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# Forest Fire Smoke and Health Impacts

*Smoke Management Review Committee*

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The logo for the Oregon Health Authority. It features the word "Oregon" in a smaller, orange, serif font positioned above the word "Health". The word "Health" is in a large, dark blue, serif font. Below "Health", the word "Authority" is written in a smaller, orange, serif font. A thin blue horizontal line is positioned just above the "Authority" text, extending from the left side of the "H" in "Health" to the right side of the "y" in "Authority".

Oregon  
Health  
Authority

# Overview

- What's the issue?
  - Composition of forest fire smoke
- What's the impact?
  - Chronic health conditions and smoke exposure
- Who is impacted the most?
  - Vulnerable populations and smoke exposure
- What is the cost?
  - Costs of selected health conditions in Oregon
- Why does this matter?

# Forest fire smoke

- Contains numerous potentially harmful components, including: particulate matter, nitrogen dioxide, ozone, carbon monoxide, polycyclic aromatic hydrocarbons, and volatile organic compounds (Reid *et. al.*, 2016)

## More about particulate Matter

- Particulate Matter (PM) is a mixture of small particles and liquid droplets found in the air. Studies have shown that there are harmful health effects from breathing PM particles (Department of Environmental Quality, 2017)
- PM is present in smoke from wildfires and smoke from planned burning events (Centers for Disease Control and Prevention, 2016)
- Particle pollution, found in smoke, can trigger chronic conditions (American Lung Association, 2017).

# Asthma

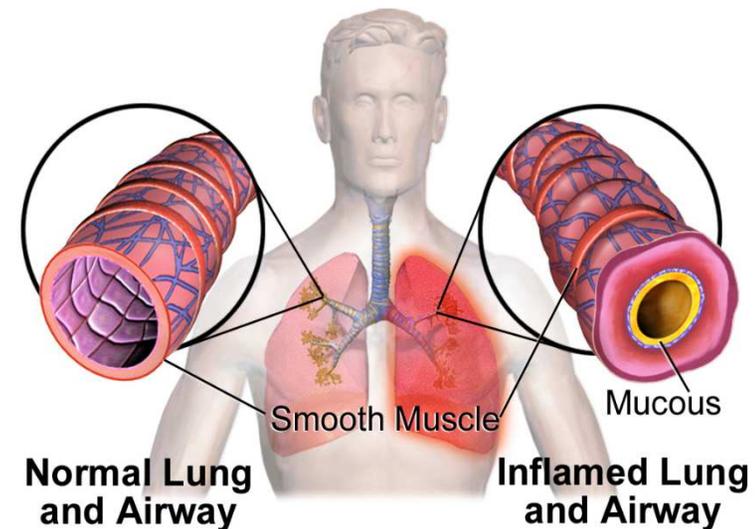
## Definition

Asthma is an obstructive lung disease. The airways become temporarily inflamed and produce excess mucus, and the muscles tighten making it harder to breathe.

## Common Triggers

- Smoke
- Air pollution
- Dust mites
- Dander
- Mold

Acute smoke exposure can trigger asthma attacks. It also may decrease lung function in non-asthmatic children.



Wikimedia Commons

# Chronic obstructive pulmonary disease (COPD)

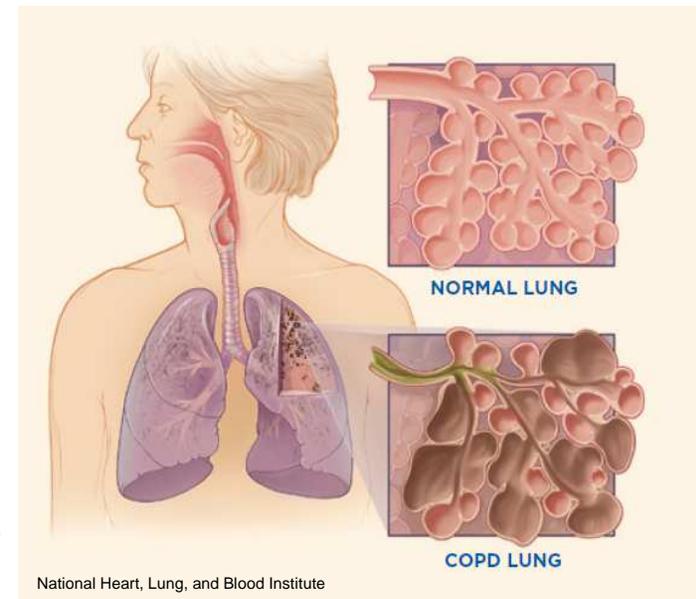
## Definition

COPD is a progressive lung disease that makes it hard to breathe. The lungs may lose their elastic properties that move air in and out, or they may become clogged with mucus.

Some things cause shortness of breath for people with COPD

- Smoke
- Dust
- Strong fumes

Acute smoke exposure can irritate the lungs and make breathing harder for people with COPD

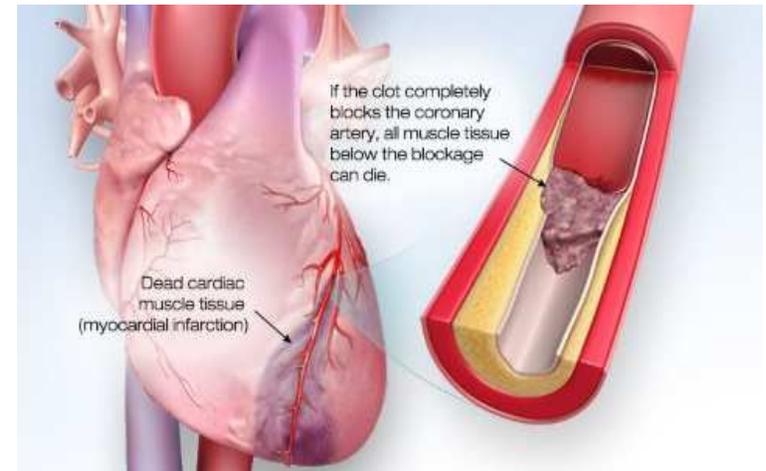


# Heart disease

## Definition

Heart disease includes a range of conditions that affect the function of the heart and the blood vessels.

Activities or substances that stress or inflame the heart and vessels can cause pain, irregular heartbeat, or heart attacks



When acute smoke exposure interferes with lung function, the heart works harder to pump blood and oxygen to the body. Chemical messengers released into the blood can also trigger cardiac events.

# Vulnerable Populations

## People with asthma, COPD, other lung disorders, or heart disease

Acute smoke exposure can trigger or worsen these conditions.

## Older adults

They may be more likely to have heart or lung diseases.

## Children

They are still developing, spend more time being active outside, and have a higher breathing rate than adults.

## Pregnant Women

Women have a higher breathing rate during pregnancy. Some evidence suggests smoke exposure is associated with decreased birthweight babies.

# Vulnerable Populations in Oregon

## Number of Oregonians

	Rural counties	Urban counties
Asthma (adults)	77,000	252,000
Heart disease	37,000	89,000
COPD	59,000	131,000
Children (age 0-14)	151,750	566,613
Adults age 65+	182,038	450,718

US Office of Management and Budget classification of Counties. Rural counties: Baker, Clatsop, Coos, Crook, Curry, Douglas, Gilliam, Grant, Harney, Hood River, Jefferson, Josephine, Klamath, Lake, Lincoln, Linn, Malheur, Morrow, Sherman, Tillamook, Umatilla, Union, Wasco, Wallowa, Wheeler. Urban counties: Benton, Clackamas, Columbia, Deschutes, Jackson, Lane, Marion, Multnomah, Polk, Washington, Yamhill.

# Costs of Disease in Oregon

	Estimated cost of medical treatment* (2010)	Hospitalization costs** (2014)
Asthma (adults & children)	\$411 million	\$16.5 million
COPD***		\$32 million
Heart disease		\$564 million
Congestive heart failure	\$182 million	
Coronary heart disease	\$1.1 billion	
Other heart disease	\$603 million	

\*CDC Chronic Disease Cost Calculator. Estimates may account for more than one disease and cannot be summed.

\*\* Hospital Discharge Dataset, Oregon 2014

\*\*\* COPD = Chronic Obstructive Pulmonary Disease

# Why does this matter?

Forest fire smoke has a health impact on vulnerable populations both in urban and rural communities in Oregon.

- Specifically, forest fire smoke has a health impact due to the particulate matter.
- Lingering amounts of smoke can trigger acute events in vulnerable populations
- Knowing this, what can communities do to support optimal health?

# References

- American Lung Association (ALA). Particle Pollution. Available at <http://www.lung.org/our-initiatives/healthy-air/outdoor/air-pollution/particle-pollution.html>. 2017.
- Centers for Disease Control and Prevention (CDC). Coronary Artery Disease (CAD). Available at [www.cdc.gov/heartdisease/coronary\\_ad.htm](http://www.cdc.gov/heartdisease/coronary_ad.htm). Updated December 7, 2009. Accessed January 13, 2014
- Centers for Disease Control and Prevention (CDC). National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. Chronic Obstructive Pulmonary Disease (COPD). Available at [www.cdc.gov/copd/index.html](http://www.cdc.gov/copd/index.html). Updated September 16, 2016.
- Centers for Disease Control and Prevention (CDC). National Center for Environmental Health. Asthma. [www.cdc.gov/asthma/faqs.htm](http://www.cdc.gov/asthma/faqs.htm). Updated January 27, 2017.
- Centers for Disease Control and Prevention (CDC). National Center for Environmental Health. Particle Pollution. Available at [www.cdc.gov/air/particulate\\_matter.html](http://www.cdc.gov/air/particulate_matter.html). Updated July 22, 2016.
- Department of Environmental Quality (DEQ). Particulate Matter. Available at [www.oregon.gov/deq/aq/Pages/Particulate-Matter.aspx](http://www.oregon.gov/deq/aq/Pages/Particulate-Matter.aspx). 2017.
- Wildfire Smoke: A Guide for Public Health Officials (2016) US Environmental Protection Agency. Available at: [https://www3.epa.gov/airnow/wildfire\\_may2016.pdf](https://www3.epa.gov/airnow/wildfire_may2016.pdf)
- Reid CE, Brauer M, Johnston FH, Jerrett M, Balmes JR, Elliott CT, Critical Review of Health Impacts of Wildfire Smoke Exposure (2016) Environmental Health Perspectives. 124:1334-43.