

Environmental Public Health Services Guidance During Wildfire Smoke Events

July 12, 2023

Context:

Wildfire smoke is becoming more prevalent, severe and widespread, and routinely impacts people and communities in the absence of a physical safety threat of wildfires.

Objective of this document:

This guidance provides a compilation of information to support Environmental Public Health Officers in their role of providing guidance to First Nations communities in preparation for and in response to wildfire smoke events. Recognizing that public health guidance is also provided by provincial health organizations, this document includes both federal and provincial (where available) guidance to enable communities to have relevant information from all sources to support their decision-making.

Roles and responsibilities of Environmental Public Health Officers:

Environmental Public Health Officers provide subject matter expertise in the area of environmental public health risks, such as outdoor air quality and emergencies. They work with community leadership and health staff, Medical Officers of Health, and other departments to evaluate risks from wildfire smoke based on each unique circumstance. Chiefs and Councils have the legal authority under provincial emergency acts to make decisions for their community and residents, including declaring states of local emergencies.

Health Risks

Wildfire smoke is comprised of a mixture of gases and fine particulates. Particulate matter is the principal pollutant of concern from forest fire smoke. Exposures experienced by the public are typically short-term (hours to weeks).

During a wildfire event, certain populations are at higher risk and may experience mild symptoms (irritation, cough, and headaches). As smoke and PM_{2.5} levels increase, higher risk populations as well as healthy individuals are expected to experience adverse health effects, depending on the exposure concentrations and durations. These may range from milder symptoms to more severe effects that may require immediate medical assistance such as dizziness, chest pains, severe cough, shortness of breath, wheezing (including asthma attacks) and heart palpitations (irregular heartbeat).

Factors that may contribute to some populations being more susceptible include: the level and duration of exposure, age, individual susceptibility, including the presence or absence of pre-existing lung or heart disease and socioeconomic status (e.g. capacity to take protective measures due to financial, housing access/quality, and access to health services).

Health Canada identifies the following people as being higher risk:

- seniors
- pregnant people
- people who smoke
- infants and young children

- people who work outdoors
- people involved in strenuous outdoor exercise
- people with an existing illness or chronic health conditions, such as:
 - o cancer
 - o diabetes
 - o lung or heart conditions

During heavy smoke conditions, everyone is at risk regardless of their age or health. It is important to encourage people to listen to their bodies and reduce or stop activities if they are experiencing symptoms.

Wildfire season can coincide with periods of extreme heat and it is important to manage the risks of extreme heat together. Smoke precautions may involve staying indoors with windows and doors sealed, and may lead to increasing thermal temperatures indoors. Exposure to heat can lead to dehydration, exhaustion, heat stroke or other serious illnesses and even death.

Additional resources:

- [Wildfire smoke 101: Wildfire smoke and your health](#): General information on wildfire smoke, symptoms of smoke exposure, reducing your exposure to wildfire smoke, and protecting your health from Health Canada.
- [Wildfire smoke 101: How to prepare for wildfire smoke](#): Printable checklist on how to prepare yourself and your home. People more at risk, links to other Canada resources (health, air quality) from Health Canada
- [Wildfire smoke 101: Combined wildfire smoke and heat](#): People at risk, symptoms of combined exposure, how to reduce risk from Health Canada

Planning and Preparedness

Community level preparedness should be carried out prior to wildfire seasons to enable appropriate planning, coordination, communication and procurement. Community preparedness actions support readiness of community staff and residents to respond in a timely, coordinated and well-informed manner.

Actions may include:

- identification or establishment of clean air shelters;
- familiarity with the Air Quality Health Index;
- special air quality statements or other indicators of smoke/poor air quality conditions;
- incorporating additional local PM_{2.5} air quality devices (e.g. Purple Air monitors);
- identifying higher risk individuals; and
- establishing the need for supporting individual homes to achieve cleaner air (e.g. air purifiers); coordination with local municipalities and regional health authorities in planning and preparedness.

Indigenous Services Canada may have funding available to support community planning and preparedness actions. Proposals for community emergency planning and other risk mitigation activities are accepted and funded annually. ISC EMAP regional offices are available to connect interested communities with the appropriate federal programs. [EMAP](#)

- Each ISC Region receives G&C funding to assist communities with Health Emergency Preparedness, including the development of emergency response plans with health components. Funding distribution to individual communities varies by Region. For more information please reach out to your Regional HEM contacts listed below. (as of June 30, 2023)

Region	FNHIB Health Emergency Management Contact
ATL	William.Dansereau@sac-isc.gc.ca
QC	chloe.leguillou@sac-isc.gc.ca
ON	Cheri.roy@sac-isc.gc.ca
MB	catherine.spreitzer@sac-isc.gc.ca
SK	Jeffrey.Wagner@sac-isc.gc.ca ; cindy.roache@sac-isc.gc.ca
AB	Patricia.louie@sac-isc.gc.ca ; parminder.thiara@sac-isc.gc.ca
NORTHERN	Sue.peterkova@sac-isc.gc.ca
BC	Health has been transferred to FNHA (Caitlin.buxton-carr@fnha.ca)

Individual level preparedness supports individuals to be well-informed and able to identify risks to themselves and their family, and identify ways in which they can reduce their own exposure. This may include:

- Knowing where to find tools and information about local air quality (community, local health authority, provincial and federal government sources).
- If considered higher-risk, developing a management plan with their doctor.
- Ensuring adequate home ventilation system recirculation and HEPA filtration. If this is not available, the use of a portable air purifier. Consider the need for cool air.
- Identifying a clean air shelter and cooling center accessible in the community.

Some provincial health and emergency response authorities have established guidelines to support the coordination, planning and response to wildfire smoke and wildland fires.

- BC: [BC Health Wildfire Smoke Response Coordination Guideline.pdf \(bccdc.ca\)](#)
- AB: Alberta Air Quality Notification Protocol What you need to know: [health-alberta-air-quality-notification-protocol-what-you-need-to-know.pdf](#)
- MB: [Smoke Exposure from Wildland Fires: Interim Guidelines for Protecting Community Health and Wellbeing \(gov.mb.ca\)](#)
- NFLD: [Microsoft Word - Forest Fire Smoke and Air Quality \(Revised May 2018\).doc \(lghealth.ca\)](#)

[Wildfire Smoke and Health | National Collaborating Centre for Environmental Health \(NCCEH\):](#)

- Repository of guides, evidence reviews, factsheets, webpages, blogs.
- Topics: public health impacts and interventions, preparedness and response planning (for public health officials and others), occupational health, communication, lessons learned, Indigenous and remote communities and returning home after a disaster.

- Mitigating wildfire and smoke risks, wildfire management, community and homeowner resources.

[About FireSmart | FireSmart Canada](#) : Information to help increase neighborhood resilience to wildfire and minimize its negative impacts.

- [Resources | FireSmart Canada](#): Program application and guidelines, videos, brochures, manuals, and checklists
- Home Guide: firesmartcanada.ca/wp-content/uploads/2023/04/Begins-at-Home-Guide-WEB.pdf

Risk Assessment

Local health staff, such as community health nurses/directors, Environmental Public Health Officers, and Regional Medical Officers are often involved in public health risk assessments and identifying the appropriate interventions. Various sources of information should be consulted including:

Air Quality Monitoring:

[ECCC Air Quality Health Index \(AQHI\)](#): The AQHI is calculated using the concentrations of 3 air pollutants that are harmful to health: ozone, nitrogen dioxide, and fine particulate matter (PM_{2.5}). These pollutants are considered the best indicators of the health risks associated with the mix of outdoor air pollutants in Canadian communities. The AQHI is presented on a scale of 1 to 10+ with 4 health risk categories. The higher the number, the greater the health risk associated with the air quality. When the amount of air pollution is very high, the number will be reported as 10+. During smoky conditions, PM_{2.5} is the primary driver. A special air quality advisory may be issued based on these values. Depending on the value, health risk messages provide guidance for both at-risk populations and the general population. Community emergency and health professionals, individuals and EPHOs can utilize this monitoring to inform guidance based on current levels. Depending on the location of ECCC and provincial air quality monitoring equipment, some regions of the province may not be adequately covered, however, special air quality statements based on the AQHI forecasts and current conditions.

[WeatherCan App](#): Receive weather alert notifications, including AQHI and special air quality statements in your forecast area, as well as in your saved locations, wherever you are in Canada. Set personal notifications to be alerted when the AQHI observation or forecast has exceeded your number. The latest forecast information directly from Canada's official weather source. Learn more about the app: <https://www.canada.ca/en/environment-climate-change/services/weather-general-tools-resources/weathercan.html>

[The Weather Information](#) page displays the Weather Alerts on an interactive map and in table format for all active alerts for Canada, with the ability to view alerts by province or territory and searching by alert name, alert type or forecast location. <https://weather.gc.ca/>

[Protecting your health from wildfire smoke](#) : Describes wildfire smoke and its air pollutants, the AQHI, how it is calculated and risk categories, preparing for and protecting health from wildfire smoke by HC and ECCC.

[Provinces](#): Consult provincial-based air quality pages.

Provincial air quality indexes: Provinces may have variations to the air quality index based on the intent and purpose of the monitoring. It may be different from the AQHI in that it measures the single worst pollutant versus the health risk of a mixture of pollutants. Ensure that the index being used to inform health actions reflects the sum of health risks appropriate to the air quality event.

Forecast Maps:

Forecast maps can assist to determine if heavy smoke may remain in an area for a prolonged period and can inform potential actions that are being considered, such as evacuation. For example, an evacuation takes time to coordinate and smoke may move out of the area by the time residents evacuate. If an evacuation has already taken place, forecasting may assist in determining when smoke may dissipate and warrant a return back to the community.

FireWork: National Wildfire Smoke Model - Environment Canada (weather.gc.ca): Canada's wildfire smoke prediction system, includes forecast maps to show how:

- the air quality in your community may be affected by wildfire smoke; and
- smoke from wildfires is expected to move across North America over the next 72 hours.

The Canadian map with corrected data and additional layers for tracking the smoke plume is available at: <https://cyclone.unbc.ca/aqmap/#3/67.55/-107.64>

This map is a tool with multiple layers of information available, Firework model, NRCan products, dispersion model that can be used for Emergency Management and Public Health Units to advise their communities of the risk of wildfire smoke.

Local PM_{2.5} Air Sensors:

Purple Air Monitors are low cost sensors (approximately \$300) that are used to supplement government air data to provide a better understanding of local-scale air pollution. The level of pollution can change rapidly and may vary within the same neighbourhood; these monitors provide air quality maps for communities to better protect vulnerable populations. These monitors connect to the internet and report real time air quality. Outdoor and indoor sensors are available. [PurpleAir | Real-time Air Quality Monitoring](#).

FNIHB Regions have been working with ECCC since 2020 to establish Purple Air monitors in First Nations communities in order to fill monitoring gaps in regions that typically do not have provincial air monitoring coverage. Information on the pilot project, installation, and requests for monitors are available by sending a request to: Celine.audette@ec.gc.ca; Chris.Nayet@ec.gc.ca; Corinne.Schiller@ec.gc.ca and Robert.Keenan@ec.gc.ca.

Visibility Index/Direct Observation:

Visibility range can be a proxy for smoke levels and is referred to in some provincial public health response guidelines for communities without particulate monitoring, where local conditions vary significantly, or where AQHI and special air quality statements are not characterizing conditions adequately. Environmental factors (e.g. night, dawn or dusk, and high humidity) affect accuracy and landmarks at known distances must be available. It should be noted that air pollution from wildfire smoke may still be present even if the smoke cannot be seen or smelled.

General instructions for using the visibility index: 1) identify visibility landmarks before they are needed, 2) face away from the sun, and 3) determine the limit of your visibility range by looking for landmarks at known distances. The visibility range is the point at which even high-contrast objects completely

disappear (ex.: a dark building viewed against the sky at noon). Some provincial jurisdictions have incorporated the visibility index levels alongside suggested health messaging and potential actions based on the air quality category.

Table 1 Estimating Particulate Matter Concentrations from Visibility Assessment

Air Quality Category	Equivalent approx. PM _{2.5} 1- 3-hour average in µg/m ³	Visibility in Km
Good	0-40	15 kms and up
Moderate/Unhealthy for Sensitive Groups	41-175	5-14 kms
Unhealthy	176-300	2.5-4 kms
Very Unhealthy	301-500	1.5-2 kms
Hazardous	over 500	Less than 1 km

Adapted from *Wildfire Smoke: a guide for public health officials*: <http://www.arb.ca.gov/smp/progdev/pubeduc/wfqv8.pdf>

Air Quality Standards:

Wildfire smoke is a complex mixture where PM_{2.5} is a major component and poses the greatest health risk. There is no safe level of exposure to PM_{2.5} (i.e. some risk of adverse health effects could occur at any exposure concentration).

In most provinces, risk assessments rely upon a range of PM_{2.5} levels to inform when personal actions should be taken.

Health surveillance in local populations:

Monitoring health effects within a population may include monitoring emergency room calls, information from local health facilities or community health care workers and information requested from central health information call lines. Some provinces, such as BC, have province-wide systems and frameworks to identify and predict health outcomes in the population, and which inform regional health level response. Consult the provincial health authorities to be familiar with notifications derived from this monitoring.

Health Canada Regional Air Quality Specialists:

Region	Health Canada Regional Air Quality Specialists
ATL	Maureen Robinson (maureen.robinson@hc-sc.gc.ca)
QC	Mireille Carpentier (Mireille.Carpentier@hc-sc.gc.ca)
ON	Phoebe Tung (phoebe.tung@hc-sc.gc.ca)
MB / SK	Jeff Eyamie (jeff.eyamie@hc-sc.gc.ca)
AB /North	Opel Vuzi (opel.vuzi@hc-sc.gc.ca)
BC	Meghan Roushorne (meghan.roushorne@hc-sc.gc.ca)

Public Health Interventions

Interventions during wildfire smoke events aim to reduce a person's exposure to smoke by supporting personal precautions. Prolonged periods of heavy smoke may require additional measures.

Health Risk Messaging:

Public health risk messaging most often focus on limiting exposure to smoke outdoors by limiting or modifying outdoor activities, canceling outdoor events, staying indoors, and access to cleaner air spaces. Messages for higher-risk populations may be different from the general population.

Local health staff, such as community health nurses/directors, Environmental Public Health Officers and Regional Medical Officers ideally should be involved in health risk communication.

Ideally, communications products should be reviewed prior to the wildfire season for currency and community-specific needs, as appropriate.

When local air quality statements or advisories are issued these can be reinforced with FNIHB/MHO guidance and awareness materials through established communication pathways. This includes instructions such as limiting activity, sheltering in place, keeping windows closed etc.

Identification of higher risk populations:

Establishing a list of priority higher-risk people will support targeted messaging and will also assist in the event that selective priority or full evacuation is deemed appropriate. It should be noted that people at a higher-risk for wildfire smoke may be different than lists used for other types of emergency evacuations.

Cleaner Air Shelters/Spaces:

Cleaner air shelters/spaces are intended to provide relief from wildfire smoke conditions, thus reducing exposure. Buildings such as libraries, community centres, malls and schools are generally equipped with ventilation systems that can filter and cool air. In First Nations communities, this may also include band halls or other community buildings. Prior to the wildfire season, communities should assess their buildings and make any improvements. Where communities do not have available buildings, clean air spaces outside of the community are relied upon, and it is important for these spaces to be culturally safe.

Evaluating a facility's ability to shelter people from smoke requires: knowledge of preparation of cleaner air spaces, identification of experts in heating, ventilation and air conditioning systems, methods and supplies for monitoring air quality in the facility, and available supplies such as filters for improving air quality.

[Guidance for Cleaner Air Spaces during Wildfire Smoke Events](#) by Health Canada provides detailed guidance and a checklist developed by Health Canada. It provides advice to local jurisdictions that are creating and/or managing community-based clean air spaces. It covers specific pollutants of concern, associated health risks, reducing exposure and associated health impacts. It includes strategies for sheltering at home.

[Wildfire-Smoke-Clean-Air-Shelters-Information](#) by the First Nations Health Authority is a visual depiction of a clean air shelter, and describes how to establish a home clean air shelter and a community clean air shelter.

Air Purifiers:

A portable air purifier can be an important intervention to reduce individual exposure, particularly where a home/building has insufficient or no building ventilation, occupants are higher risk, and when cleaner air spaces are not accessible. Those who are at higher risk will benefit most from using one in

their home. Air purifiers must be appropriately sized, operated and maintained. Due to supply issues during a smoke event and accessibility for remote and isolated communities, devices should be obtained before the wildfire season. Devices that generate ozone should not be used (electrostatic precipitators, ionizers, and ozone generators). Purifiers that use UV light or photocatalytic oxidation are not effective at removing particles.

[Wildfire smoke 101: Using an air purifier to filter wildfire smoke](#) by Health Canada is a printable tipsheet that teaches about those who benefit most, how to choose the right one for yourself, general operation, and HVAC systems.

[WildFire FactSheet PortableAirCleaners](#) by the Province of British Columbia describes the use of, types, and selection of portable air cleaners.

Commercially available portable air purifiers are recommended. Instructions for do-it-yourself (DIY) air cleaners/filters are available, they can reduce indoor particulate levels, and in some cases may be useful where commercial air purifiers are not available or accessible. Before choosing to make and use one, there are important limitations and risks that should be considered.

- [Do-it-yourself air cleaners: FAQs and additional resources](#) by the National Collaborating Centre on Environmental Health.
- [WildFire FactSheet BoxFanAirFilters](#) by the Province of British Columbia provides information and instructions on box fan filters.

Face masks:

If you must spend time outdoors, a well-fitted respirator type mask (such as a NIOSH certified N95 or equivalent respirator) that does not allow air to pass through small openings between the mask and face, can help reduce your exposure to the fine particles in smoke. These fine particles generally pose the greatest risk to health. However, respirators do not reduce exposure to the gases in wildfire smoke. It is important to listen to your body and reduce or stop activities if you are experiencing symptoms. It is important to be aware of the limitations and potential risks to certain people, such as people who are pregnant, or have respiratory or cardiac conditions. [BCCDC WildFire FactSheet FaceMasks.pdf](#)

The Public Health Agency of Canada (PHAC), through its National Emergency Strategic Stockpile (NESS) program, is working with organizations to distribute free N95 respirators to populations across Canada most affected by air quality concerns from wildfire smoke. Organizations may request these respirators directly from PHAC (nessppe-rnsuepp@phac-aspc.gc.ca) with request and delivery details (see Annex A).

Evacuations:

Evacuations themselves may impact human health and the associated risks must be balanced with the benefits. Communities also consider more broadly if there is an imminent threat to life safety, such as a compromise to the only egress out of a community, in which case a community may be better positioned to first evacuate those vulnerable as both a smoke and life safety precaution. Current evidence indicates that evacuation to protect populations from wildfire smoke exposure in the absence of life safety risks should only be considered as a last resort for multiple reasons:

- evacuations are themselves disruptive to mental and physical wellbeing (and cultural safety);
- smoke can be very dynamic in space and time, so it may be impossible to identify communities that are not also affected by smoke to host the people being evacuated;

- evacuations take time to coordinate, and evidence from Canadian smoke-specific evacuations found that smoke concentrations within the communities were higher pre-evacuation than post-evacuation in about 50% of cases (i.e. the evacuation occurred too late to protect against the worst of the smoke).

It is generally recommended that individuals and communities shelter-in-place by improving their home air quality and accessing clean air spaces. A variety of factors should be considered in evaluating the need for evacuation of people who have prolonged exposure to poor air quality and includes:

- Air quality monitoring results/estimates
- Air quality and weather forecasts
- Vulnerability of people
- Symptoms being experienced by people
- Duration of exposure to poor air quality, including continuous or intermittent exposure
- Ability to safely evacuate
- Ability to accommodate evacuees and family members

In emergency situations, there is no national air quality trigger level or threshold that is used to inform an evacuation. The Newfoundland Labrador public health guidelines (2015) recommends considering evacuation where there is a continued exposure of PM_{2.5} levels of 250 to 500 micrograms per cubic metre. However, this should be applied with the other factors mentioned above and with consideration to risks of evacuation.

The decision to evacuate or move elders, vulnerable people, and others is made at the local level by Chief and Council in consultation with various emergency and health staff (EMT, MOH, Nursing Staff, wildfire officials, provincial health authorities etc.). Should an evacuation be considered, the following should be considered:

- Air quality in receiving community is expected to be improved and not forecasted to deteriorate
- Adequate provision of shelter, food (traditional and culturally appropriate), culturally safe access to services (e.g. interpreters, medical services, medical aids, medications, mental wellness supports, NIHB, homecare)
- Prioritization of evacuees based on risk

A return to the community should also be adequately informed. Consult provincial resources and guidance for criteria and considerations for returning to the community after a wildfire smoke evacuation. The following criteria are important in decision-making:

- The smoke or fire emergency that caused the evacuation is no longer a threat
- People with health risks and care needs can be managed locally with existing resources
- Family units, caregivers and support people can be kept together
- Local officials have agreed it is safe to re-enter the community, clean water is available and utilities are working properly
- Re-entry of evacuees may be considered in reverse priority order. This ensures that higher priority evacuees stay away until air quality has improved to a level where no harmful effects are anticipated. Local officials should also consider providing information about food safety if a power outage affected refrigeration.

Region specific information:

BC	BC policy recommends sheltering in place for wildfire smoke protection. The decision to evacuate a population (or subgroup of a population) due to wildfire smoke is the responsibility of the local authority in coordination with the local MHO. FNHA-Returning-to-Your-Home-After-Wildfires.pdf
Alberta	Alberta Air Quality Notification Protocol What you need to know: health-alberta-air-quality-notification-protocol-what-you-need-to-know.pdf ISC - Wildfire and Air Quality Resource list_Eng_Final.pdf (onehealth.ca)
Manitoba	Smoke Exposure from Wildland Fires: Interim Guidelines for Protecting Community Health and Wellbeing (gov.mb.ca)
Newfoundland Labrador	Forest Fire Smoke and Air Quality Public Health Guidelines, rev 2018 Microsoft Word - Forest Fire Smoke and Air Quality (Revised May 2018).doc (lghealth.ca)

References:

1. BC public health decision-making [WFSG BC guidance 2014_09_03trs.pdf \(bccdc.ca\)](#)
2. BC: [BC Health Wildfire Smoke Response Coordination Guideline.pdf \(bccdc.ca\)](#)
3. [Smoke Exposure from Wildland Fires: Interim Guidelines for Protecting Community Health and Wellbeing \(gov.mb.ca\)](#)
4. EPA guidelines, [Wildfire Smoke, A guide for public health officials \(airnow.gov\)](#)

The Public Health Agency of Canada (PHAC), through its National Emergency Strategic Stockpile (NESS) program, is working with organizations to distribute free N95 respirators to populations across Canada most affected by air quality concerns from wildfire smoke. We are reaching out to you today to ask whether your organization is interested in receiving a volume of NIOSH-certified N95s from the NESS at no cost, to make available to members of your communities free of charge (see product information sheet attached).

Should your organization be interested in receiving a volume of these free N95 respirators for your community, please send an email request to nessppe-rnsuepp@phac-aspc.gc.ca containing the following details:

1. Name of requestor (personal and network/organization):
 - a) Email address:
 - b) Phone number:
2. Delivery by date:
3. Delivery location address:
 - a) Delivery address
 - b) Delivery location contact name:
 - c) Email address:
 - d) Phone number:
4. Desired volume (*note that there is a 1-case minimum (400 units)*):
5. Rationale for request (*optional*):