

Public Health & Wildfire Smoke Exposure

King County Agriculture Commission Briefing
July 8, 2021

Presented by:
Addison Houston, AICP
Environmental Health Mitigation & Response Planner
PHSKC | Environmental Health Services Division

Public Health

Seattle & King County



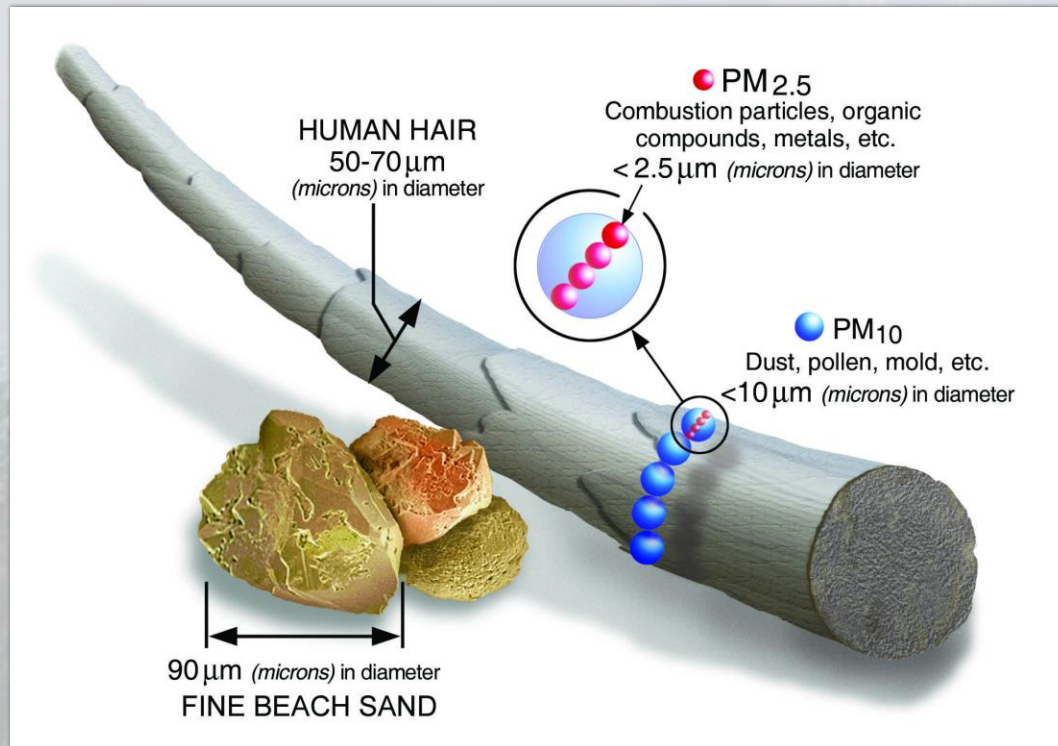
Wildfire Smoke Composition

Complex mixture of:

- ◆ carbon dioxide (CO₂)
- ◆ water vapor
- ◆ carbon monoxide (CO)
- ◆ hydrocarbons
- ◆ nitrogen oxides (NO_x) & volatile organic chemicals (VOCs)
 - ◆ *both ozone precursors*
- ◆ trace minerals
- ◆ and **particulate matter**



Primary Pollutant of Public Health Concern

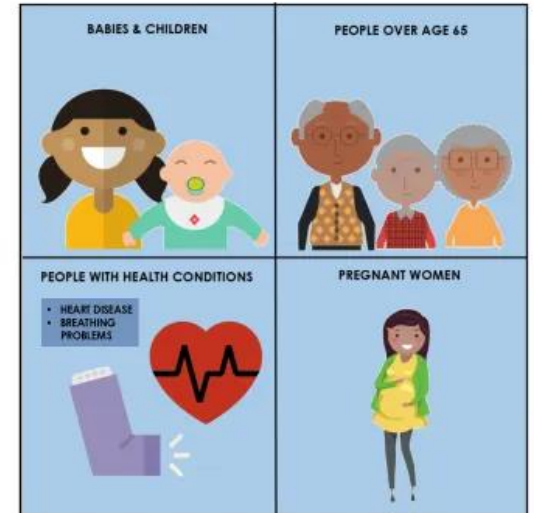


- ◆ Particulate Matter (PM_{2.5-10}) are the primary proxy for determining wildfire smoke impacts on public health
- ◆ Particles with diameters less than 10 microns (PM₁₀) are upper respiratory tract and eye irritants
- ◆ Smaller particles (PM_{2.5}) are the greatest current health concern and can **affect respiratory and heart health**

Groups Most Sensitive to Wildfire Smoke

- ◇ People with pre-existing medical conditions
 - ◇ Especially lung and heart diseases
- ◇ People with respiratory infections
 - ◇ **Includes people with and/or who have recovered from COVID-19**
- ◇ Children & infants
- ◇ People 65 years and older
- ◇ Pregnant women
- ◇ Outdoor workers
- ◇ Growing evidence of other sensitive groups, **including the young and healthy**

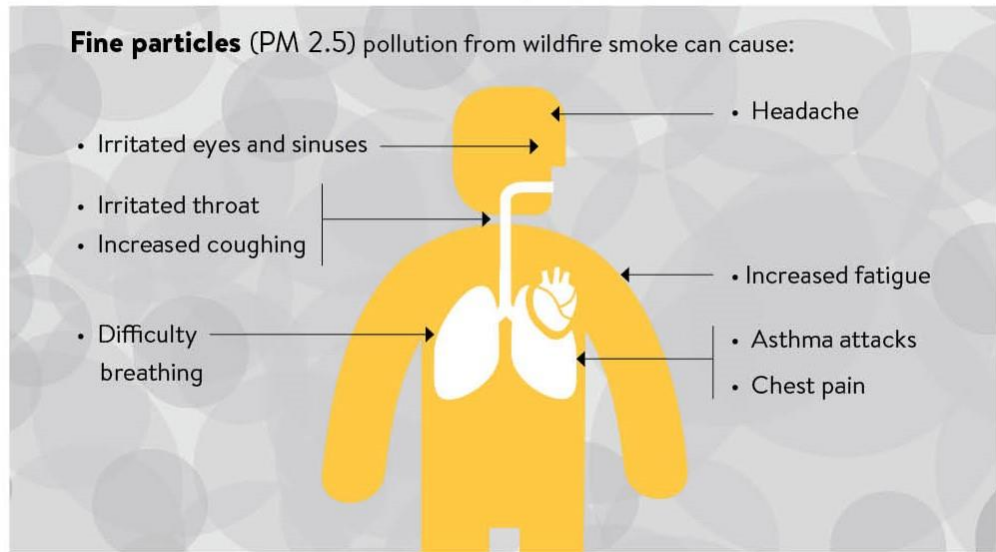
Who is most sensitive to wildfire smoke?



Stay indoors and keep indoor air clean.
Concerns? Contact your healthcare provider.

Symptoms of Exposure

Wildfire Smoke Health Impacts



Immediate health effects of wildfire smoke exposure:

- ◆ Shortness of breath
- ◆ Chest tightness
- ◆ Eye, nose, & throat irritation
- ◆ Headache
- ◆ Psychological stress
- ◆ Exacerbation of pre-existing health conditions (esp. respiratory, cardiovascular, and circulatory illness)

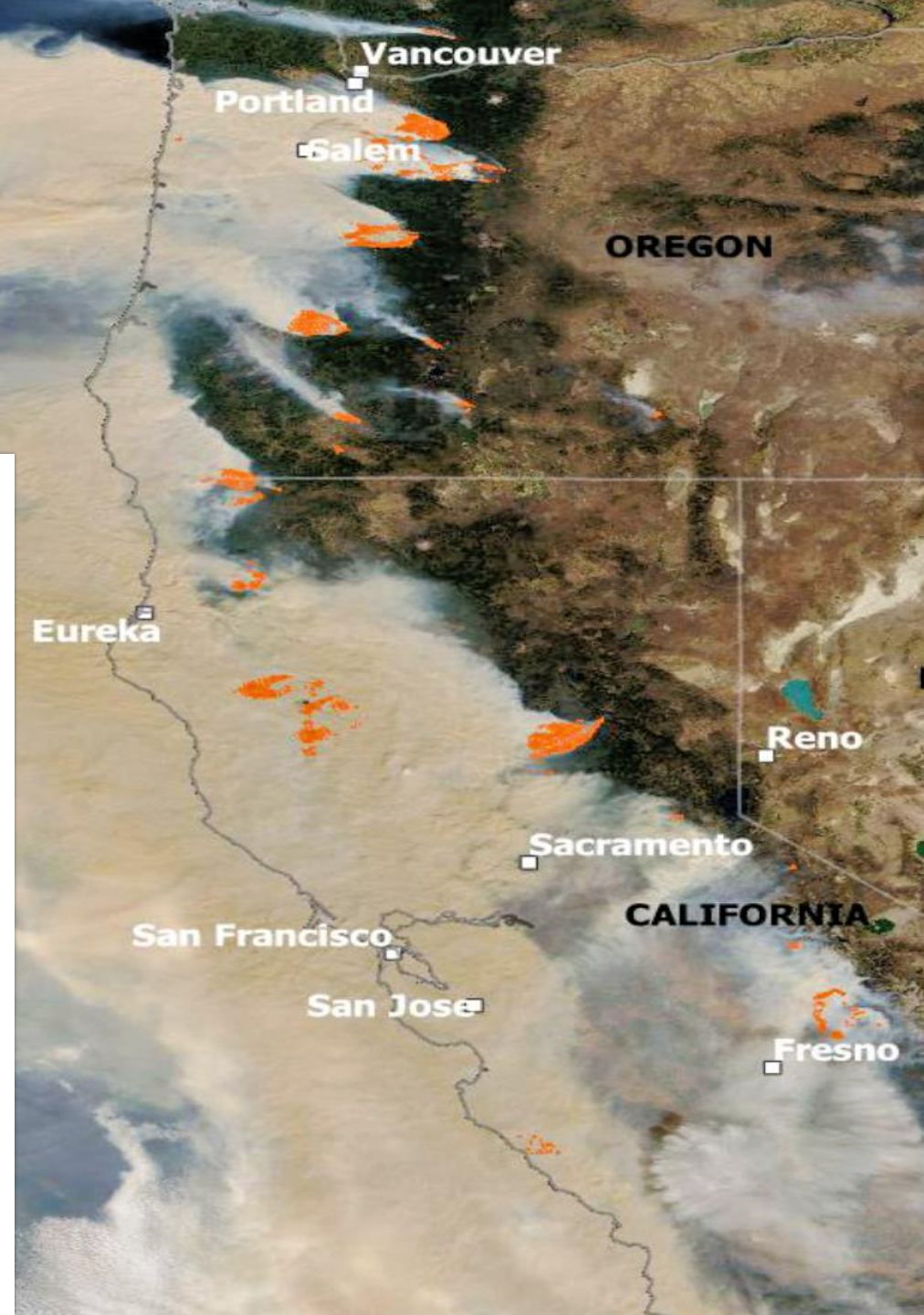
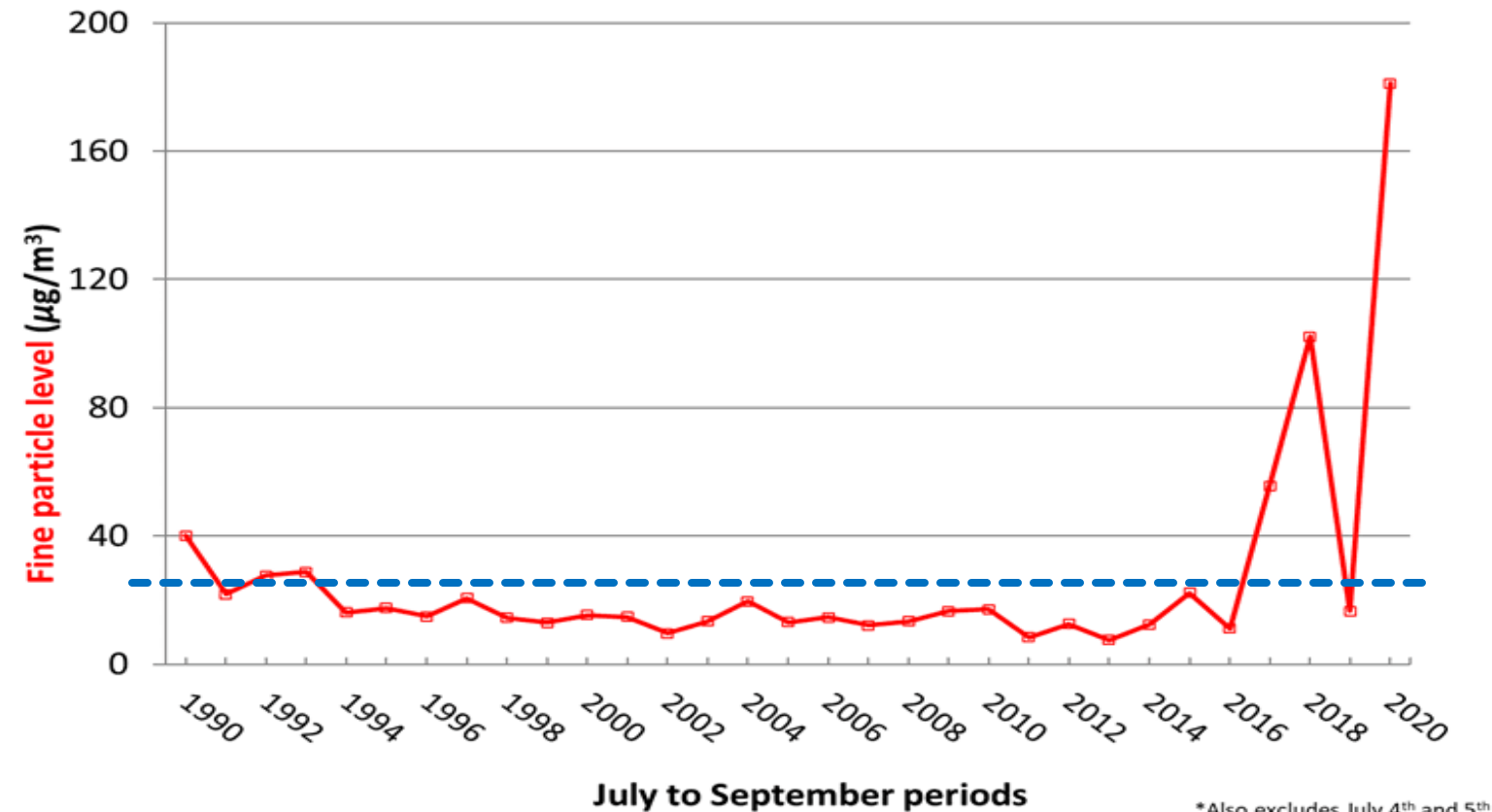
Mortality associated with wildfire smoke exposure

- ◇ Washington study from 2006 – 2017 found wildfire smoke exposure to **increase odds of non-traumatic mortality by 2% the day after exposure**
- ◇ Average PM_{2.5} concentration for days with wildfire smoke during the study period was **26.4µg/m³**

Reference: Doubleday, A., Schulte, J., Sheppard, L. et al. Mortality associated with wildfire smoke exposure in Washington state, 2006–2017: a case-crossover study. *Environ Health* 19, 4 (2020). <https://doi.org/10.1186/s12940-020-0559-2>

Post Labor Day Wildfire Smoke Event: September 2020

Seattle July-Sept max daily **fine particle levels**



*Also excludes July 4th and 5th

Health Outcomes of Wildfire Smoke Exposure

- ◆ Wildfire PM2.5 associated with heart attacks and strokes **for all adults**; particularly vulnerable are individuals over the age of 65
- ◆ **Increase in risk generally occurs day after exposure**
 - ◆ All cardiovascular impacts: 12% ^
 - ◆ Heart attack: 42% ^
 - ◆ Heart failure: 16% ^
 - ◆ Stroke: 22% ^
 - ◆ All respiratory causes 18% ^
 - ◆ Abnormal heart rhythm: 24% ^ (occurrences observed on same day as exposure)

Reference: DeFlorio-Baker (2019), Cardiac effects of fire particulate matter, Environmental Health Perspectives

COVID-19 Considerations for 2021 Wildfire Season

- ◆ Overlap in both symptoms and vulnerable populations
- ◆ Wildfire smoke increases the risk acquiring COVID and severity of illness
- ◆ People who have recovered from COVID-19 are more sensitive to wildfire smoke exposure

Know the difference between symptoms of smoke exposure and COVID-19

Symptoms that can be caused by both wildfire smoke and COVID-19:

- Cough, difficulty breathing, runny nose, headache, and fatigue



Symptoms not related to wildfire smoke exposure:

- Fever, chills, muscle and body aches, vomiting, diarrhea, and loss of taste or smell



Washington Labor & Industries Rulemaking and Emergency Rule

- ◇ WA L&I received a petition to establish a rule for workplace provisions for outdoor workers during wildfire smoke events under Chapter 296-62, WAC
- ◇ A separate **emergency rule filing is anticipated to be issued in the coming weeks for Summer 2021**
- ◇ Rule will **require employers to provide respirators (N95 or KN95) for voluntary use during wildfire smoke events** and a written plan detailing worker accommodations during smoke events

Threshold for provision of respirators for voluntary use:

20.5 $\mu\text{g}/\text{m}^3$

- AQI 68
- WAQA **Unhealthy for sensitive groups**

For more information visit:
<https://lni.wa.gov/safety-health/safety-rules/rulemaking-stakeholder-information/wildfire-smoke>

Guidance for Employers & Outdoor Workers

- ◇ **Reduce outdoor activities** during forecasted wildfire smoke events
- ◇ **Identify locations for wildfire smoke reprieve** where outdoor workers can get a break from wildfire smoke exposure
- ◇ **Improve HVAC air filtration systems** in office settings and cabin air filters in fleet vehicles (MERV 13 or higher)
- ◇ **Allow employee use of sick leave** during wildfire smoke events for staff in vulnerable groups
- ◇ **Provide PPE for voluntary use** (e.g. N-95 or similar NIOSH approved respirators)



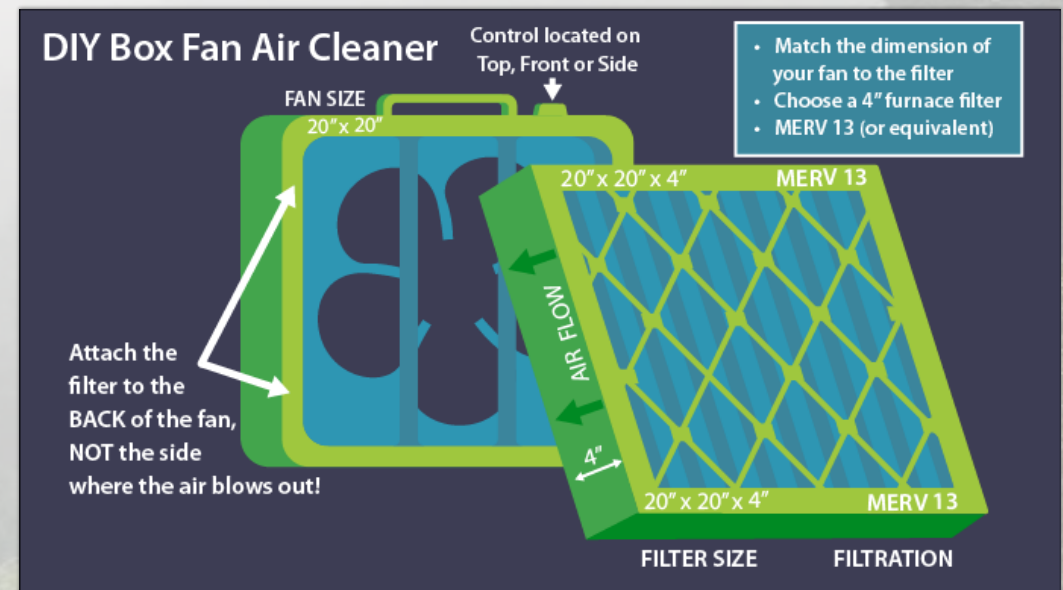
D.I.Y. Box Fan Filtration: A Low-Cost Solution to Better Air Quality

Create a D.I.Y. Box Fan Air Filter using a 20" X 20" Box Fan and a 20" x 20" MERV 13 filter, *or equivalent*:

- *FPR 10 from Home Depot*
- *MPR 1900 from 3M*

A D.I.Y. Box Fan Air Filter can clean the air in ~300 sq. ft. every 15 minutes!

For safe operation do not use near water, close windows and doors while in use, turn off periodically to allow unit to cool, and never leave the unit unattended.



Contact:

C. Addison Houston, AICP

Environmental Health Mitigation & Response Planner

Public Health – Seattle & King County

Environmental Health Services Division

ahouston@kingcounty.gov

206-263-3498

Public Health

Seattle & King County

