

Land Acknowledgement

- We acknowledge that what we now call Portland, Oregon and Multnomah County are the ancestral lands of the Multnomah, Wasco, Kathlamet, Clackamas, Cowlitz bands of Chinook, Tualatin Kalapuya, Molalla and many other Tribes who made their homes along the Columbia and Willamette Rivers.
- We are here because this land was occupied, and its traditional people were displaced by colonists and settlers. As settlers and/or guests, we recognize the strong and diverse Native communities in our region today, from Tribes both local and distant, and offer respect and gratitude for their stewardship of these lands throughout the generations.

Protecting Oregon Workers from Wildfire Smoke Exposure

Public Health Division, Oregon Health Authority
Rulemaking Presentation

Oregon OSHA Rules Advisory Committee

March 25, 2021



(Enter) DEPARTMENT (ALL CAPS)

(Enter) Division or Office (Mixed Case)

Health Defined

- Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.
- The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

~ World Health Organization definition of HEALTH

OHA's Health Equity Definition

- Oregon will have established a health system that creates health equity when all people can reach their full health potential and well-being and are not disadvantaged by their race, ethnicity, language, disability, gender, gender identity, sexual orientation, social class, intersections among these communities or identities, or other socially determined circumstances.
- Achieving health equity requires the ongoing collaboration of all regions and sectors of the state, including tribal governments to address:
 - The equitable distribution or redistribution of resources and power; and
 - Recognizing, reconciling and rectifying historical and contemporary injustices.

Outline

- What's in wildfire smoke?
- Risk factors
- Smoke inhalation health effects
- Symptoms from smoke exposure
- Air pollution in Oregon from wildfire smoke
- Health impacts from smoke in Oregon
- Limitations of tracking health impacts from smoke
- Recommendations from the CDC National Institute of Occupational Safety and Health

Wildfire Smoke

What's in it?

Wildfire smoke is a complex mixture of gases and particles:

- Carbon monoxide, carbon dioxide
- Particulate matter (PM)
- Oxides of sulfur and nitrogen
- Hydrocarbons (benzene, toluene, PAHs)
- Metals and dioxins

Who's at increased risk?

- People with respiratory or cardiovascular disease
- Older adults
- Children & pregnant women
- Outdoor workers: construction, migrant & seasonal workers, day laborers, firefighters

Other factors:

- Access to health care
- Social & economic disparities



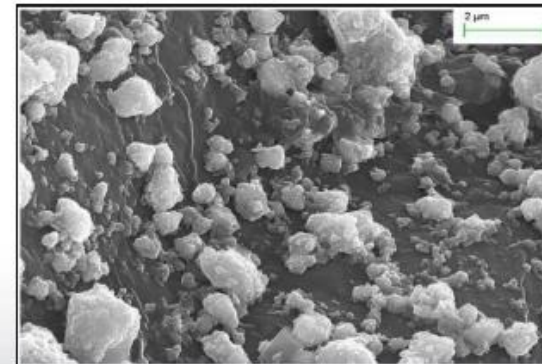
What is Airborne Particulate Matter?

Particulate Matter (PM) – “soot”

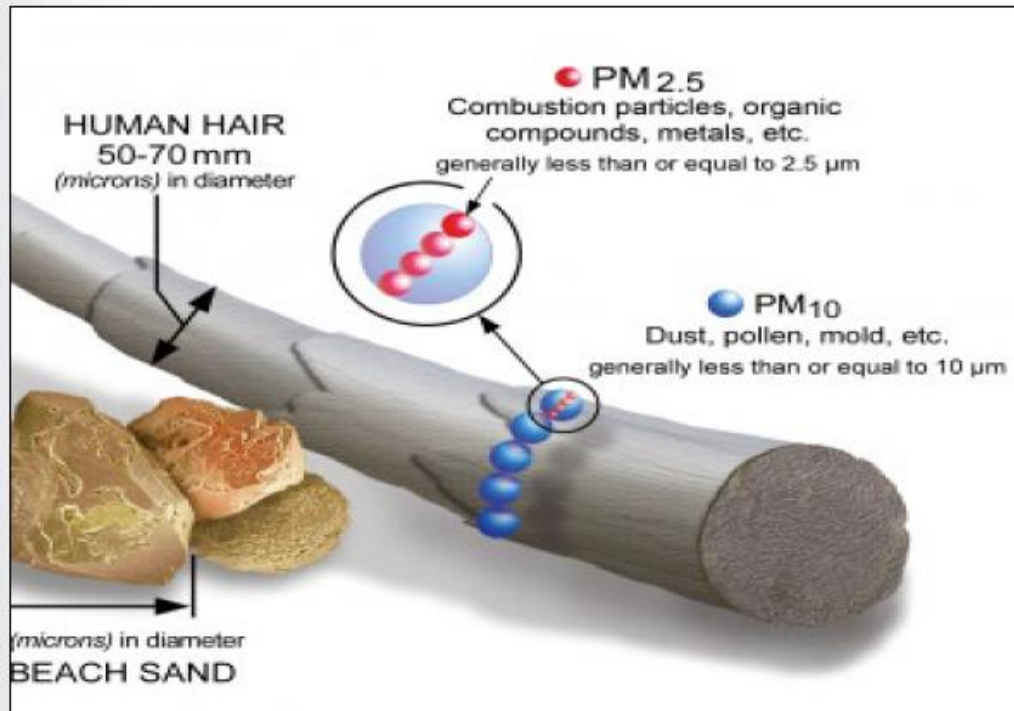
- from combustion sources
- mixture of solid particles and liquid droplets found in the air

National Ambient Air Quality Standards (NAAQS)

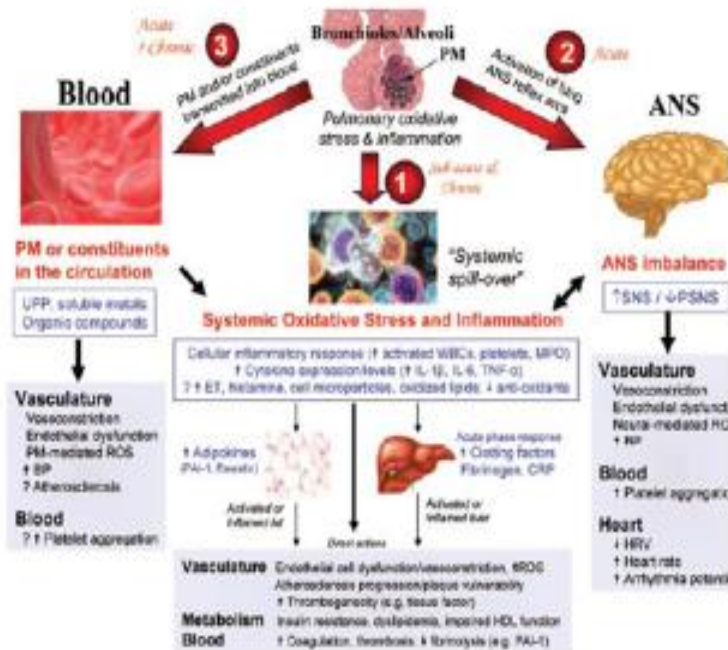
- 35 $\mu\text{g}/\text{m}^3$ - 24 hours
- 12 $\mu\text{g}/\text{m}^3$ - annual average



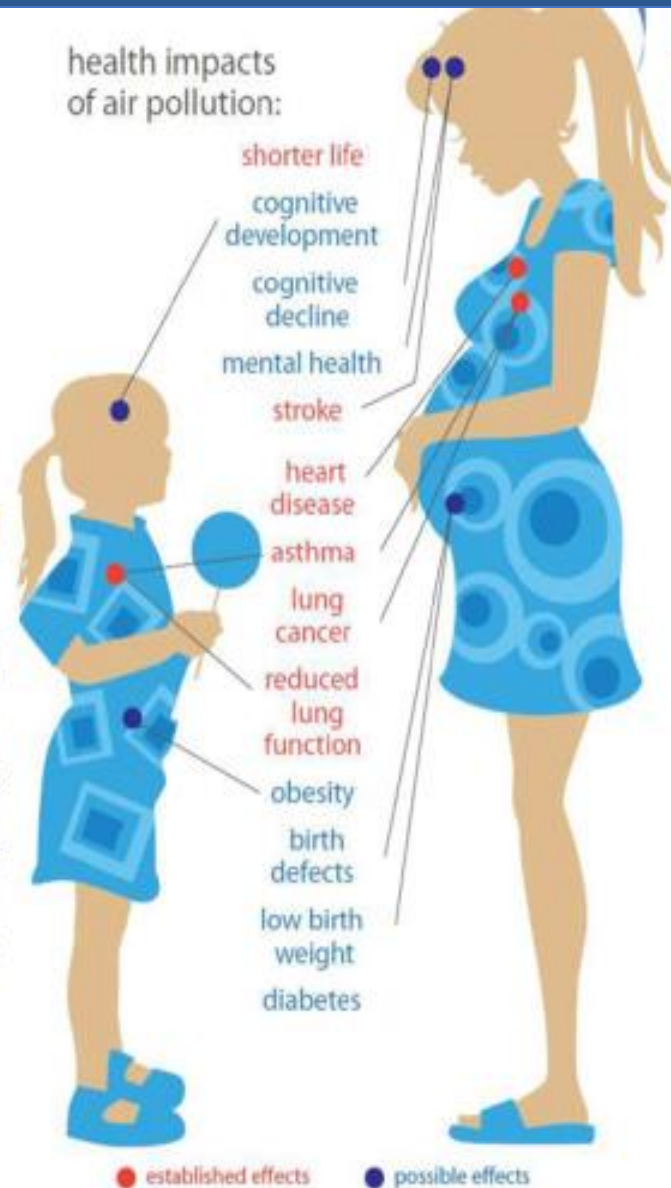
MacKenzie AR.
Environ. Sci.
Technol. 2012



Effects Beyond the Lung



health impacts of air pollution:



Brook et al., *Circulation*, 2010
BC Lung Association

Symptoms and Effects of Breathing Wildfire Smoke

Immediate (short-term)

- Wheezing
- Coughing
- Shortness of breath
- Headache
- Worsen allergy symptoms
- Irritate eyes, nose & throat

Long-term

- Worsen existing heart, lung and circulatory conditions such as asthma, COPD, atherosclerosis
- May cause asthma
- Long-term effects from breathing wildfire smoke need more study

AQI Health Guidelines (airnow.gov)

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Air Quality During the September 2020 Wildfire Smoke Event

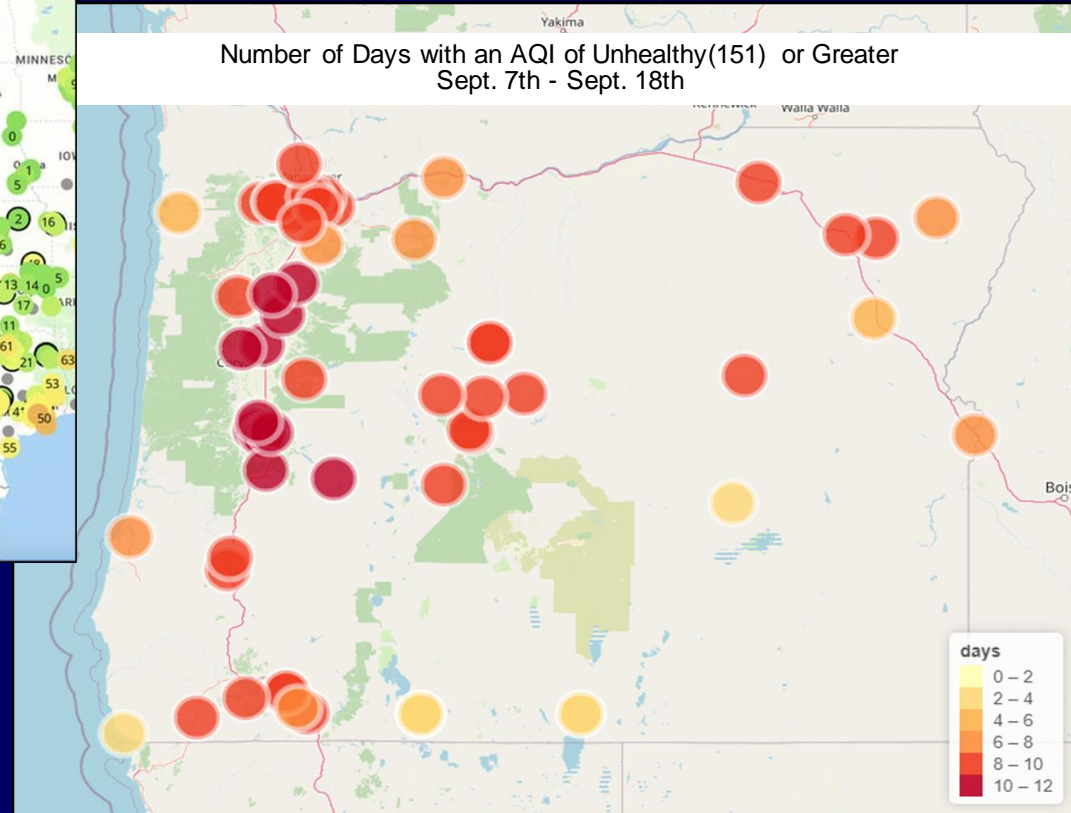
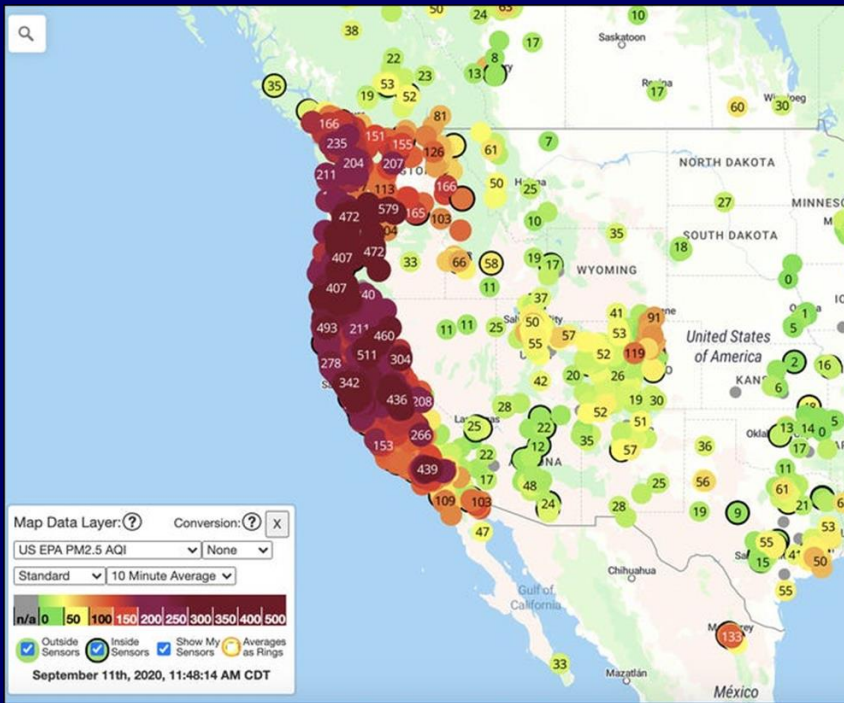
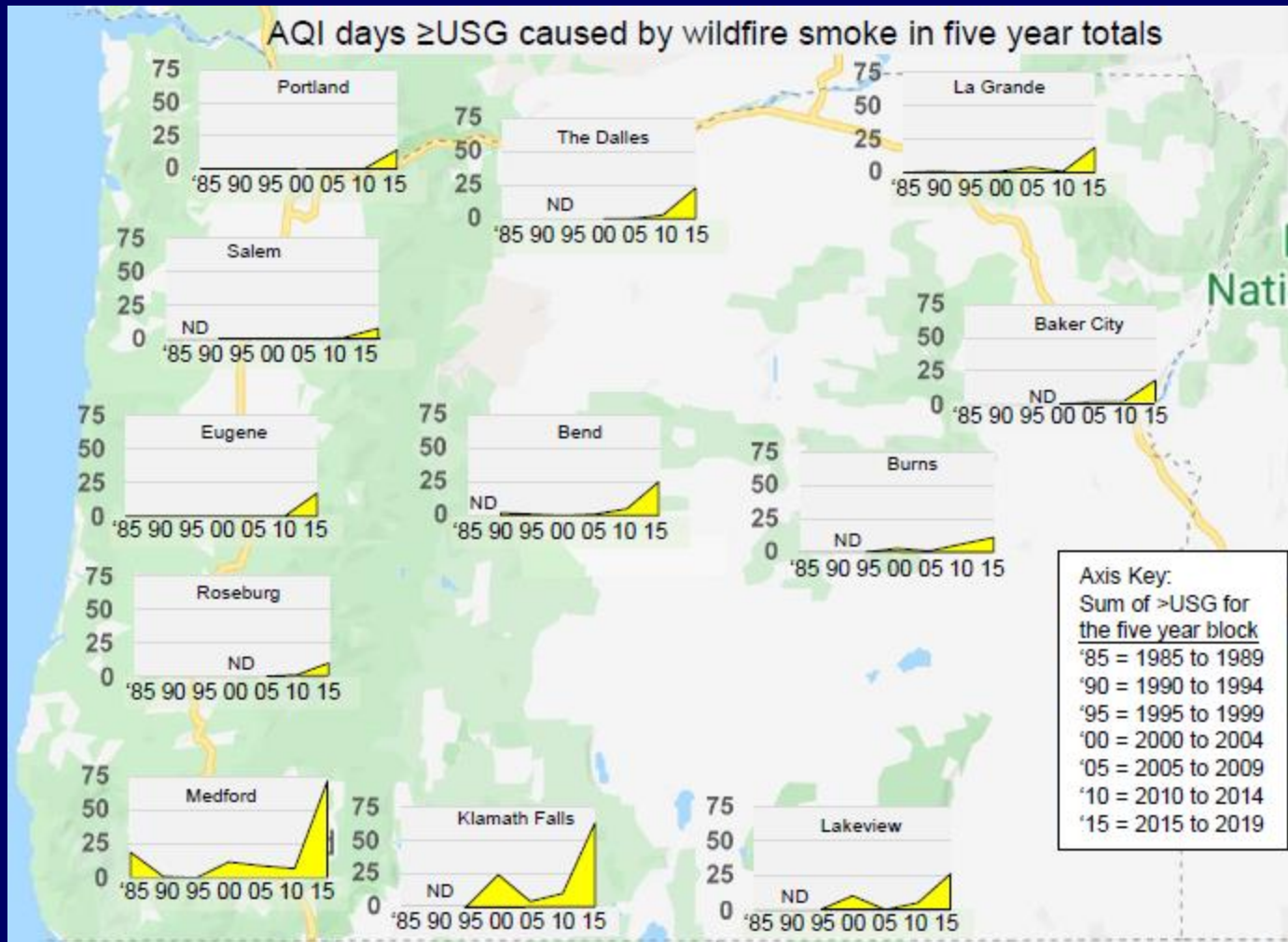


Image source:

<https://www.insider.com/west-coast-hazardous-air-quality-worst-on-earth-wildfire-smoke-2020-9>

Air Quality Trends During Wildfires 1985-2019

days at or greater than AQI of Unhealthy for Sensitive Groups (USG)



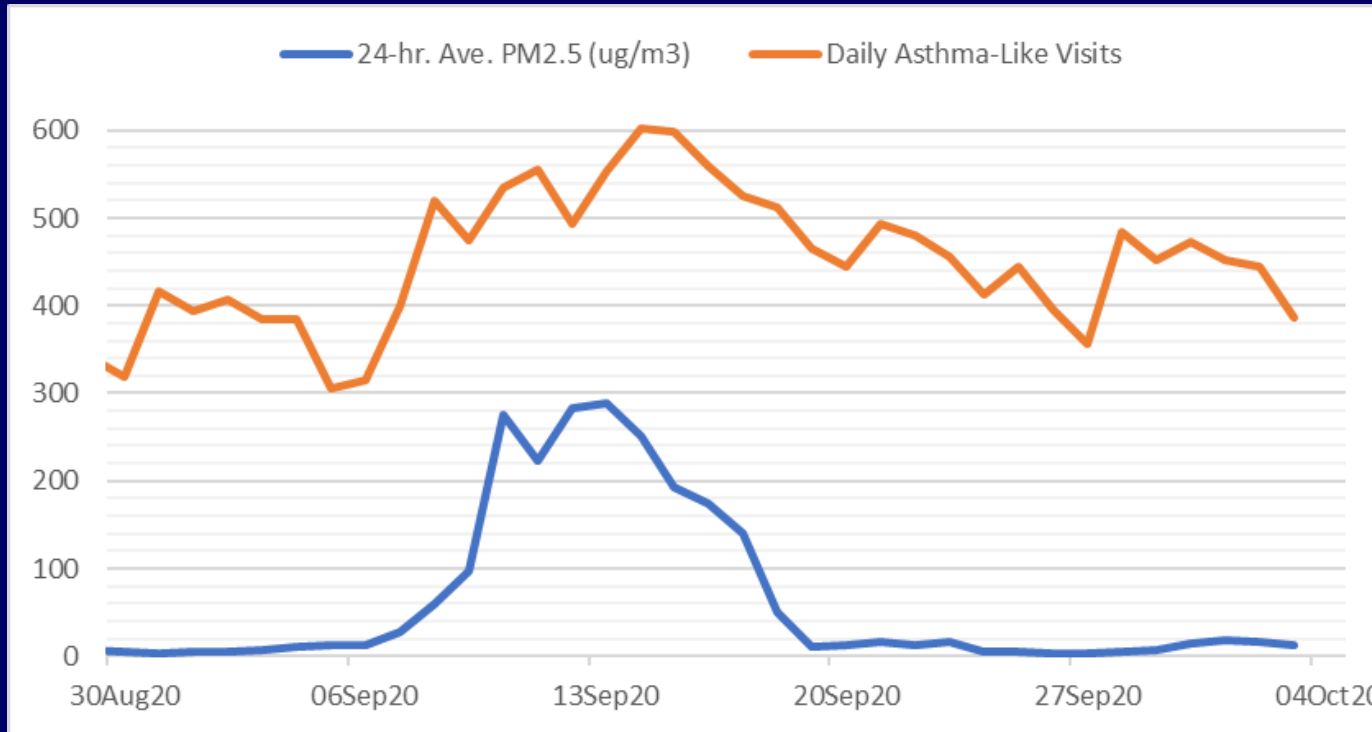
AQI and Standards for Particulates

Air Quality Rating	Air Quality Index (AQI)	PM _{2.5} 24-hour Average (µg/m ³)
GOOD	0 - 50	0.0 - 12.0
MODERATE	51 - 100	12.1 - 35.4
UNHEALTHY FOR SENSITIVE GROUPS	101 - 150	35.5 - 55.4
UNHEALTHY	151 - 200	55.5 - 150.4
VERY UNHEALTHY	201 - 300	150.5 - 250.4
HAZARDOUS	>300	>250.5

**PM_{2.5} NAAQS = 35 ug/m³
24-hr Average**

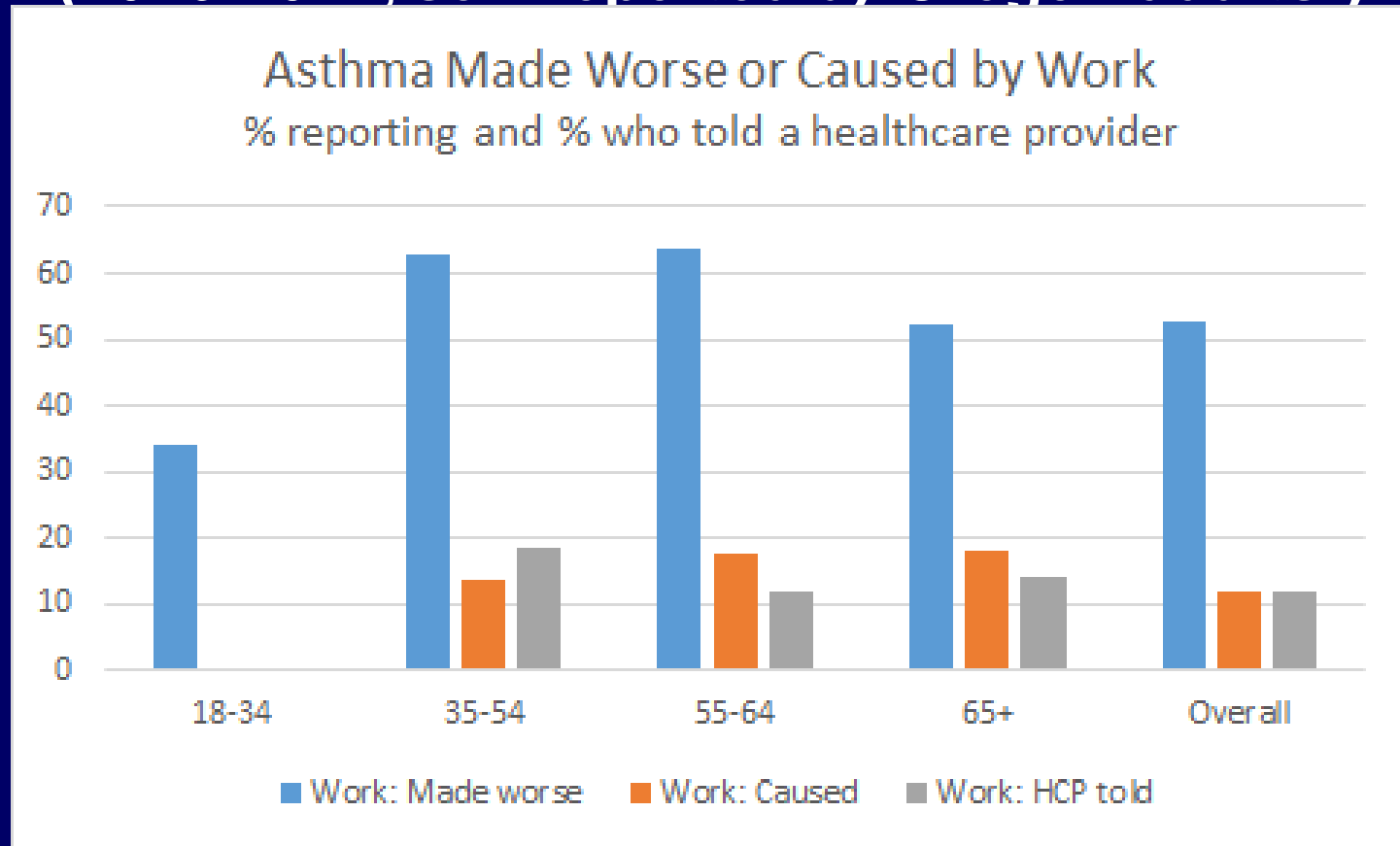
September 2020 Wildfire Health Impacts

- PM2.5 daily 24-hr average concentrations (provisional data from state, regional and tribal air quality monitoring)
- Emergency department and urgent care asthma-like visits from near-real-time syndromic surveillance (OR ESSENCE)



*This type of tracking misses many less severe cases, cases diagnosed differently and people who did not seek care

Asthma Caused or Made Worse by Job (2016-2017, self-reported by Oregon adults*)



*Oregon Behavioral Risk Factors Surveillance System Asthma Call Back Survey
<https://www.oregon.gov/oha/PH/DISEASES/CONDITIONS/CHRONICDISEASE/DATAREPORTS/>

OCCUPATIONAL PUBLIC HEALTH PROGRAM
 Public Health Division

2017 Excess Asthma-related Costs

- **Chetco Bar Fire/central and SW Oregon:**
 - 1.1 million residents in 8 counties
 - 207 excess emergency department (ED) visits and
 - 18 excess hospitalizations for asthma
 - Estimated cost of **\$558,000**
- **Eagle Creek Fire/Columbia Gorge**
 - 2 million residents in seven counties
 - 96 excess ED visits and
 - 9 excess hospitalizations for asthma
 - Estimated cost of \$529,000
- Estimated ED visit and hospitalization costs from excess asthma morbidity attributed to the major Oregon wildfires of 2017 exceeded \$1M.

Approved CDC NIOSH Particulate Filters

Filtering facepiece respirators

- Filter particles out of the air user is breathing
- 7 classes of filters available
- 95% is the minimal level of filtration approved by NIOSH
- Different designations (N, R, P) refer to the filter's oil resistance



N95 or P100 respirators can help protect your lungs from smoke or ash.

https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html

OCCUPATIONAL PUBLIC HEALTH PROGRAM
Public Health Division

Oregon
Health
Authority



Thank You

Carol Trenga, MS, PhD
Environmental Epidemiologist
carol.a.trenga@dhsosha.state.or.us
971-599-0081

Photo credit: Peter Murphy <https://1859oregonmagazine.com/>

OCCUPATIONAL PUBLIC HEALTH PROGRAM
Public Health Division

Oregon
Health
Authority