closures: Closures for health reasons should only be implemented in discussion with public health.

After a smoke event: Air out the building and replace filters.

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AQHI and Recommended Actions for Children

1-HOUR $PM_{2.5}$ ($\mu g/m^3$)	PROVINCIAL AQHI	AQHI RISK CATEGORY	ACTIONS TO IMPROVE INDOOR AIR QUALITY	ACTIONS FOR OUTDOOR ACTIVITIES
0 - 10	1	LOW	**Maintain normal operations.**	**Encourage outdoor play** as much as possible.
11 - 20	2			
21 - 30	3			
31 - 40	4	MODERATE	**Keep exterior doors and windows closed**, if safe to do so without overheating. **Run portable HEPA air cleaners** continuously in areas where children spend the most time. **Enhance filtration** in the building ventilation system.** **Adjust air intake** for the building ventilation system.** **Monitor** for particulate matter ($PM_{2.5}$), temperature and CO_2 indoors.	**Monitor symptoms among students.** Allow those with symptoms to modify their activities or stay indoors. **Allow for light or moderate intensity* outdoor activities** for a short duration (less than 1 hour). **Consider rescheduling** or moving multi-hour outdoor events and high intensity activities indoors with filtered air.
41 - 50	5			
51 - 60	6			
61 - 70	7	HIGH		**Monitor symptoms among students.** Encourage those with symptoms to stay indoors. **Move activities indoors whenever possible.** If outdoor activities are required, limit them to light intensity activities.* **Cancel or postpone** multi-hour outdoor events and high intensity activities if they cannot be moved indoors with filtered air.
71 - 80	8			
81 - 90	9			
91 - 100	10			
101+	10+	VERY HIGH		**Monitor symptoms among students.** **Move all outdoor activities indoors** with filtered air. **Limit the intensity*** of activities indoors, if indoor $PM_{2.5}$ is elevated.

*Examples of light intensity activities include playing board games, playing catch and stacking blocks. Examples of moderate intensity activities include climbing on the playground and hopscotch. Examples of high intensity activities include soccer, jogging or running, jumping jacks, jump rope.

** Only if appropriate for your HVAC system. See page 3 and ASHRAE Guideline 44P and this EPA Guide.

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Do you know how smoke gets inside your building?

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.

Choosing and using portable air cleaners

When choosing air cleaners, consider units that have:

- **HEPA air filters** to remove fine particles in smoke.
- **Activated carbon filter** to remove gases in smoke.
- **The right sizing.** Check the recommended maximum room size to make sure units are sized for your space. Multiple devices may be needed in larger spaces. See BCCDC Portable Air Cleaners for Wildfire Smoke resource for more information.
- **Low ozone certification** for units that use electrostatic precipitation or ionizing technologies. These units can create ozone gas, which is a respiratory irritant.

When using air cleaners, consider the following:

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

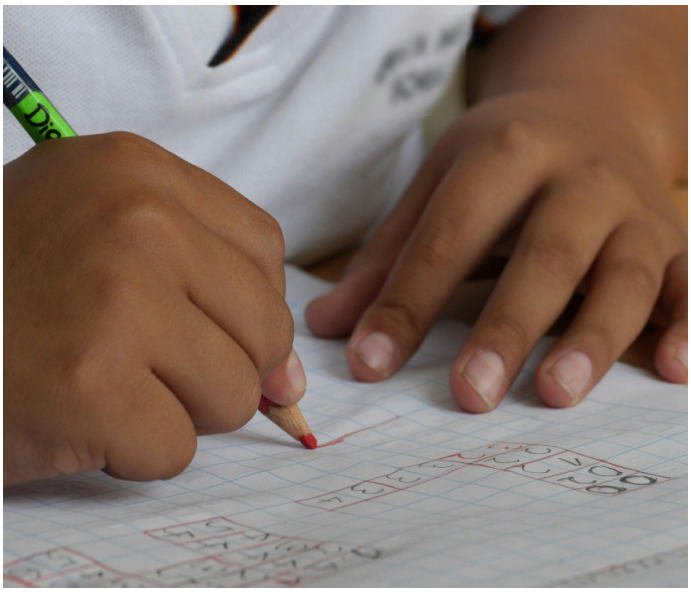
Wildfire Smoke Resources

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

Classroom and school activities

Build air cleaners to increase community resilience: Some people at higher risk from wildfire smoke can't afford to buy an air cleaner or may not have the mobility to build their own. "Do-it-yourself" box fan air cleaners are fast, easy, and require few supplies. Consider if your school could build air cleaners for people in the community, using grants or local sponsors to purchase supplies. The BC Lung Foundation-funded BREATHE project provides instructions, shopping lists and videos.

Check the air you're breathing: The VCH wildfire smoke website has resources that can be used for classroom activities. Learn what is in wildfire smoke. Practice checking the neighborhood air quality and reading the Air Quality Health Index. Make a list of air-conditioned buildings in the community to spend time in if it's smoky.



Want to learn more?

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