



# INDIGENOUS

## EDUCATIONAL TOOLKIT

for Understanding Air Quality  
& the Impacts on Health and Well-Being

# ACKNOWLEDGMENTS

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THE UNIVERSITY OF BRITISH COLUMBIA



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# COMMUNITY GUIDE

This educational toolkit was developed to assist Indigenous communities to better understand current quality of outdoor air, and its effects on holistic health and wellbeing. It is a guide that could be utilized by community health representatives to start or continue dialogue on the effects of air quality. The guide can also be used to decide when it is unsafe to be outside or in your home during a fire, or other events where air quality may be poor.

In recent years, Indigenous communities in Canada have experienced a significant increase in heat and air quality events due to wildfires, and environmental reactions to global warming.

Under climate change, the frequency of these environmental risks are expected to increase because of rising temperatures and the decrease of available water supplies. It is essential that preventative approaches and education on the risks of poor air quality are shared and discussed due to the considerable amount of smoke and pollutants produced from these events, and the severity of the effects on health and well-being. In this educational toolkit, you will learn about the air quality, the effects of outdoor smoke on your health, and how to measure and know when it is safe to be outside or stay in your home.

In Canada, the outdoor air quality is measured using the Air Quality Health Index (AQHI). This is one method used by the Meteorological Service of Canada (MSC) to provide the public with information

about health risks associated with their air quality. Additionally, the MSC issues alerts to warn the public of poor air quality events and associated health risks. An important component of this public communication is the call to action for the public to understand the risks and to provide information to reduce exposure. This educational toolkit serves to assist you to develop and reinforce your knowledge on how air quality is relevant to your health and wellbeing.

In recent years, Indigenous communities in Canada have experienced a significant increase in heat and air quality events due to wildfires, and environmental reactions to global warming.





# WHAT IS AIR QUALITY?

- Air quality is good when pollutant levels are low. Pollutants can include particles and gases (such as ozone, nitrogen dioxide, sulphur dioxide, and carbon monoxide).

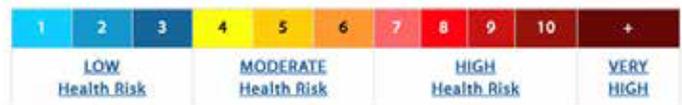
When the smaller particles (less than 2.5 micrometers) are inhaled, they can travel down the throat and lungs and can be more harmful. PM<sub>2.5</sub> are very fine particles made up of smoke, soot, bacteria or pollen that are small enough to get into one's lungs (Health Canada, 2019). These particles are labelled PM 2.5 and are 1/8 of the diameter of a human hair. The next size is PM 10, which can be up to 4 times larger, and is also a health risk because it can become caught in the nose and throat. (Healthlink BC, 2018).

- It is important to learn about air quality to be able to enjoy being outdoors and to protect your health. Sources of poor air quality can come from any materials burning, road dust, construction and agriculture. Poor air quality can increase health risks that compromise breathing, circulation, and other defense systems' ability to function.
- Exposure to poor air quality can be limited with information and notice about local air quality conditions.

Sources of poor air quality can come from any materials burning, road dust, construction and agriculture.

- The AQHI is a tool used in Canada to rate the air quality based on a scale of 1 to 10+; the higher the number, the higher the health risk. The scale can be used as a health protection tool to make decisions to reduce short-term exposure to air pollution by adjusting activity levels during increased levels of air pollution.

The AQHI includes health messaging for each of the categories with advice on when and how to take action to protect your health.



- Vulnerable people include children, Elders, pregnant women and people who may suffering from heart or lung diseases; such as asthma, chronic obstructive pulmonary disease (COPD), or heart disease.



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# TOOLKIT OVERVIEW

Throughout this toolkit,  
you will find:

## Tips

To provide recommendations that minimize health risks and to improve the quality of outside air.

## Sharing Circle Discussion Topics

The worksheets consist of Sharing Circle topic-specific questions that are designed to ignite dialogue. Invite Sharing Circle members to discuss the needs of your community and how to address them by using some of the questions to start dialogue. It is always recommended to include Elders and youth for sharing perspectives in the Sharing Circle activities.

## Links

Online websites that provide relevant resources that can be shared on social media or your community website.



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# COMMUNITY ENGAGEMENT



## Community Health & Wellness Needs Assessment

### What are Health & Wellness Needs?

The community wholistic health & wellness needs are a complex balance of spiritual, emotional, mental, and physical components that contribute to an individual's vision of health and wellness, with ties to culture, tradition, history, and current knowledge. The individual's ability to meet and satisfy needs within their environment also affects health and wellness.

This toolkit is also designed to support the assessment of individual member needs in the community in relation to the quality of outdoor air.





## A WILDFIRE STORY

We live in a community where in the summer the wind blows hard and the sun is hot.

The forests are abundant with Ponderosa pine trees. In the old days, forest fires were a normal part of clearing the grounds, and we performed controlled burns in the early spring. However, this year we were hit with another forest fire. It was said that it was of human cause. It seems that every year we have a fire that starts from the train tracks, a cigarette thrown out of car, or lightning from a storm. My Auntie's house always seems to be feet away from being caught in the fire as it comes down the hill, through the hay fields. She has a routine where she has all her valuables, pictures, and baskets made by our relatives and her, by the door in case the fire is too close. The farm animals have headed down to the river but my Auntie stays by the house with the sprinklers on the outside. Her house is not air tight and she sleeps on the second floor which is higher and

closer to the blanket of smoke. We could all see the fire at night, but it is much harder to see the smoke in the dark.

In the old days, forest fires were a normal part of clearing the grounds, and we performed controlled burns in the early spring.

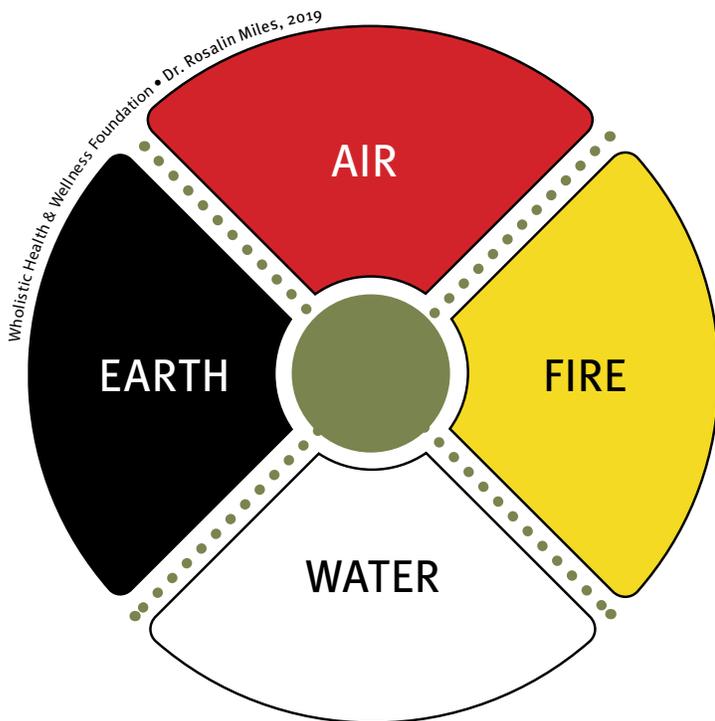
Once the Wildland firefighters had the fire under control, she began to air out the house and wash down the walls. However, how do I alert her to leave for the good of her health? The AQHI data that is available are for areas that are too far from her home or our community.

*This is a true story and life experience, written by Dr. Rosalin Miles, Lytton First Nation.*



# A WHOLISTIC APPROACH

Always include your community’s wholistic approach to health and wellness when you conduct your community needs assessment.



This can be achieved by including your community’s cultural teachings, and using other references towards the Medicine Wheel. The Medicine Wheel may reflect Indigenous worldviews that could be centered in a balance and harmony between family, community, and the environment. These teachings of interconnectivity tie the individuals’ goals for health and well-being within the spritual, emotional, mental, and physical realms.

As you read this, take a moment to reflect on what elements of health and wellness that you believe could be included when thinking of each component >>







**FROM YOUR MEETINGS AND  
SHARING CIRCLES, LOCAL RESOURCES  
THAT ALREADY EXIST CAN BE USED TO  
SHARE THE IMPORTANCE OF  
AIR QUALITY FOR OUR HEALTH.**

# CONDUCTING A COMMUNITY NEEDS ASSESSMENT

There are several approaches to conducting a community Air Quality needs assessment to reduce possible harm and risks throughout the seasons.

Leaders in health and wellness will often look at numerous positive and negative influences on community health and wellness. To create community understanding, there must be continuous and meaningful community engagement with residents through Sharing Circles or one-on-one interviews. Once there is an understanding by the Health Leader of the local community, then traditions, cultures, history, and teachings for each season of health and wellness can be considered, and goals and activities that are strength-based can be developed into plans to respond to high risk air quality.

From your meetings and Sharing Circles, local resources that already exist can be used to share the importance of air quality awareness and the Air Quality Health Index. You may also discover what your community may need to support the discussion on preventing harms due to high risk air quality. For example, you may find out that the location and seasonal weather conditions or events of your community will largely impact the air quality. Furthermore, geography also plays a role in the quality of air. In some terrains or rural areas, concentrations of pollutants are higher in low-lying areas relative to areas of higher ground, which can affect people who live in the valley.

It is a good idea to speak to the Elders in your community to provide additional insights on how Indigenous lifeways have evolved and adapted over time, especially in response to wildfires.

It is helpful to acknowledge both western and Indigenous perspectives in relation to finding measures to address health issues arising from air quality. Through a “Two-Eyed Seeing” approach, one can harness and highlight the strengths of Indigenous communities, while examining, and possibly integrating Western tools of monitoring air quality. Applying a culturally relevant lens to your community assessment is vital to the process.

What is a cultural reflection on the benefits of wildfires in your community?

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# REFLECTIONS ON WIND, AIR, & FIRE

There are many variables, like temperature, humidity, wind speed, and direction that have an influence on air quality. For example, hot weather and clear skies during summer seasons are more likely to accelerate chemical reactions that increase smog and ground-ozone levels in some communities. In Canada, most wildfires burn during the summer season, with the most intense fires often occurring when the weather is hottest. This means that people may be exposed to both smoke and extreme heat, both of which may be harmful to health. On the other hand, rainfall and wind may play a role in lowering levels of pollutants and particulate matter. Cooler seasons often lead to polluted air being trapped in locations that are situated in valleys. Colder weather also leads to increased practices such as burning of fuel for heat, which can increase levels of exposure to particulate matter.

There is growing concern on the effects of climate change on such environmental events that will affect air quality. Take time to think of how your location, and the seasons affect the air quality in your community. Also, reflect on how you can prevent harm from poor air quality, and what can be done to help create a healthier and more sustainable environment for you and your community.

1. Where is your community located and how does your location affect air quality?

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2. How do the different seasons within a year affect the air quality in your community?

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3. Have you noticed any changes in weather patterns in your community in recent years?

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4. What actions could you do to decrease/avoid exposure to air pollutants during warmer seasons?

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5. What actions could you do to decrease/avoid exposure to air pollutants during cooler seasons?

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6. What actions could you do to help promote a healthier and more sustainable environment for you and your community?

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# SHARING CIRCLE DIALOGUE QUESTIONS: COMMUNITY AIR QUALITY NEEDS ASSESSMENT

Why is it important to monitor air quality for the community?

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Why do we use the Air Quality Health Index to communicate risks of air quality?

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What is your understanding of the Air Quality Health Index and its use?

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What do you think are the limitations of the Air Quality Health Index in terms of usability and practicality in the community?

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What features would you recommend that could be implemented to improve the Air Quality Health Index for your community?

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How can we make the Air Quality Health Index more culturally appropriate or relevant?

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What can you and your community do to improve air quality?

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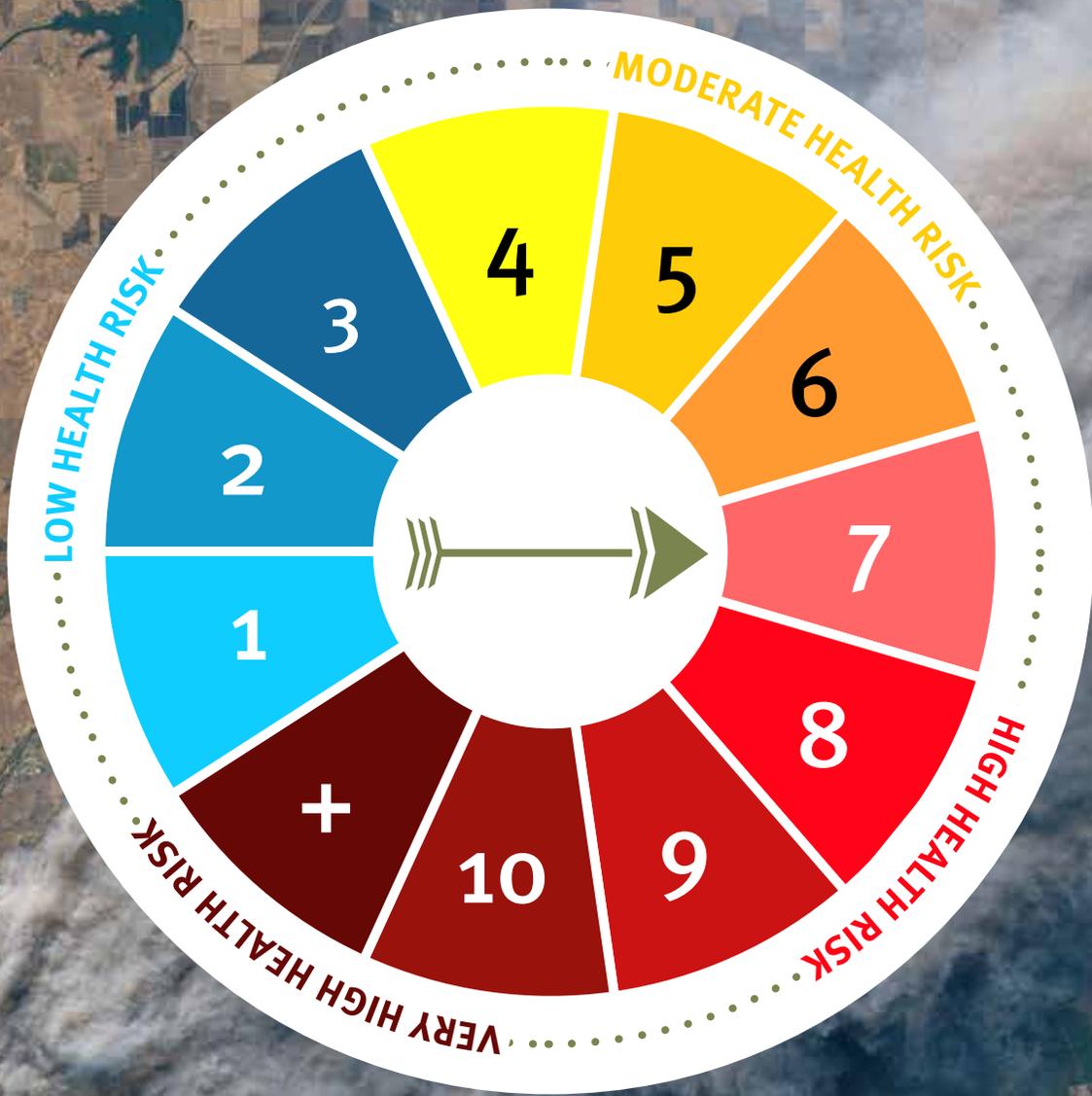
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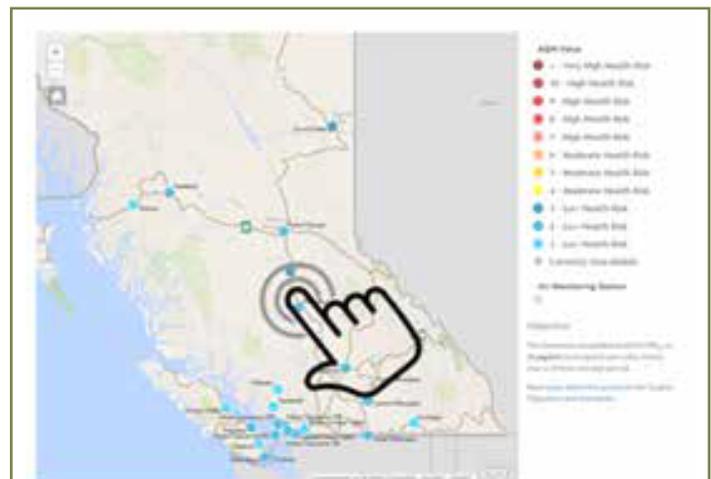
*Indigenous Studies in Kinesiology, 2018*

# UNDERSTANDING AIR QUALITY AND IMPACTS ON WHOLISTIC HEALTH AND WELLNESS

## INTERPRETING THE AIR QUALITY HEALTH INDEX (AQHI)

### What is the AQHI in Canada?

- The AQHI is a tool used to measure the health risk associated with outdoor air quality
- The AQHI is measured on a scale from 1 to 10+
- The scale values are grouped into health risk levels ranging from “low health risk” to “moderate”, “high”, and “very high” respectively
- The health risks can help community members plan their daily activities. A key way to reduce exposure to poor air quality is to reduce or avoid outdoor activities. The AQHI and air quality alert messaging is able to indicate when populations should consider making changes to their activity plans, whether they are part of the vulnerable population or not.



### Did you know?

You can verify whether the Air Quality Health Index is available in your community or region. If it is, find out how community members can receive the index reading (for example, the AQHI Canada App, Environment Canada website (see page 41), local TV channel, radio station, newspaper, etc.) so that they can use it to plan their outdoor activities. When community members get the daily reading, they can use the index to figure out what activities they should do based on the health risk level for the day.



# STORY: ME, GRANDPA, & AQHI

I was told by our health department that I need to pay attention to the AQHI especially when it is the summer time and there are a lot of forest fires.



I worry about the Elders in our community and I know that it would harm their lungs and heart if they are outside too long.

I worry about the Elders in our community and I know that it would harm their lungs and heart if they are outside for too long, so I called my grandfather to see if I could help by running errands for him. He said that it was okay to go outside for him, for he was brought up around smoke from wildfires, wood stoves, and slash burning. I told him that the effects of smoke are becoming worse due to climate change, that he lives in a valley, and that he isn't becoming any younger. He laughed as I offered to bring him some milk, bread, and coffee back from the store and he said sure. To me, it is important to not only look out for our own health, but we need to be there for our Elders.

It is important that you are paying attention to your senses, signs, and symptoms and being cautious about outdoor activities until conditions improve. It is also important to be paying attention to any air local quality alerts or messaging.

Vulnerable people include children, Elders, pregnant women and people who may be suffering from heart or lung diseases; such as asthma, chronic obstructive pulmonary disease (COPD), or heart disease.

*This is a true story and life experience, written by Dr. Rosalin Miles, Lytton First Nation.*

However, we do not have a local AQHI monitor and the closest reading available on the government web page is over 100 kms from our community. So how do I know when it safe to be outside when I can smell and see smoke from our neighbouring community due to a wildfire? I feel like it is safe for me to be outside and I am a healthy individual. I went outside for 30 minutes to work on the garden, and my throat became irritated, so I decided to go back inside. I am not sure if the effects of being outside and breathing smoke from wildfires have serious effects similar to smoking?

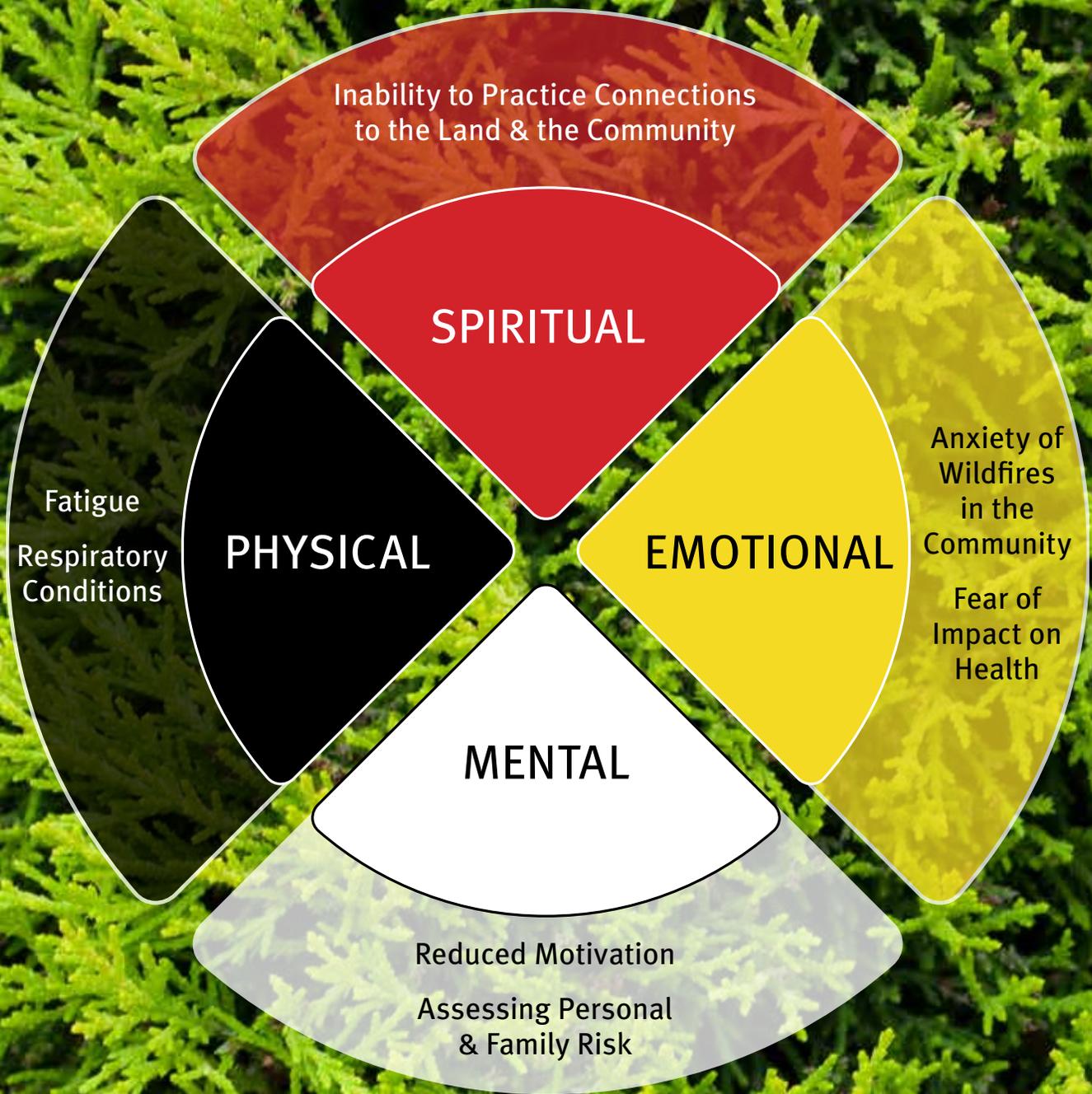


Oksana Kuzmina/Shutterstock.com



musicman/Shutterstock.com





*Indigenous Studies in Kinesiology, 2018*

# UNDERSTANDING HEALTH AND WELLNESS FROM A WHOLISTIC PERSPECTIVE

Medicine Wheels are visual representations of some Indigenous wholistic cultures and teachings.

Even though there are many different interpretations of the Medicine Wheel, they all have a common symbolism of wholeness, interconnectedness and balance. The wheel, pictured as a circle with four quadrants, represents the alignment and continuous interaction of spiritual, emotional, mental, and physical realities.



Jess Kraft/Shutterstock.com

## Components of Wholistic Health & Wellbeing

### Spiritual

Health and wellbeing reflect spiritual aspects of Indigenous culture and traditional values that are personal, and beliefs vary from community-to-community, and from person-to-person. Your spiritual values may aim to build and nurture positive practices that strengthen cultural practices and ties to community ways of knowing.

Here are some examples:

- Respect self, nature, and the environment. Recognize the previous generations, and how we treat the land, water, and air contributes to the quality of life.
- Encourage community members to practice spiritual beliefs and honour teachings of Elders to have fires for cultural reasons, and limit burning of materials that can be recycled, landfilled or composted.
- Increase spiritual practices such as prayer or song in Sharing Circles where dialogue of air may be a topic of discussion.

### Emotional

Enjoying clean air is filled with various emotions, such as the simple joy of being outdoors and having harmony with nature. Emotional health and wellbeing is strengthened when there is less smoke. When people are affected by pollutants they may become more anxious, stressed, and depressed due to limitations on being outdoors.



*Linus Strandholm/Shutterstock.com*

## Mental

Understanding that fires are a part of cycles in nature, whether caused by lightning or the use of woodstoves to keep warm. Learning about the effects of poor air quality on you and your family's health and wellness is valuable information to prevent exposure to pollutants such as smoke from woodstoves, or slash burning in your neighbour's yard. It is also important for mental wellness to understand the AQHI scale so you know when it is safe to be outdoors for family and community events, particularly when vulnerable populations are present (i.e., children and Elders).

## Physical

Having ties to the land and being able to go outdoors to gather, fish, and hunt are essential to some community's ability to sustain their physical health and wellness with food, nutrition, and exercise. Poor air quality can indirectly affect your health and ways of life and may prevent some community members from being outdoors. Poor air quality can also limit your ability to engage in moderate-to-high levels of physical activity. High exposure to air particles and emissions may also lead to physical diseases of the heart and lungs.

### **Air Quality effects everyone in every way!**

By focusing on the four components of the Medicine Wheel, it is valuable to recognize that poor air quality is not just a factor that affects your heart and lungs, but your way of life and connections to the land, family, and community.



# POOR AIR QUALITY AND PARTICULATE MATTER

## What is Particulate Matter (PM)?

Particulate matter is a combination of liquids and soil particles (sand, silt, clay) that are suspended in the air.

## Health Effects

According to the United States Environmental Protection Agency (EPA), the size of particulate matter is associated with potential health concerns.

**PM<sub>10</sub>** refers to particulate matter that have a diameter smaller than 10 micrometers. Some examples are dust, pollen, and mold. Particles in this category are dangerous for health.

**PM<sub>2.5</sub>** refers to particulate matter that have a diameter smaller than 2.5 micrometers. Particles in this category include combustion matter from burning, organic matter, and metals. Particles in this category are dangerous for health.

**PM<sub>1.0</sub>** are particles smaller than 1.0 micrometer. Particles in this category are dangerous for health because they are small enough to enter the bloodstream. This could lead to cancer and other diseases. Particles in this category are dangerous for health.

PM<sub>2.5</sub> can come from various sources, including motor vehicles, factories, volcanoes, and forest fires. Due to the small size, particles in this category are able to pass through the nose and the airway into the lungs, and even enter the bloodstream into the circulatory system.

Health effects associated with exposure to PM:

- Premature death in people with heart or lung disease
- Heart attacks
- Irregular heartbeat
- Asthma
- Decreased lung function
- Irritation of the airways, coughing, or difficulty breathing



Mild problems associated with exposure to fine particulate matter include shortness of breath, coughing, and wheezing.

## Environmental Effects

Particulate matter can be carried by wind and travel long distances. Overtime, they can settle and cause disruptions to the air, water, and soil. Damage to the environment varies depending on the chemical composition of the particles. For example, haze is a form of air pollution caused by PM<sub>2.5</sub>. When sunlight meets fine, suspended particulate matter in the air, visibility and clarity of the sky is obscured.

## Environmental effects caused by PM

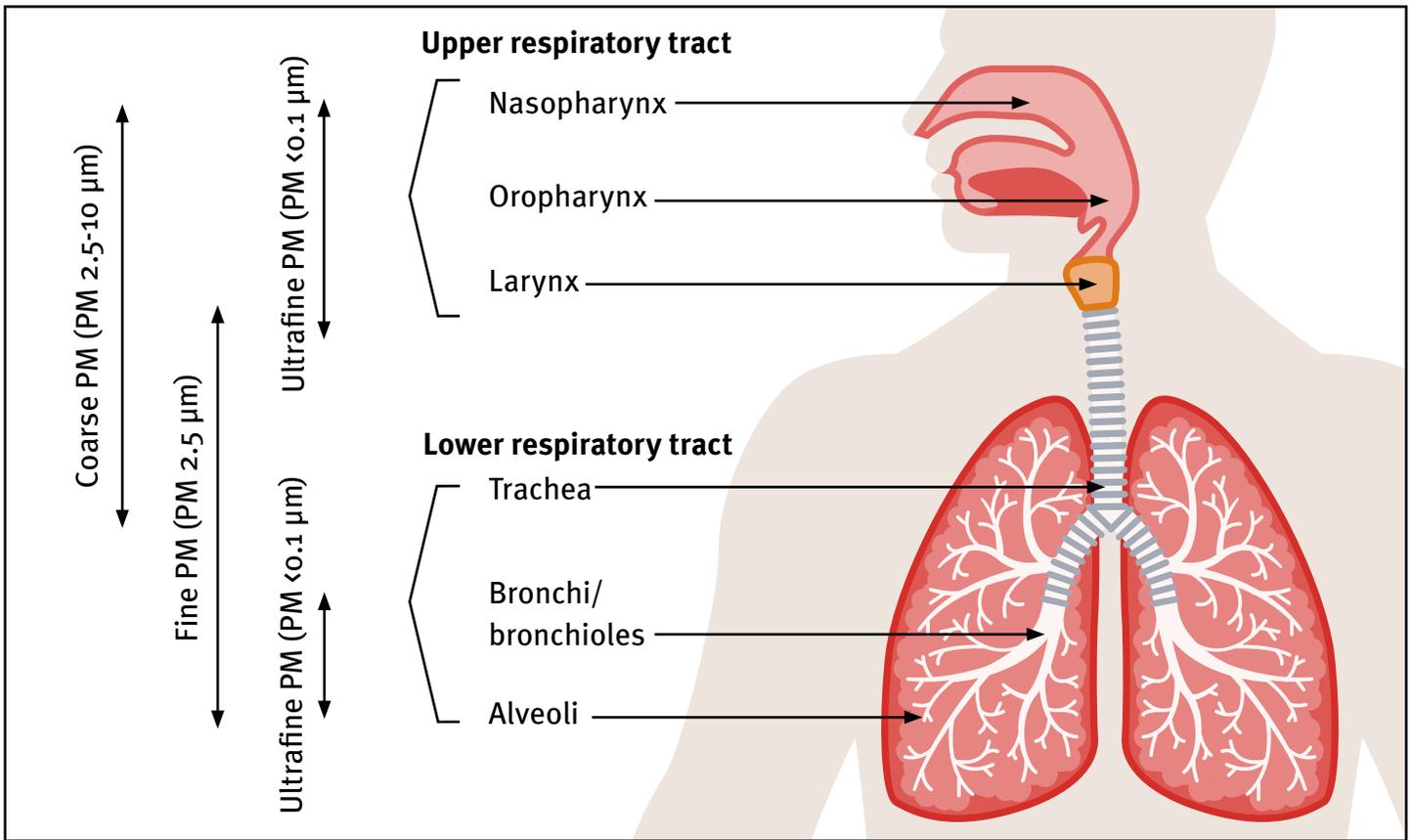
- Visible haze
- Causing lakes and streams to be acidic
- Changing nutrient balance in coastal waters and river basins
- Depleting nutrients in soil
- Damaging to forests and crops
- Affecting the diversity of ecosystems
- Acidic rain that damages statues and monuments

- The AQHI measures a combination of three pollutants that include particulate matter (PM<sub>2.5</sub>), ground level ozone, and nitrogen dioxide.
- Poor air quality affects respiratory and cardiovascular health for everyone; people, the animals, and birds
- Excessive levels of ground-level ozone and nitrogen dioxide increases the risk of asthma, respiratory disease and impaired lung development.
- Particulate matter affects heart and lung health. Mild problems associated with exposure to fine particulate matter include shortness of breath, coughing, and wheezing. More severe consequences include chronic heart and lung disease, exacerbation of asthma, and increased risk of heart attack.

## Also to consider!

In many instances, rural communities have limited access to air quality monitors. Furthermore, rural communities may have limited access to well-filtered facilities, ultimately affecting indoor air quality and the overall health and wellness of community members.





Source: Compartmental deposition of particulate matter (Guarnieri, Balmes; 2014)

# HOW IT AFFECTS OUR HEALTH

## RESPIRATORY SYSTEM

- Diseases of the respiratory system are of concern for all Indigenous communities, and is the most common reason for hospitalization.
- The Inuit community has the highest rate of asthma and lower respiratory tract infections.
- First Nations communities, especially living on-reserve, have higher risks of severe respiratory-related challenges when hospitalized.
- Indigenous women and children are even more vulnerable to exposure to indoor air pollutants, which increases their risks of acquiring respiratory problems.
- Respiratory tract diseases and lower respiratory tract infections are the leading cause of hospitalization for Indigenous children.

An aerial photograph of a boreal forest landscape. The foreground and middle ground are dominated by a dense stand of dead, charred trees, their trunks appearing as a light brown and grey grid. Patches of green moss and small, regrowing evergreen trees are scattered throughout. In the background, a more vibrant green forest is visible, suggesting a transition or a different stage of the forest's recovery. The sky is a clear, deep blue.

**BOREAL FOREST  
WILDFIRE EMISSIONS  
ARE A MAJOR SOURCE  
OF AIR EMISSIONS.**

# OUTDOOR AIR & WILDFIRE SMOKE

## Did you know?

- Canada has 28 percent of the world's boreal forest zone, which roughly equals to 552 million hectares.
- Boreal forest wildfire emissions are a major source of air emissions.
- The ignition and growth of fires depend on various factors, for which the primary cause is the weather.
- With the occurrence of climate change, it is predicted that wildfires will keep increasing in severity and prevalence.
- Wildfires release large amounts of particulate matter, but also carbon monoxide, methane, carbon dioxide, atmospheric mercury, and ozone-forming chemicals.
- Wildfire smoke exposure is linked to an increased risk of mortality, as well as increased risks for exacerbation of respiratory conditions and adverse birth outcomes.
- Breathing air from wildfire smoke can cause symptoms of coughing, wheezing, feeling tightness in your chest, and having sore and watery eyes.

# REDUCING EMISSIONS AND MANAGING YOUR HEALTH

In the case of a wildfire or if high levels of air pollutants are present in outdoor air, there are several measures that can be taken to protect yourself, your family, and community members.

## How do I protect myself?

### Do's

- Reduce time spent outdoors and increase social activities indoors.
- If possible, you may wish to be active indoors in a facility with cool, filtered air.
- It has been recommended for people to use HEPA filters and avoid the use of wood stoves.
- When air quality is poor, doors and windows in your home should be closed to limit ventilation. Air conditioning units should be set to recirculate, if possible, to avoid outdoor air from entering homes.
- Do further research on the health risks that arise from poor air quality.
- Stay away from secondary smoke exposure, such as cigarette smoke, smoke from wood stoves, candles, cultural activities that involve burning and smoke, etc.
- Be prepared for a case of emergency.
- Drinking plenty of water can help your body cope with the smoke.
- Good lifestyle behaviors such as exercise and consumption of nutritious foods can help reduce susceptibility to disease and protect your heart and lung health.

### Don't

- Keep your doors and windows open. Outdoor air may infiltrate your home. Remember, if it is hot out it may not be safe to keep doors and windows closed if you cannot maintain a comfortable temperature in your home.
- Use excessive burning of wood as a source of fuel.
- Spend too much time outdoors if you experience health problems.
- Use contaminated water and eat foods that may be contaminated by smoke, soot, or heat.

### Don't forget!

- A preventative approach is best to limit exposure to air emissions and reduce health risks. The goal is to avoid worsening the potential health risks associated with heat and air quality related issues.



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## How do I protect my community?

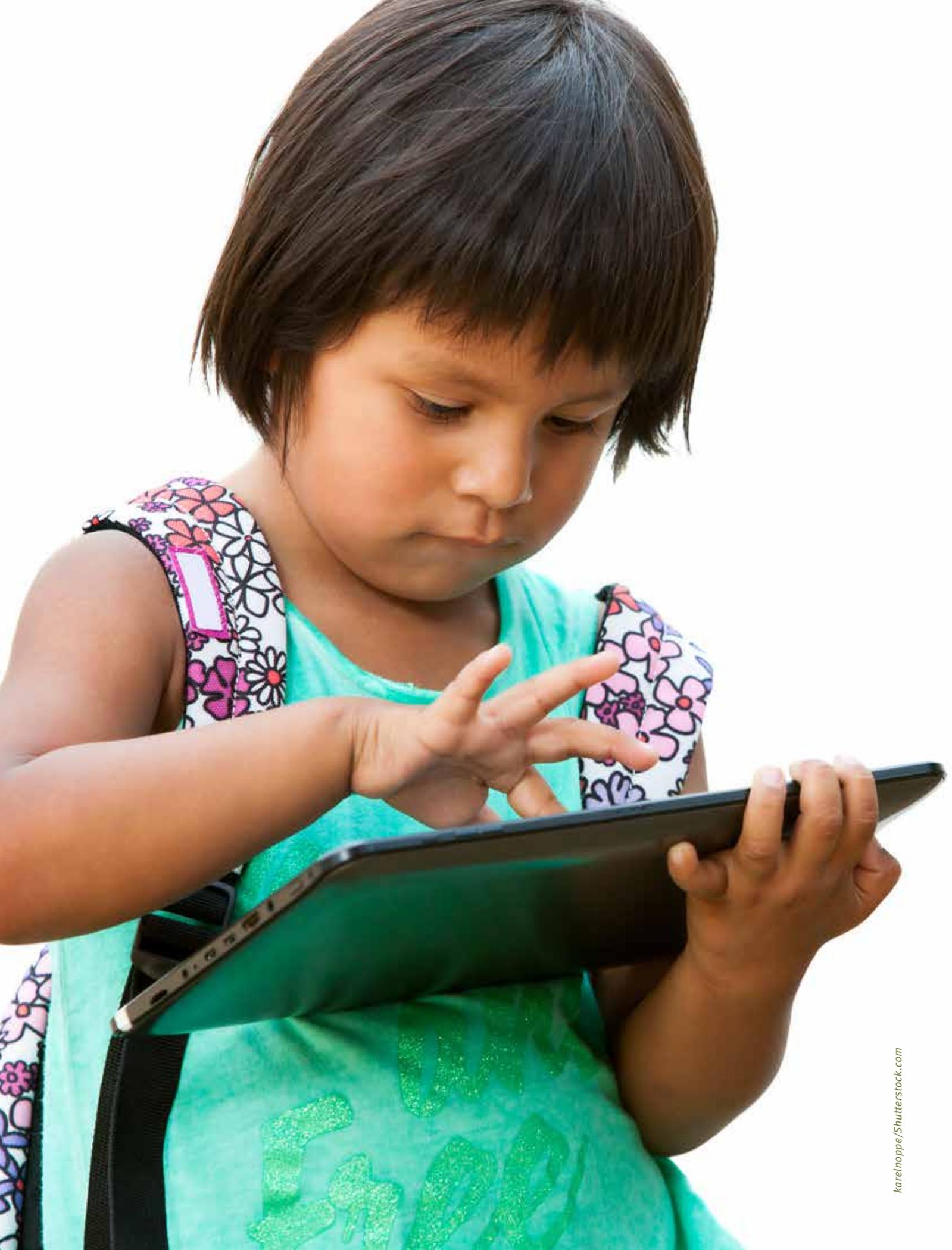
### Do's

- Initiate and run education sessions on air quality and health so that all members of your community are knowledgeable on the issue.
- Seek advice from your Elders on their views and recommendations concerning exposure to air pollutants.
- Engage in community activities such as healthy eating and exercising in groups to encourage one another towards optimal health and wellbeing.
- Use portable air monitoring tools if they are accessible to you and your community. Portable air monitoring tools are a convenient way of assessing air quality when the AQHI readings are not available for your community.
- Regularly check the air quality conditions for your community.

- Check on family members and friends – particularly those living alone and those with existing health conditions.
- Learn how to set up a community clean air shelter and identify a facility and related resources that would be required.

### Don't

- Be insensitive to the needs of other members of your community. Younger children and Elders tend to be more sensitive to the effects of air emissions.
- Ignore the health risks. If you are experiencing symptoms such as coughing, and watery eyes, it is best to protect yourself and stay indoors.
- Do careless actions that might start a wildfire or create a condition that could lead to air emissions.



# RESOURCES

## Air Quality Health Index Website

Information about the Air Quality Health Index can be found on the Environment Canada website. There is also an application available for download on smartphones. The application can be found on the App Store and on Google Play. The application allows for quick and easy access to the Air Quality Health Index.

### Links:

**Air Quality Health Index website:**

<https://www.canada.ca/en/environment-climate-change/services/air-quality-health-index/about.html>

**Weather Alerts website:**

[https://weather.gc.ca/warnings/index\\_e.html](https://weather.gc.ca/warnings/index_e.html)

<http://www.env.gov.bc.ca/epd/bcairquality/readings/find-stations-map.html>

**Download the AQHI Canada App on the App Store:**

<https://itunes.apple.com/ca/app/aqhi-canada/id1020320494?mt=8>

**Download the AQHI Canada App on Google Play:**

[https://play.google.com/store/apps/details?id=ca.ab.gov.nationalaqhi&hl=en\\_CA](https://play.google.com/store/apps/details?id=ca.ab.gov.nationalaqhi&hl=en_CA)

**Check out the new Environment Canada Weather app:**

<https://www.canada.ca/en/environment-climate-change/services/weather-general-tools-resources/weathercan.html>





# REFERENCES

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for Understanding Air Quality & the Impacts on Health and Well-Being



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