

# Beyond the Flames: Wildfires and Our Health

Wildfires and our response to them present a range of physical and mental health hazards and risks. **The main hazards are caused by fire, smoke and heat.**

## The Impact of Fire

Fire has an impact on people located directly within the range of fire.

- People can directly die from the fire
- People could have injuries and/or burns. Burns can be deadly because they disrupt the skin barrier and can create a host of problems and infections.

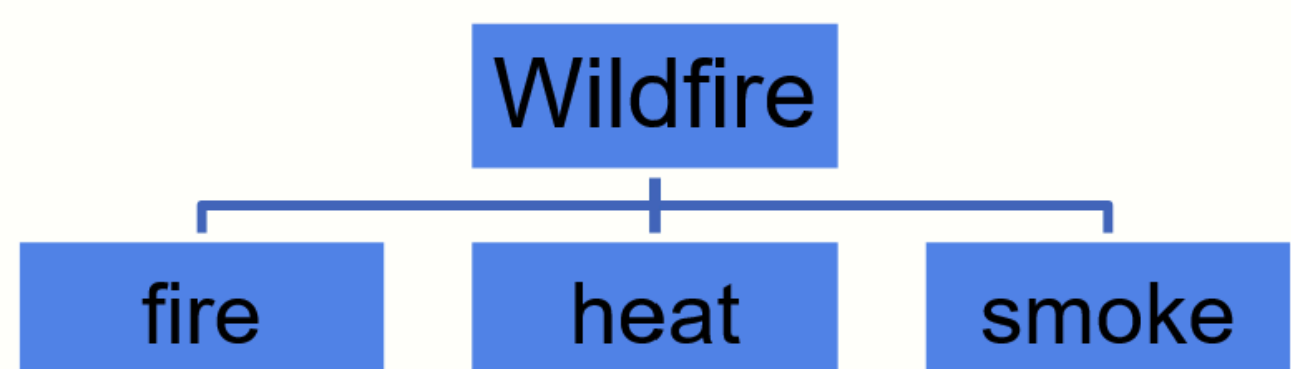
Direct exposure to intense heat and flames can cause severe burns, leading to immediate and life-threatening injuries. The rapid spread of wildfires can also hinder escape routes, trapping people in perilous situations and impeding rescue efforts.

Flying embers and debris carried by strong winds pose additional threats, potentially causing lacerations, eye injuries or blunt force trauma.

Moreover, the unpredictable nature of wildfires amplifies the risk of being caught in rapidly advancing flames.

## Heat and Smoke

Each person's response to heat and smoke depends on the level of exposure, health and age. Inhaling the smoke and toxic gases generated by wildfires can result in respiratory distress, exacerbate existing health conditions and even lead to asphyxiation in extreme cases.





## Wildfire Smoke

Wildfire smoke can infiltrate homes through openings like doors, windows and ventilation systems, leading to indoor exposure. This smoke can also travel large distances, impacting people several thousand kilometres from the fire and creating health risks to distant communities.

## Extreme Heat

Extreme heat may occur directly from the wildfire or alongside the wildfire and be strengthened by it.

## Smoke and air pollutants

Wildfire smoke is a mixture of hazardous air pollutants. These include high concentrations of PM2.5, large quantities of carbon dioxide and other greenhouse gases, including ozone, ammonia, carbon monoxide, nitrogen dioxide, polycyclic aromatic hydrocarbons, volatile organic compounds, water vapour and trace metals.

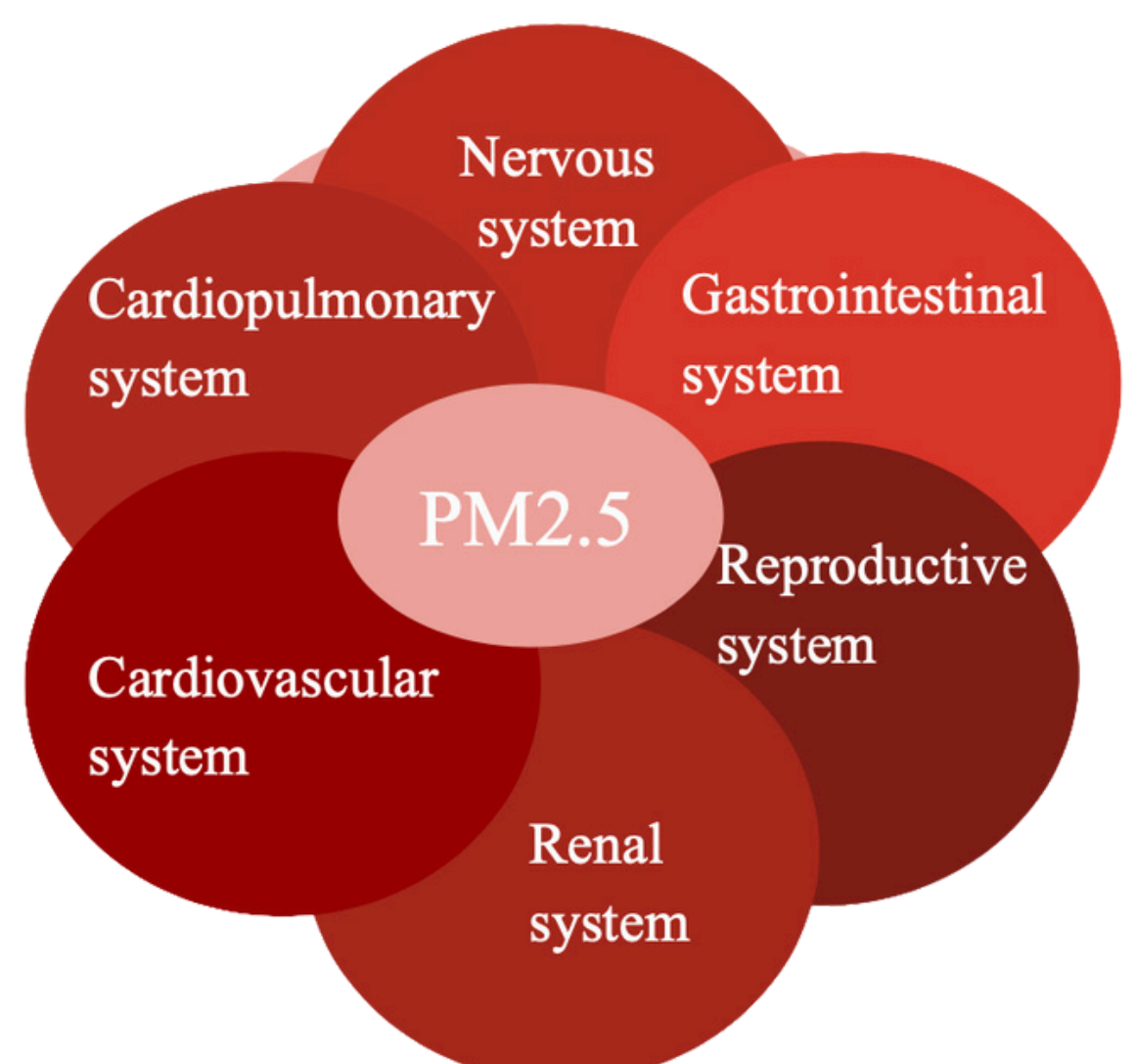
It's important to note that both smoke and extreme heat can impact your health, but they do so in different ways. Understanding these differences is key to being prepared.

Wildfire smoke exposure symptoms	
Mild	Severe
<ul style="list-style-type: none"><li>• Eye irritation</li><li>• Runny nose</li><li>• Sore throat</li><li>• A mild cough</li><li>• Phlegm production</li><li>• Wheezing</li><li>• Headaches</li></ul>	<ul style="list-style-type: none"><li>• Dizziness</li><li>• Chest pains</li><li>• Severe cough</li><li>• Shortness of breath</li><li>• Wheezing (including asthma attacks)</li><li>• Heart palpitations (irregular heart beat)</li><li>• Stroke</li><li>• Heart attack</li></ul>

## PM2.5 explained

Fine, inhalable particulate matter, PM2.5, is the air pollutant of most significant concern to public health from wildfire smoke because it can travel deep into the lungs and may even enter the bloodstream.

In recent years, there has been a connection between PM2.5 from wildfires and an increased number of [diseases](#) that affect your body. Often, these effects can be seen days or weeks after the smoke exposure.

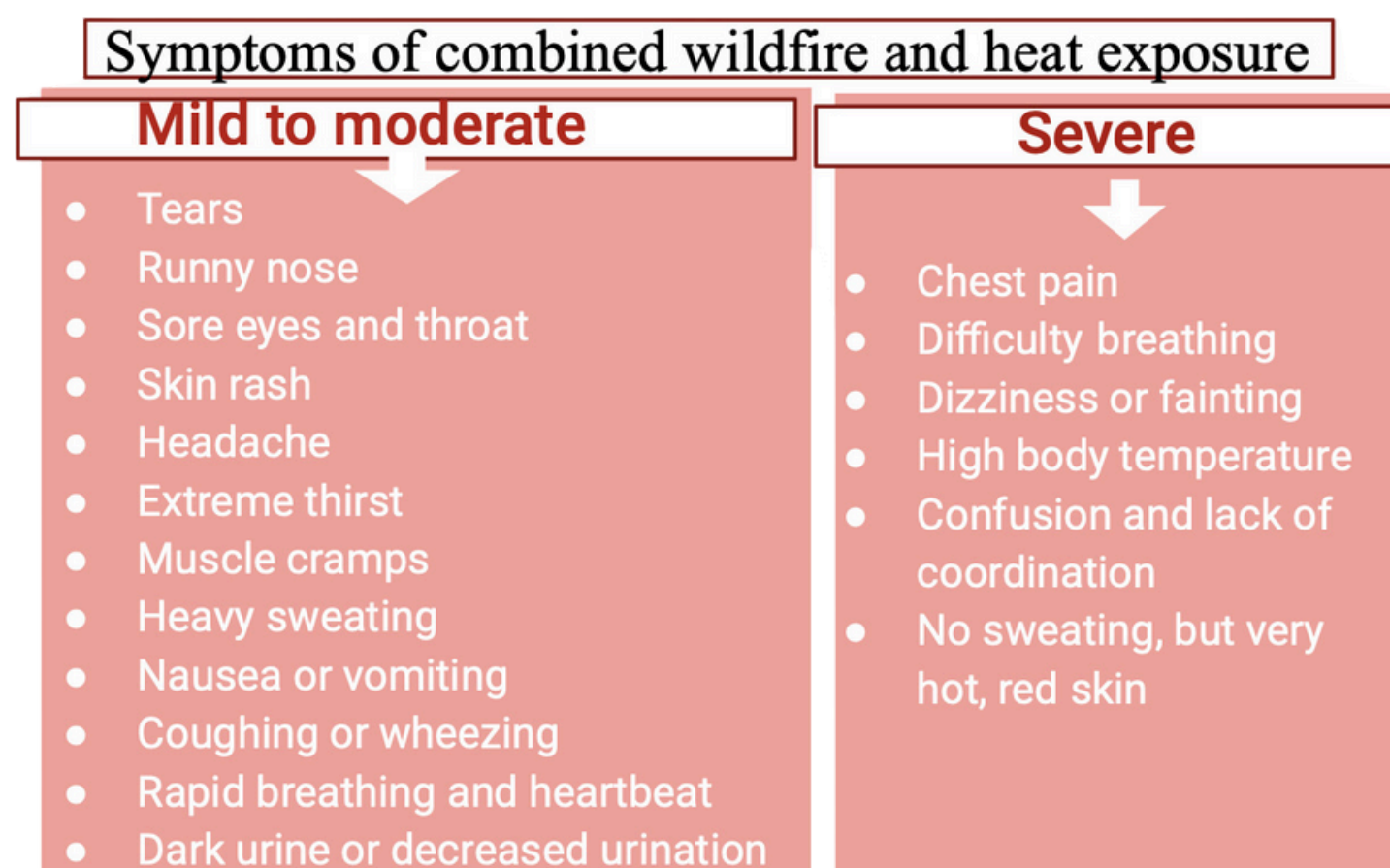


## Overview of PM2.5 Health Effects

SYSTEM	EFFECT
<i>Nervous system</i>	Increased risk of developing Parkinson's disease, Alzheimer's disease, memory deficit, dementia, anxiety, low cognition and changes in social behavior.
<i>Gastrointestinal system</i>	Increased mortality rates associated with liver, colorectal and gastrointestinal cancer, as well as with dysbiosis resulting in increased peptic ulcer blood loss in elderly individuals, changes in amino acid metabolism, changes in the intestinal microbiota and peptic ulcers.
<i>Cardiopulmonary system</i>	Exacerbation of pre-existing cardiopulmonary diseases, chronic obstructive pulmonary disease (COPD), pneumonia, lung cancer, asthma and morphological changes in the epithelium.
<i>Renal system</i>	Risk of chronic kidney disease (CKD), of progression to end-stage kidney disease—ESKD and of lower glomerular filtration rate, renal dysfunction, and fibrosis.
<i>Reproductive system</i>	Negative effect on individuals' fertility, hinders fetal development and leads to placental and circulatory impairment, premature births, decreased fetal growth, morphological alteration of the placenta and placental thrombus.
<i>Cardiovascular system</i>	Arrhythmias and fibrillation, cardiac remodeling, atherosclerosis, increased blood pressure and variations in heart rate.

Short-term exposure to wildfire has been strongly associated with all-cause mortality, acute bronchitis, exacerbation of chronic respiratory conditions such as asthma and chronic obstructive pulmonary disease, as well as increases in respiratory emergency room visits and hospitalizations.

There is also an association between wildfire exposure and respiratory infections, adverse birth outcomes, adverse cardiovascular outcomes and mental health impacts.





## Populations at increased risk

- ▶ Wildland or forest firefighters
- ▶ Seniors (generally 65 years and over)
- ▶ Pregnant people
- ▶ Infants and young children
- ▶ People who work outdoors
- ▶ People experiencing homelessness
- ▶ People involved in strenuous outdoor exercise
- ▶ Indigenous populations
- ▶ People with an existing illness or chronic health conditions, such as:
  - ▶ cancer
  - ▶ diabetes
  - ▶ mental illness
  - ▶ lung or heart conditions

In addition to directly threatening lives and property, wildfires can aggravate water and air quality and produce particulate matter that affects public health in many ways.



## Water Quality

Wildfires significantly impact water sources like rivers, lakes, streams and drinking water systems. Water quality deteriorates due to damage to vegetation, trees, infrastructure, air pollution and soil contamination.





## Air Quality Health Index (AQHI)

The AQHI is calculated based on the relative risks of a combination of common air pollutants such as ozone (O<sub>3</sub>) at ground level, particulate matter (PM<sub>2.5</sub>) and nitrogen dioxide (NO<sub>2</sub>). These pollutants are considered the best indicators of the health risks associated with the mix of outdoor air pollutants in Canadian communities.

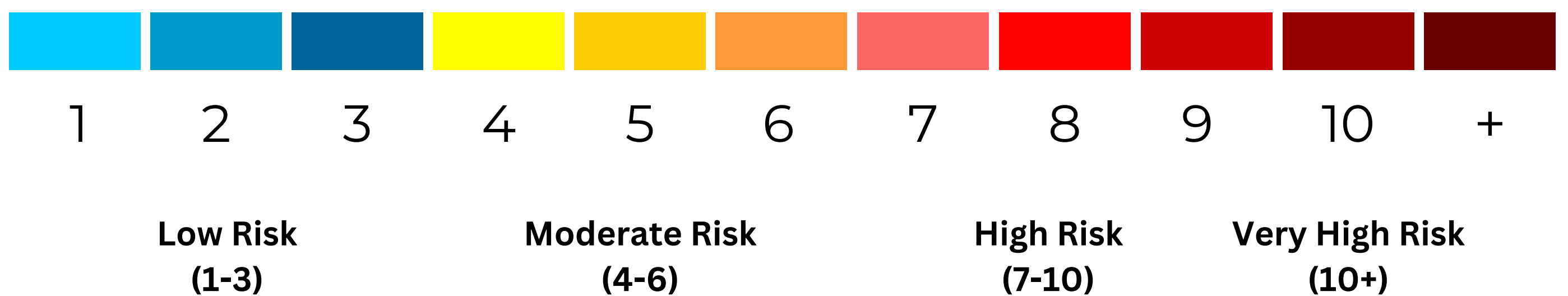
**Low Risk:** Safe to enjoy the outdoor activities.

**Moderate Risk:** Consider reducing outdoor activities if you have coughing and throat irritation symptoms.

**High Risk:** Reduce activities outdoors

**Very High Risk:** Avoid activities outdoors

In Canada, an AQHI value of 10+ is typically due to very high levels of fine particulate matter (PM<sub>2.5</sub>) from wildfire smoke. The [Local Air Quality Health Index](#) by the Government of Canada is updated every hour if you are curious about your current air quality conditions. Many weather apps now also include this information.



Established in 1969, the Conservation Council of New Brunswick is the province's leading public advocate for environmental protection.

A member of the United Nations' Global 500 Roll of Honour, we work to find practical solutions to help families and citizens, educators, governments and businesses protect the air we breathe, the water we drink, the precious marine ecosystem and the land, including the forests, that support us.



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