Update on the Wildfire Smoke Guide and EPA's New Wildfire Smoke Communication Research

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Joint Meeting of the Environmental Research Institute of the States Board and US EPA ORD Meeting

July 11, 2017

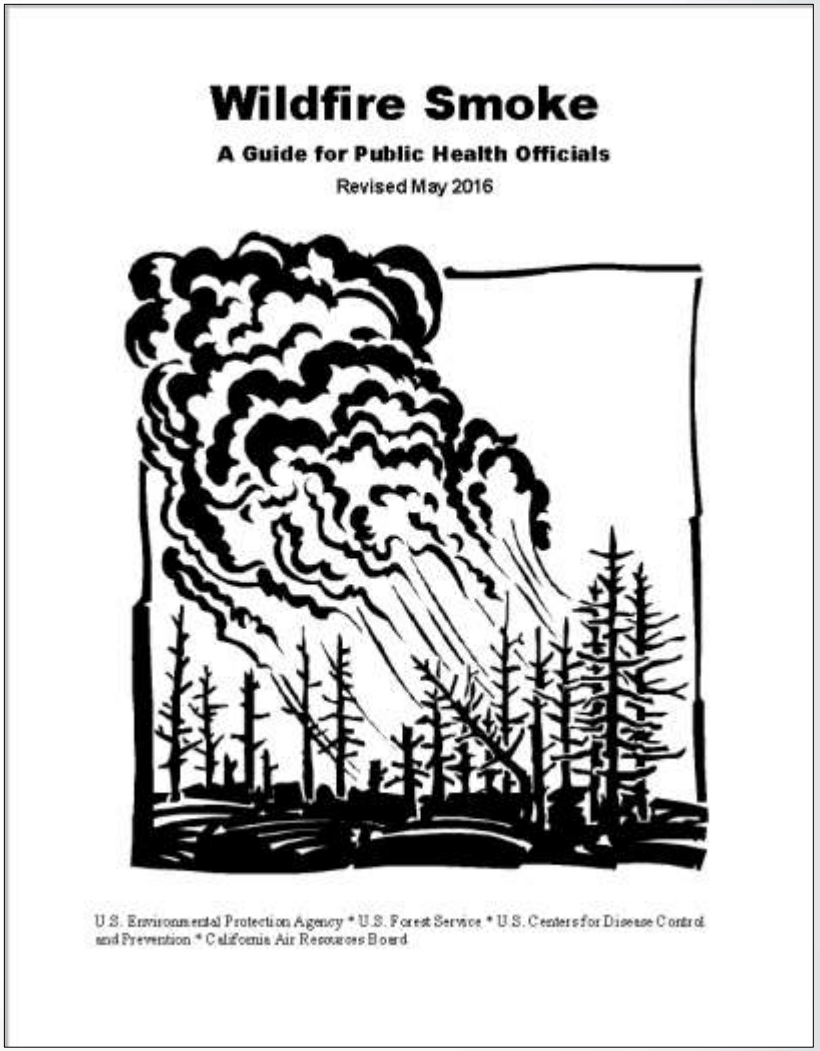
Overview

Provide an update of:

- **2017 *Wildfire Smoke: Guide for Public Health Officials***
- **New EPA Wildland Fire Research website**
  - SmokeSense app
  - Wildland Fire Sensor Challenge
  - Wildfire Community Health-Vulnerability Index

Wildfire Smoke: Guide for Public Health Officials

- Air quality and health information updated 2016
- Evidenced-based exposure reduction measures
- Entirely new section on communicating air quality
  - Uses “Current PM” levels from AirNow
  - Uses satellite information on Fires: Current Conditions page
  - Visual range information updated
  - New interagency Wildland Fire Air Quality Response Program
- Used by the states which provided recommendations for improvements



https://www3.epa.gov/airnow/wildfire_may2016.pdf

New Wildfire Smoke Guide 2017

Coming in Late Summer/Fall

- **Updated look**
- **Addition of ozone**
- **Smoke vs urban particles**
- **Add sections**
  - PM web course
  - Sensors
  - Ash cleanup
- **Stand-alone fact sheets**
  - Children
  - Older adults
  - Pets/livestock
  - Preseason preparedness
  - Exposure reduction
  - Respirator use
  - Ash cleanup
  - Know when to evacuate

Wildfire Smoke Guide 2017
Example Draft Fact Sheets

EPA

WILDFIRE SMOKE FACTSHEET

Prepare for Fire Season

If you live in an area that is regularly affected by smoke or where the wildfire risk is high, take steps prepare for fire season. Know how to get ready before a wildfire. Know how to protect yourself from smoke exposure during a wildfire.

Being prepared for fire season is especially important for the health of children, older adults, and people with heart or lung disease.

Prepare Before a Wildfire

- **Stock up** so you don't have to go out when it's smoky. Have several days of medications on hand. Buy groceries that do not need to be refrigerated or cooked, because cooking can add to indoor particle levels.
- **Create a "clean room"** in your home. Choose a room with as few windows and doors as possible, such as a bedroom. Use a portable air cleaner and avoid indoor sources of pollution.
- **Buy a portable air cleaner** before there is a smoke event. High-efficiency particulate air (HEPA) filter air cleaners, and electrostatic precipitators that do not produce ozone, can help reduce indoor particle levels.
- **Understand** how you will receive alerts and health warnings, including air quality reports and public service announcements, from local officials.
- **If you have heart or lung disease,** check with your doctor about what you should do during smoke events.
- **If you have asthma or another lung disease**, update your respiratory management plan.
- **Have a supply of N95 masks** and learn how to use them. They are sold at many home improvement stores and online.
- **Organize** your important items ahead of time and know where to go in case you have to evacuate.

EPA

WILDFIRE SMOKE FACTSHEET:
Indoor Air Filtration

Exposure to Particle Pollutants

Indoor sources of particulate matter (PM) come from combustion events such as smoking, candle burning, cooking and wood-burning. During a wildfire event, outdoor PM can increase indoor PM levels well above the levels normally found. As outlined in the Guide, reducing indoor sources of pollution is a major step to lower the concentrations of PM indoors. Further reductions in indoor PM can be achieved using one of the filtration options discussed below.

Filtration Options

There are two effective options for improving air filtration in the home: upgrading the central system filter, or using high efficiency portable air cleaning appliances. Before discussing filtration options, it is important to understand the basics of filter efficiency.

Filter Efficiency

The most common industry standard for filter efficiency is known as the Minimum Efficiency Reporting Value, or MERV rating. The MERV scale for residential filters ranges from 1-20. The higher the MERV rating the greater the percentage of particles captured as the air passes through the filter media. Higher MERV (higher efficiency) filters are especially effective at capturing very small particles that can most affect health.

Central Air System Filter

The filter used in the central heating/cooling system of the home can effectively reduce indoor PM. A home typically will have a low MERV (1-4) fiberglass filter that is 1" thick. Simply repla filter with a medium efficiency filter (MERV significantly improve the air quality in you Higher efficiency filters (MERV 9-12) wil even better, and a true high efficiency filte 16) in the central system can reduce PM by as a 95%. However, these filters can also more resistance to air flow, which may incr energy used by the blower motor for the You may wish to consult with a local technician or the manufacturer of your ce system to confirm that the system can hand efficiency filter. If you are not able to upgr more efficient filter, simply running the continuously by switching the thermost "Auto" to "On" has been shown to red concentrations by as much as 24%.

Portable Air Cleaners

Portable air cleaners are self-contained air appliances that can be used alone or in con enhanced central filtration to effectively particles. Their effectiveness in reduc depends on several factors such as the si air cleaner, the filter efficiency, how frequ unit is turned on and at what fan speed. Po indoor PM concentrations by as much as more.

Portable Air Cleaners: Ho Choose

There is a wide variety of air cleaners on the ranging in price from about $50 to $3,000. H air cleaners under about $200 typically do n the air well and would not be helpful in a situation.

Types of Air Cleaners

Most air cleaners fall under two basic cat mechanical and electronic. Mechanical air

EPA United States Environmental Protection Agency

PEHSU Pediatric Environmental Health Specialty Units

WILDFIRE SMOKE FACTSHEET

Children

Background

- **Wildfires** expose children to fire, smoke, the byproducts of burning, and other chemicals released from burning structures and furnishings in addition to the psychological stress associated with these events.
- **During the acute phase** of wildfire activity, the major problems are fire and smoke. Smoke can travel many miles downwind from a burning fire.
- **Children,** individuals with pre-existing lung or cardiovascular diseases (e.g. asthma) are especially vulnerable during wildfires.
- **Children are in a critical period of development** when toxic exposures can have profound negative effects, and their exploratory behavior often places them in direct contact with materials that adults would avoid.

Health Effects from Smoke

- Wildfire smoke has very small particles, liquid droplets, and gases such as carbon monoxide (CO), carbon dioxide (CO2) and other volatile organic compounds (VOCs).
- Symptoms from smoke inhalation can include chest tightness, shortness of breath, wheezing, coughing, respiratory tract and eye irritation and burning, chest pain, dizziness, or lightheadedness and other symptoms.
- Children with allergies and asthma may have more symptoms than usual.
- The risk of developing cancer from short-term exposures to smoke is vanishingly small.

Recommendations

Planning Ahead

- **Stock up** so you don't have to go out when it's smoky. Have several days of medications on hand.
- **Buy groceries** that do not need to be refrigerated or cooked, because cooking can add to indoor particle levels.
- **Create a "clean room"** in your home. Choose a room with as few windows and doors as possible. Use a portable air cleaner and avoid indoor sources of pollution.
- **Buy a portable air cleaner** before there is a smoke event.
  - High-efficiency particulate air (HEPA) filter air cleaners and electrostatic precipitators that do not produce ozone can help reduce indoor particle levels.
- **Organize** and plan ahead of time and know where to go in case you have to evacuate.

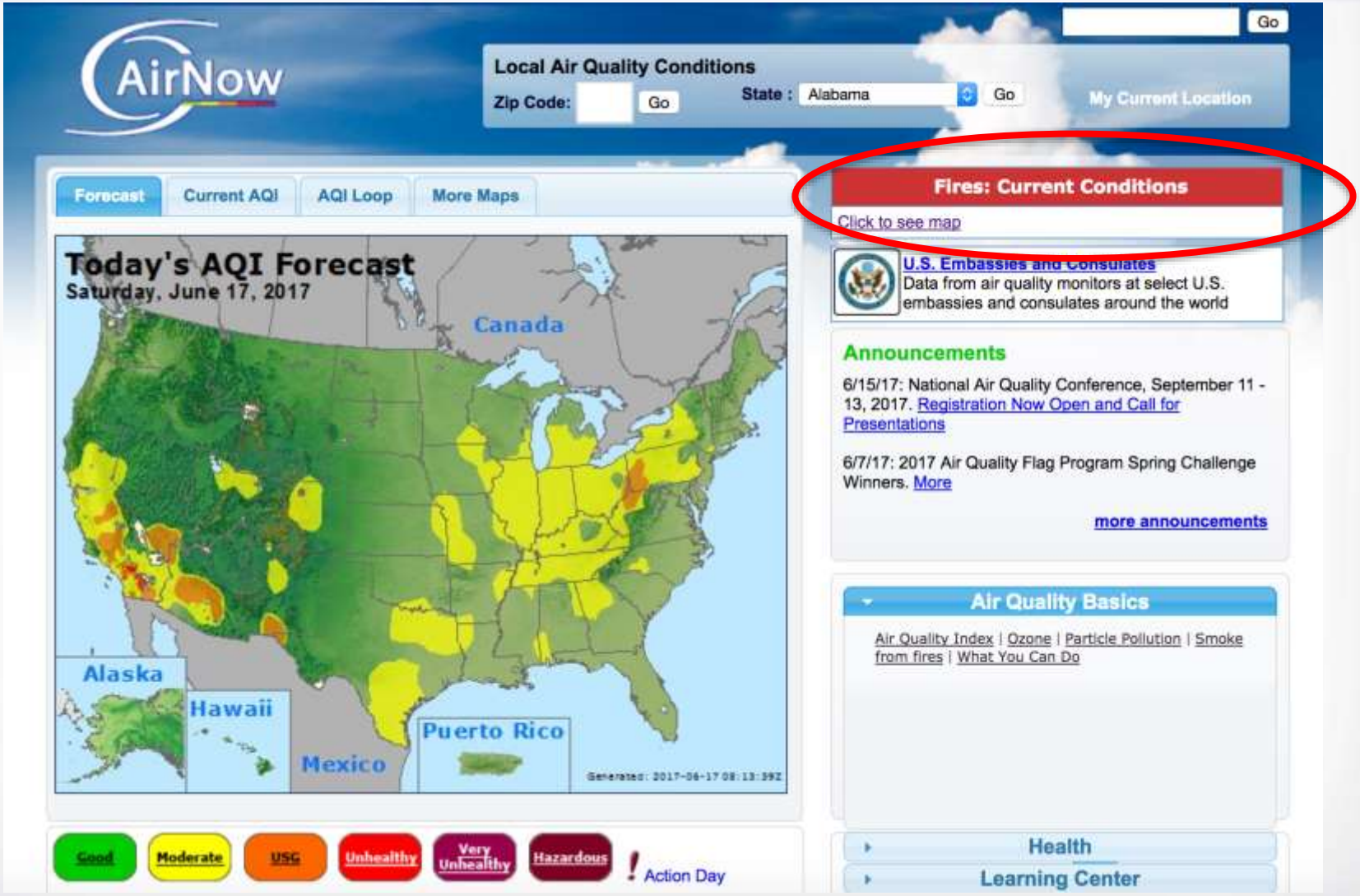
During Wildfires – Around Your Home & Car

- **Stay indoors** with the doors and windows closed. If you have an air conditioner, run it with the fresh-air intake closed (recirculate mode) to keep outdoor smoke from getting indoors.
- **Do not add to indoor air pollution.**

Wildfire Factsheets Under Development

Original PEHSU Wildfire Factsheet available at: http://www.pehsu.net/cgi/page.cgi/resources.html

AirNow (www.AirNow.gov)



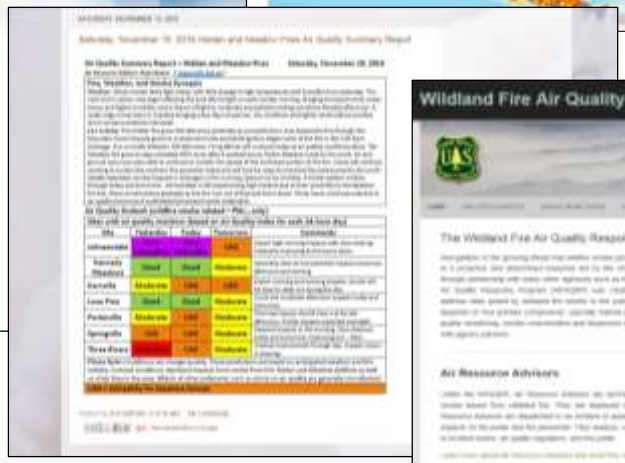
www.airnow.gov

Fires: Current Conditions Page

- Current Smoke Map generated by NOAA HMS
- Current Advisories – State/Local/Tribal agency blogs and Wildland Fire Air Quality Response Program

Current Conditions Map - May 9, 2016

Current Advisories



CA Smoke Blog

USFS Wildland Fire Air Quality Response Program

Wildland Fire Smoke Risk Communication

EPA Wildland Fire Research
New Web Page

Featuring:

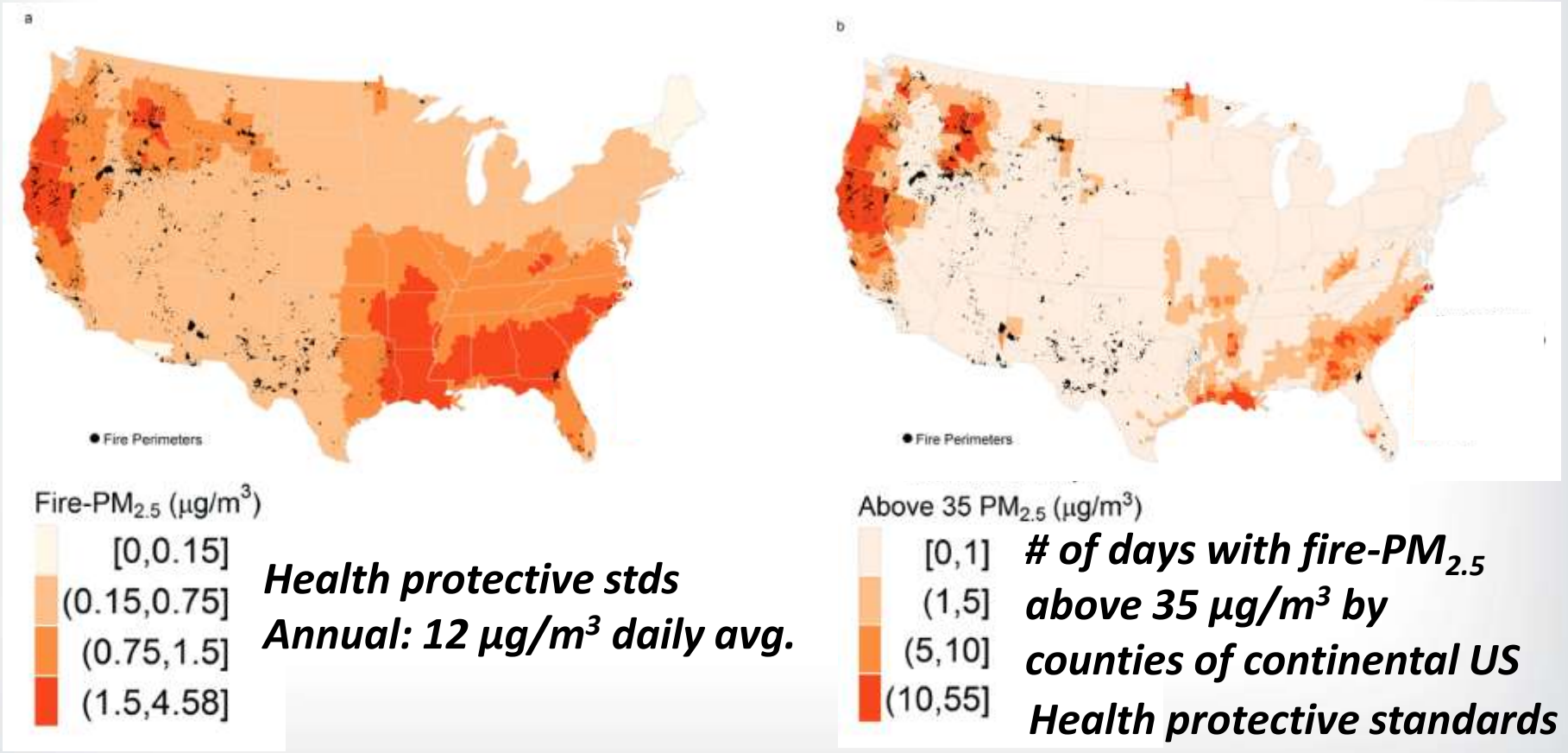
- **Links to Public Health Information**
- **Research Areas**
- **Research Publications and Other Resources**
- **Smoke Sense Study and app**
- **Wildland Fire Sensor Challenge**

https://www.epa.gov/air-research/wildland-fire-research-protect-health-and-environment

Air Quality Impacts of Wildland Fires

Annual average daily fire-$PM_{2.5}$ footprint for US counties

How much does smoke contribute to air quality and how often does it lead to exceeding daily standard?



Health protective stds
Annual: 12 µg/m³ daily avg.

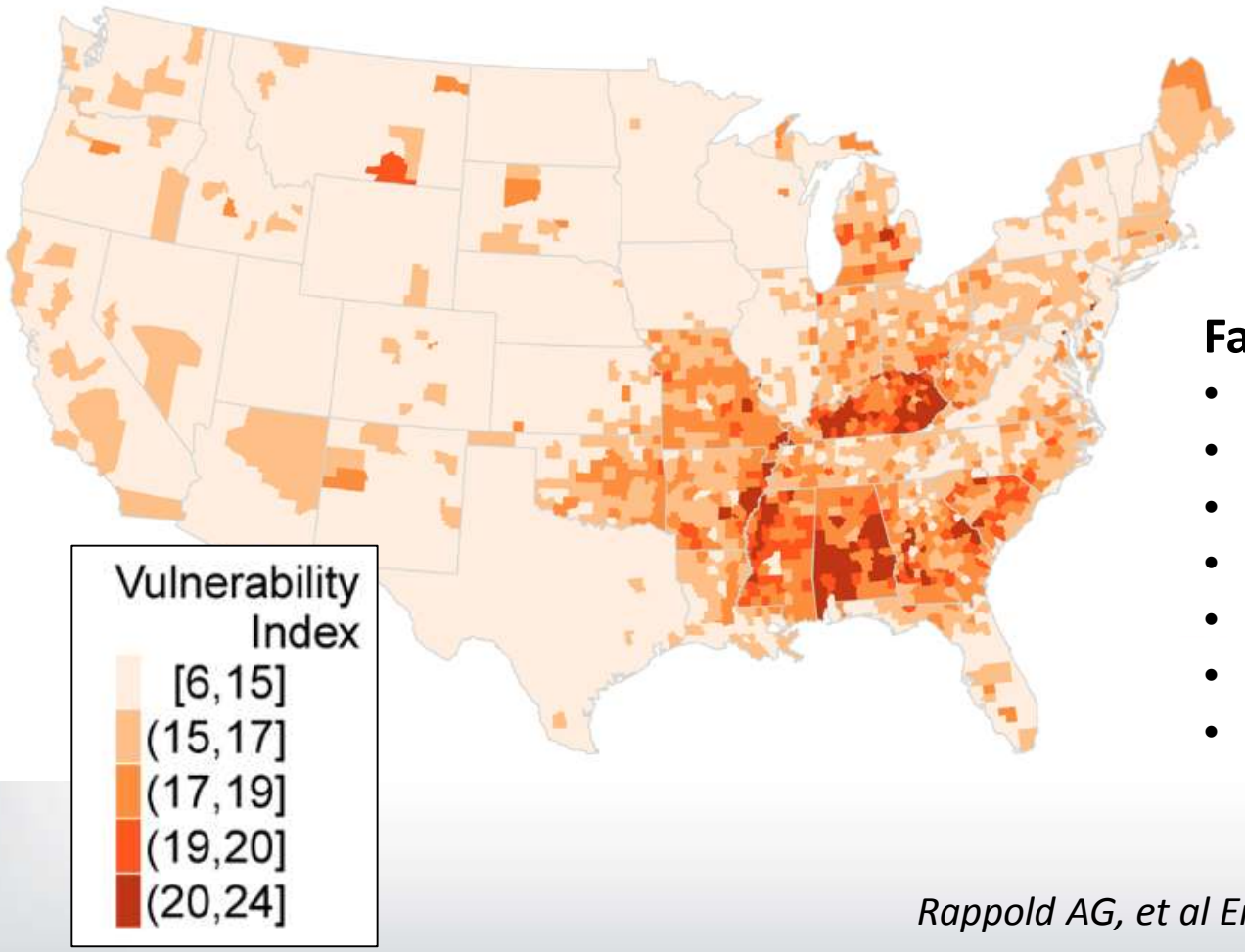
# of days with fire-$PM_{2.5}$ above 35 µg/m³ by counties of continental US
Health protective standards
Daily: 35 µg/m³

Rappold AG, et al Environ Sci Technol 2017

Community Health-Vulnerability

Community-Health Vulnerability Index

National map of community-health vulnerability index and air pollution awareness to adverse health effects



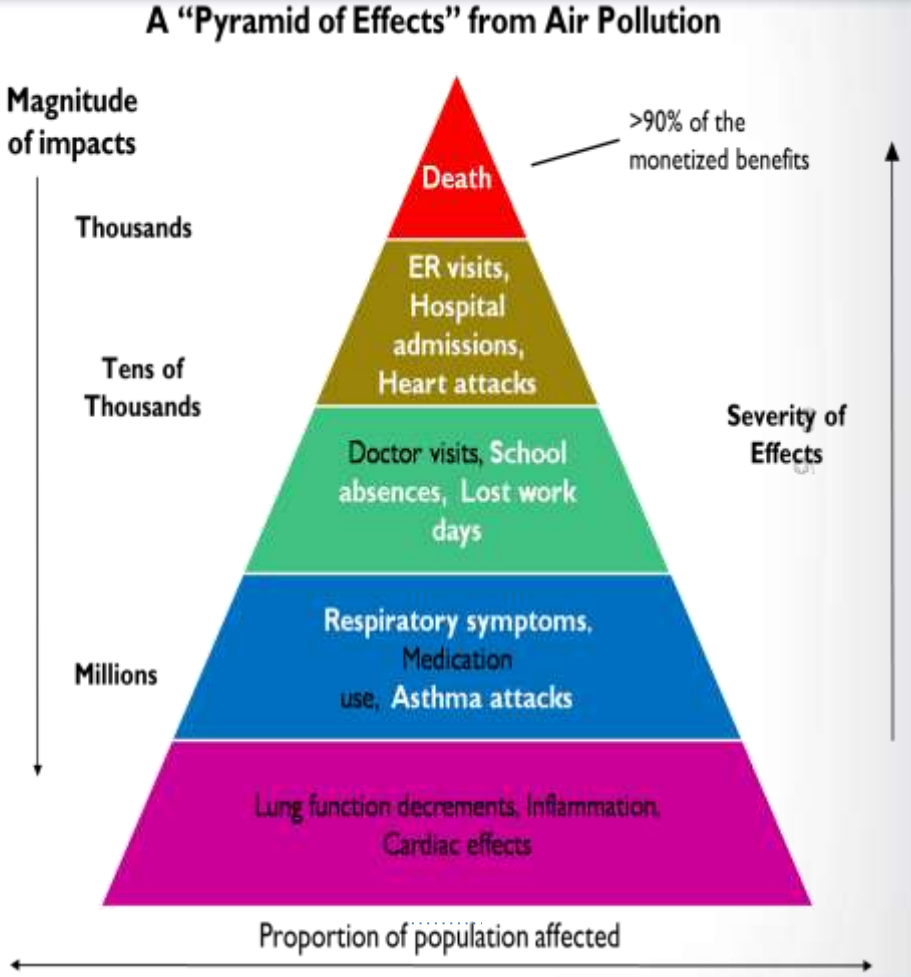
Factors of Vulnerability

- Peds & Adult Asthma
- COPD
- Obesity
- Diabetes
- Hypertension
- % population age 65+
- Income, education, poverty, unemployment

Rappold AG, et al Environ Sci Technol 2017

In a Population Subclinical Effects Outnumber Clinical Effects

- **Sufficient information** about how many people go to the hospital during wildfire smoke episodes
- **Insufficient information on subclinical symptoms** (less severe symptoms) from exposure to wildfire smoke
- **More people experience these subclinical effects than those who go to the hospital**
- Effects include **decreased lung & heart function, worsened asthma, & lost days of school and work**



Community vulnerability to health impacts of wildland fire smoke exposure, *Rappold AG, et al Environ Sci Technol 2017*

Smoke Sense Project
Improving Public Health Outcomes

Aims of Smoke Sense:

- ***Measure the effect of wildfire smoke exposure on health and productivity***
- ***Develop health risk communication strategies to improve public health outcomes***

As part of this, researchers have developed a Smoke Sense mobile phone application to:

1) Collect user input on how smoke events impact their health and daily activities, and

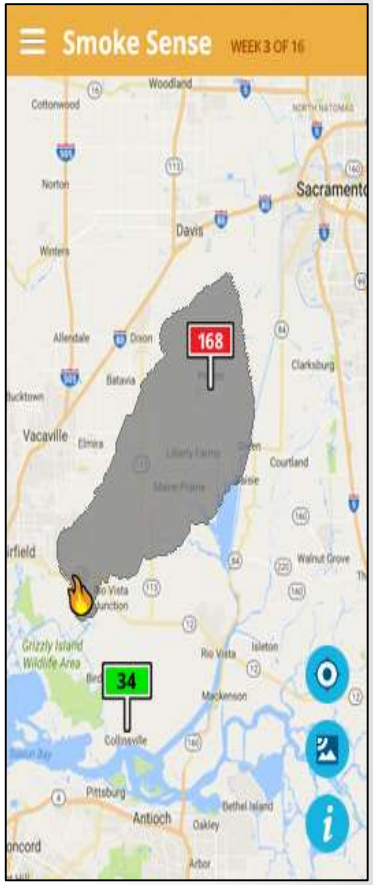
2) Provide information about the smoke exposure and recommended health risk messages

Air Quality & Smoke Plume Info

Smoke Sense provides information about current and future air quality

Forecasted smoke plumes can be visualized

Less time outside during smoke episodes to decrease exposure & protect health



Symptom & Smoke Reporting

- Smoke Sense helps collect information about who, when, and how frequently people are impacted by smoke
- Information about smoke in the air and symptoms experienced in the past week will be logged

Gamification to Promote Participation

- Participants receive badges as they learn about air quality and when they complete surveys
- Our expectation is that participants have fun as they learn to protect their health

Wildfire Prone Pilot States

Work closely with NC & WA to encourage residents to use the Smoke Sense App

- Use existing communication channels (websites, social media, etc.) to encourage usage of the App
- EPA will help states develop packet of communication materials to promote App to residents
  - Tweets
  - Factsheets
  - Blogs
  - More, as desired
- Explore setting up a formal collaboration to exchange data gathered during this study

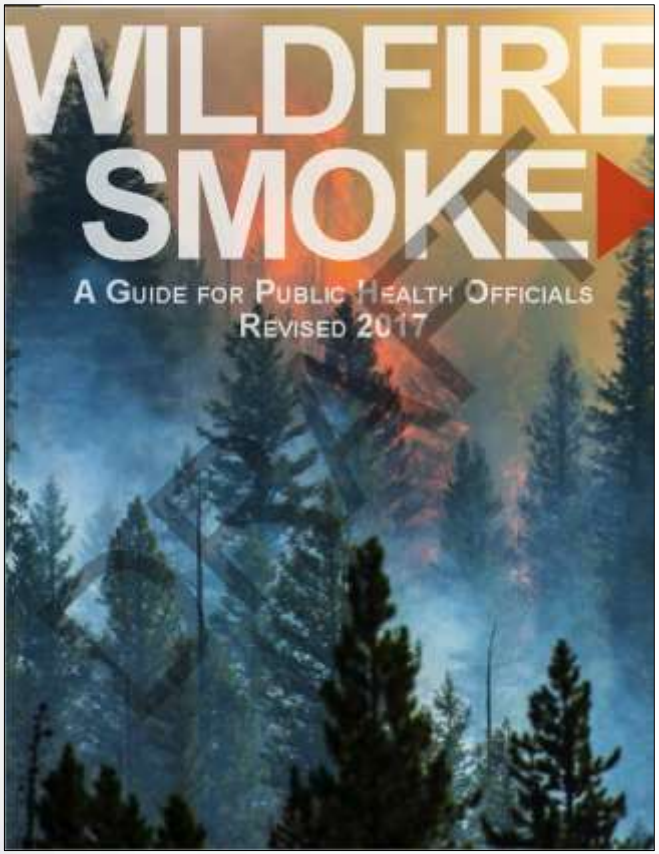
Wildland Fire Sensor Challenge

Multiple Federal Agency Sponsors

- Intended to stimulate development of low-cost, light-weight, accurate & easily deployable sensor technology that could be used by first responders and public health agencies during wildland fires
- Collaborative project between EPA (ORD, OAQPS and regional offices), federal partners (USFS, NASA, NOAA, CDC and NPS) and NGOs
- Announced in early 2017, 9 month development window, testing and judging in 2018
- Designing complimentary projects with EPA regional offices and other interested groups to field test sensors in a wildland fire scenario

For More Information Visit

2017 WILDFIRE GUIDE - A GUIDE FOR PUBLIC HEALTH OFFICIALS,
Estimated release late Summer/Fall 2017



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- AirNow
  - Current Conditions
  - Health Providers Page
  - Wildfire Smoke and Health
  - Wildfire Smoke: Guide for Public Health Officials
  - Wildfire Trends
- EPA Wildfire Research Webpage
- California Air Resources Board Resources
- CDC Wildfire Factsheets
- Wildland Fire Air Quality Response Program

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