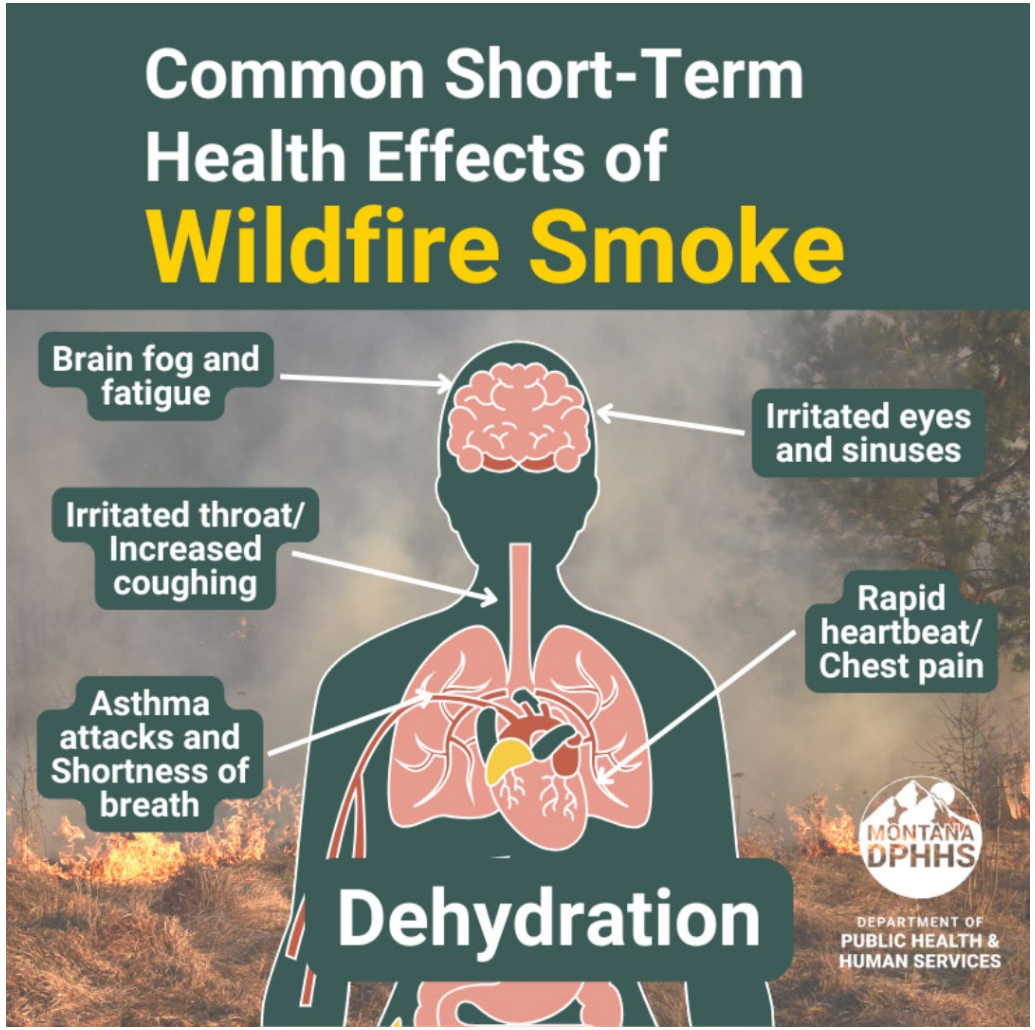
Health Impacts of Wildfire Smoke

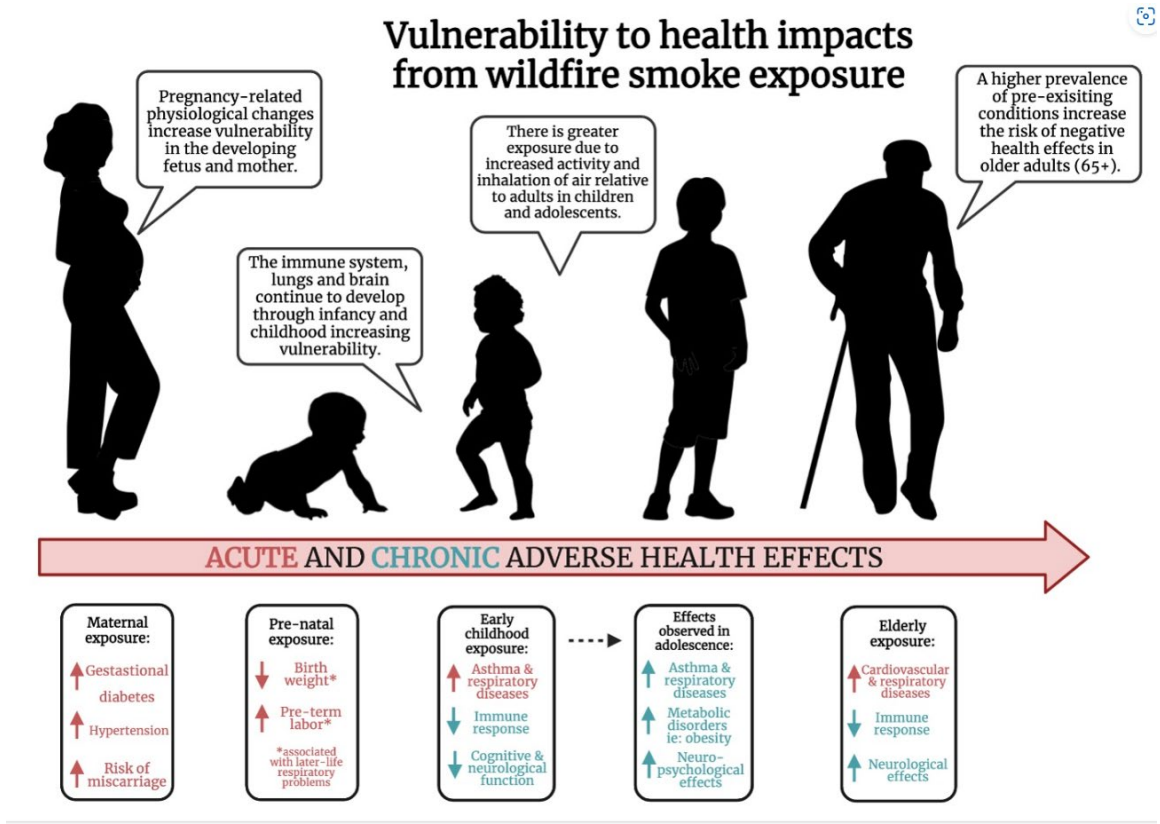
Short Term Effects of Wildfire Smoke

Wildfire smoke contains a slough of harmful particles that cause negative short- and long-term health impacts when exposed. These particles are so small that they can travel into the bloodstream when inhaled, impacting other parts of the body than the respiratory system. Everyone is impacted differently when exposed to wildfire smoke, but here are some common short-term symptoms.



Wildfire Smoke Linked to:

- **Lower birthweight babies/preterm labor**
- **Lifetime risk** of respiratory issues, heart disease, cancer and dementia
- **Reduced Lung Function:** Recent UM study with younger adults in Missoula
- **Dementia**
- **Morbidity:** MT had the highest fraction of mortality due to wildfire smoke from 2006-2018



Most vulnerable populations

- Persons with chronic lung or heart disease
- Seniors
- Children
- Persons who are pregnant
- Low-income Individuals
- Outdoor workers

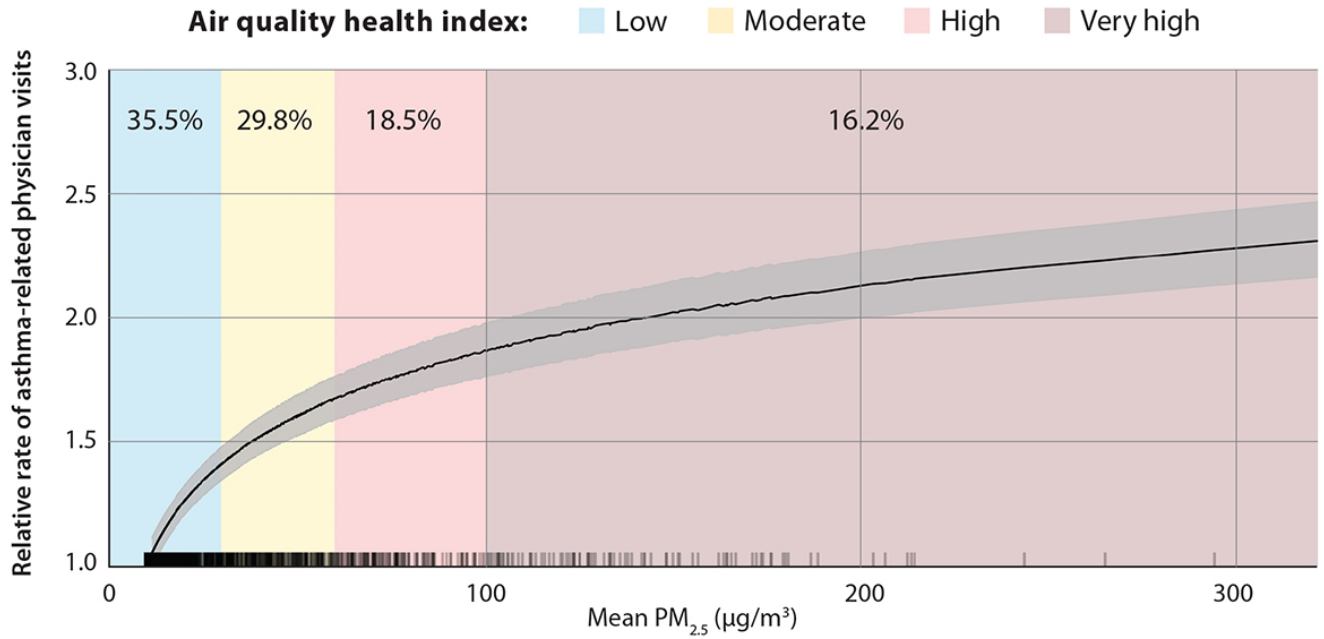
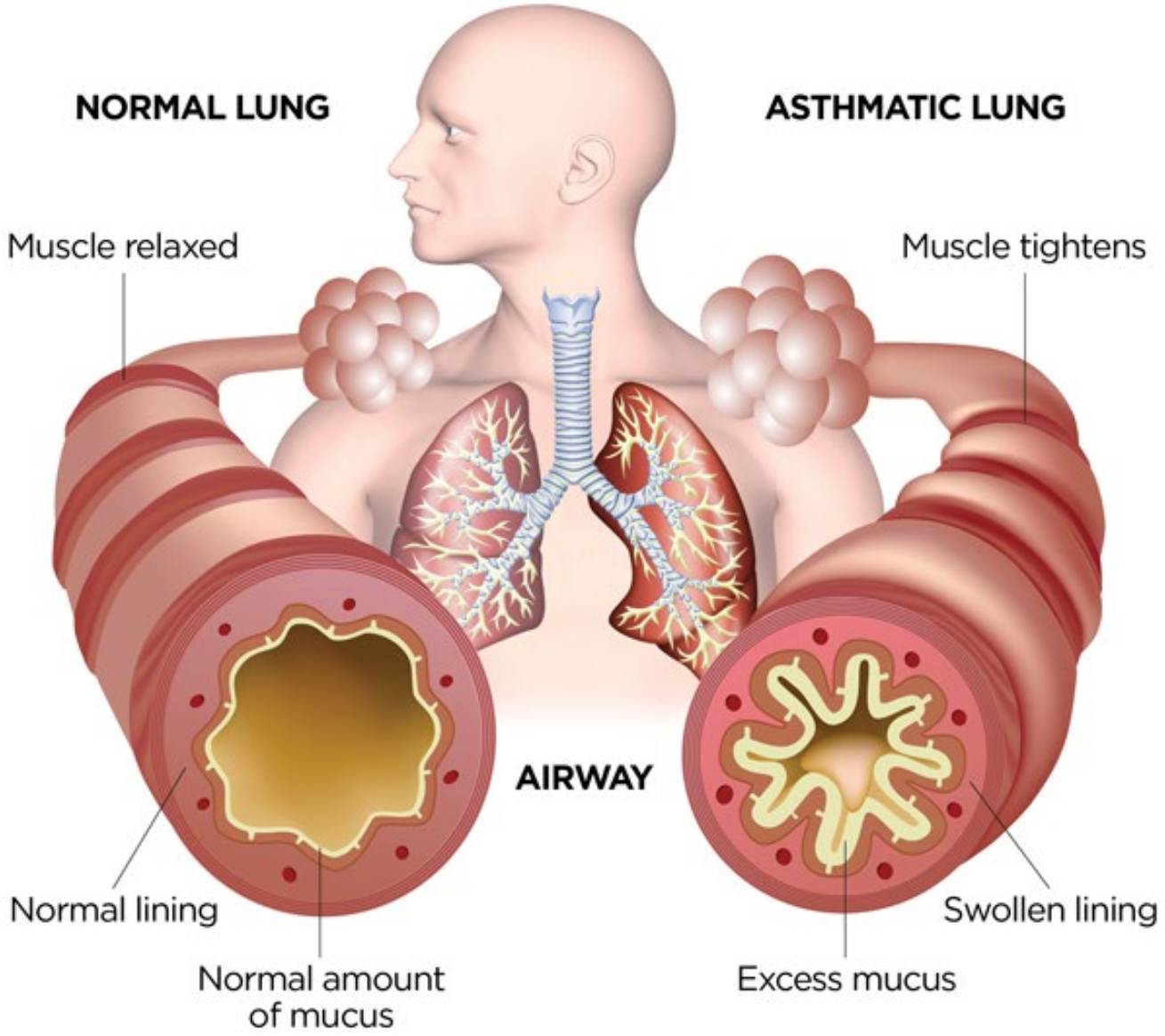


FIGURE. The relationship between 24-hour fine particulate matter ($PM_{2.5}$) concentration and the relative rate of asthma-related physician visits (black line with 95% CI) in BC from 2016 to 2022.
The rate at all concentrations is shown relative to the rate at concentrations less than 10 µg/m³, which is the typical air quality in BC. The carpet plot along the *x*-axis shows the frequency distribution of higher daily $PM_{2.5}$ concentrations. The background shading indicates the ranges of 1-hour $PM_{2.5}$ concentrations corresponding to each level of the air quality health index. Percentages at the top of each shaded area indicate how much of the total burden of excess asthma-related physician visits are attributable to $PM_{2.5}$ concentrations higher than 10 µg/m³ in that range.

Persons included in vulnerable populations should follow air quality guidelines, clean their indoor air and keep medications on hand.

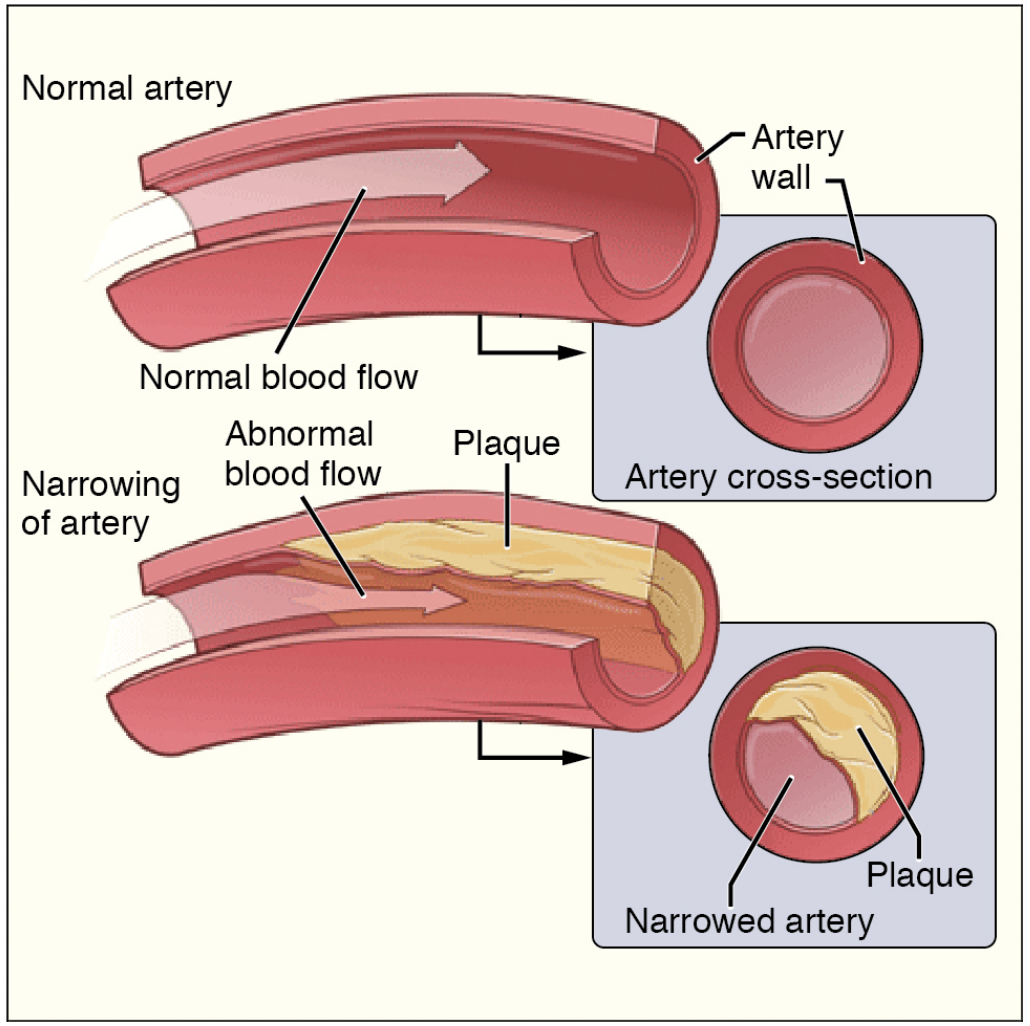
Asthma and Wildfire Smoke

- Asthma airways have diminished ability to filter smoke particles because they are already inflamed
- Diminished capacity requires more breaths, which increases the particles in the lungs.
- Rescue inhaler and other medications need to be on hand during a smoke event
- Persons with asthma should stay indoors with filtered air



Heart Disease and Wildfire Smoke

- Wildfire smoke particles are so small, they enter the bloodstream through the lungs
- These particles then cause an inflammation in already damaged heart tissue
- Rapid heart rate and increased development of clots may occur
- Emergency room visits due to heart conditions go up 20-70% during a wildfire smoke event



Senior Citizens and Wildfire Smoke

- Lower Natural Immunity
- Ofen have existing chronic disease
- May not be able to take steps to protect indoor air without assistance
- May not be familiar with Outdoor Air Quality Guidelines
- Reduced lung capacity means more breaths of unfiltered air

Children (0-18) and Wildfire Smoke

- More vigorous activity so heart rate and breathing more elevated
- Lungs and heart are still developing
- May have undiagnosed conditions
- Spend more time outdoors
- Less likely to stop exercise and activity than adults

Persons who are Pregnant and Wildfire Smoke

- Breathing rates increase during pregnancy, leading to more exposure
- Wildfire smoke in bloodstream may lead to other issues like gestational diabetes
- Wildfire smoke exposure linked to increased risk of preterm labor
- Wildfire smoke exposure linked to lower birthweight baby

Low Income Individuals and Wildfire Smoke

- Lower income individuals often have less access to healthcare
- Lower income individuals may have undiagnosed health conditions
- Lower income individuals may not always have the means to purchase their emergency medication
- Lower income individuals may not have access to ways to reduce their exposure to wildfire smoke (ie: leaving the area, purchasing indoor air filtering materials, sealing doors and windows)

Outdoor workers

- Outdoor workers often have extended periods of time exposed to high concentrations of smoke
- Outdoor workers are often physically active, which increases breathing rates and heart rate
- During a wildfire smoke and heat event, outdoor workers may experience dehydration, which makes the body's ability to filter smoke particles more difficult

Ways to Reduce Health Effects of Wildfire Smoke

If you cannot avoid exposure to unhealthy air quality during a wildfire smoke event, these steps may help:

- Drink water: staying hydrated helps your liver and kidneys to remove toxins
- Prioritize sleep. The body recovers while sleeping.
- Eat foods that help with inflammation. Berries, beans, broccoli and nuts are good choices
- Run a HEPA air cleaner or DIY Box fan filter in your home.

Resources

- American Lung Association
- American Heart Association
- Environmental Protection Agency
- Missoula Climate Smart
- Montana DPHHS Smoke From Fires
- Smoke and Stroke: Investigating the Long-term Effects on Wildfires on Heart Health | Department of Civil and Environmental Engineering
- Long-term exposure to wildfire smoke associated with higher risk of death < Yale School of Public Health