

Welcome to today's webinar,

# Western Wildfires: Keeping Communities from Polluted Air

May 21, 2018

Thank you for your interest and attendance!

*Please use your computer speakers to listen to today's presentation.*

*Please submit your questions and comments in the Q&A box.*

**NACCHO**

National Association of County & City Health Officials

The National Connection for Local Public Health

We will begin at 1:00 pm ET

This webinar will be recorded



West Coast Collaborative

# Speakers

- **Brendon Haggerty, MURP**, Senior Program Specialist, Multnomah County Health Department, Portland, Oregon
- **Elizabeth Rhoades, Ph.D.**, Director, Climate Change and Sustainability, Los Angeles County Department of Public Health, Los Angeles, California











Photo: Bala Sivakumar



# Golfers finish a round as massive Oregon wildfire rages behind them



By **Doug Criss**, CNN

🕒 Updated 11:26 AM ET, Thu September 7, 2017



These golfers in Washington state give new meaning to the term "playing through."

## Story highlights

The Eagle Creek fire came within view of a Washington state golf course

**(CNN)** — Everybody knows golfers just *hate* to stop a good round.

So, when the [Eagle Creek fire](#), a 31,000-acre blaze

## More from CNN



Ben Carson's ex-Uber driver chief of staff sends a signal



This local health initiative has expanded birth control access

Earn up to \$500 and a top savings rate.

Earn a bonus of up to

**\$500** + **1.60%** APY

on accounts with balances of \$10,000 or more.

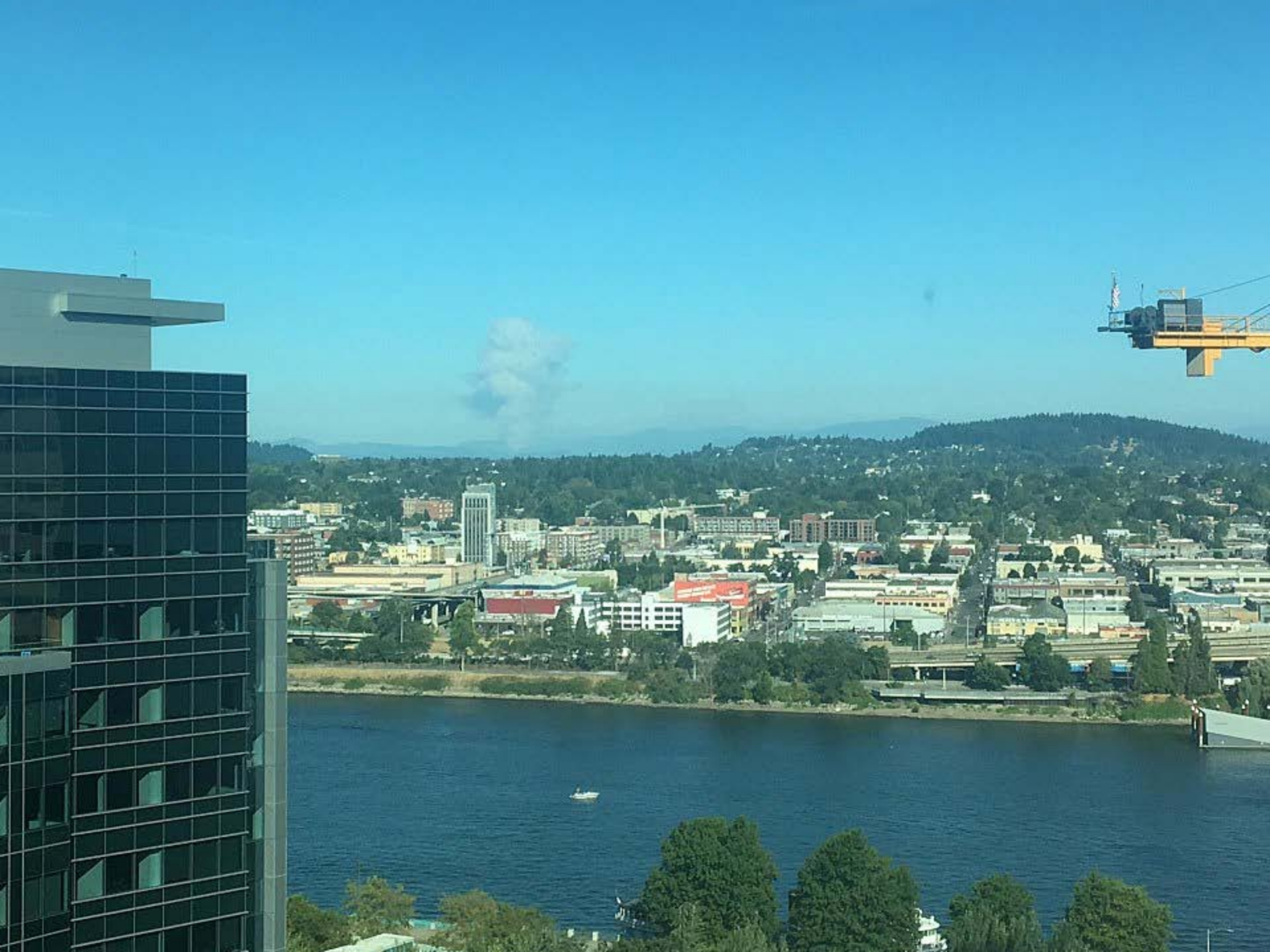
[Learn More](#)

Promo code required

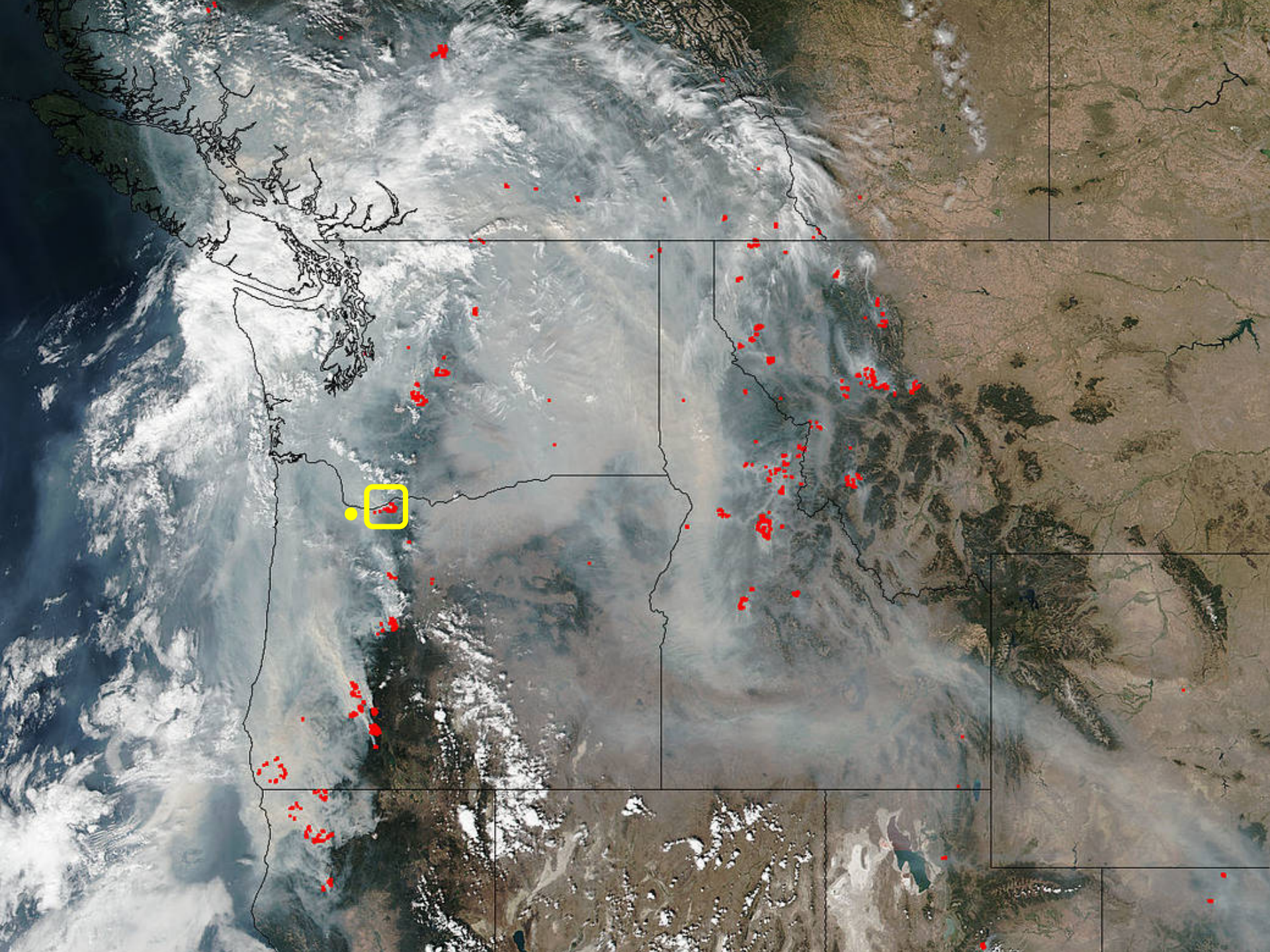
FDIC

Advertisement



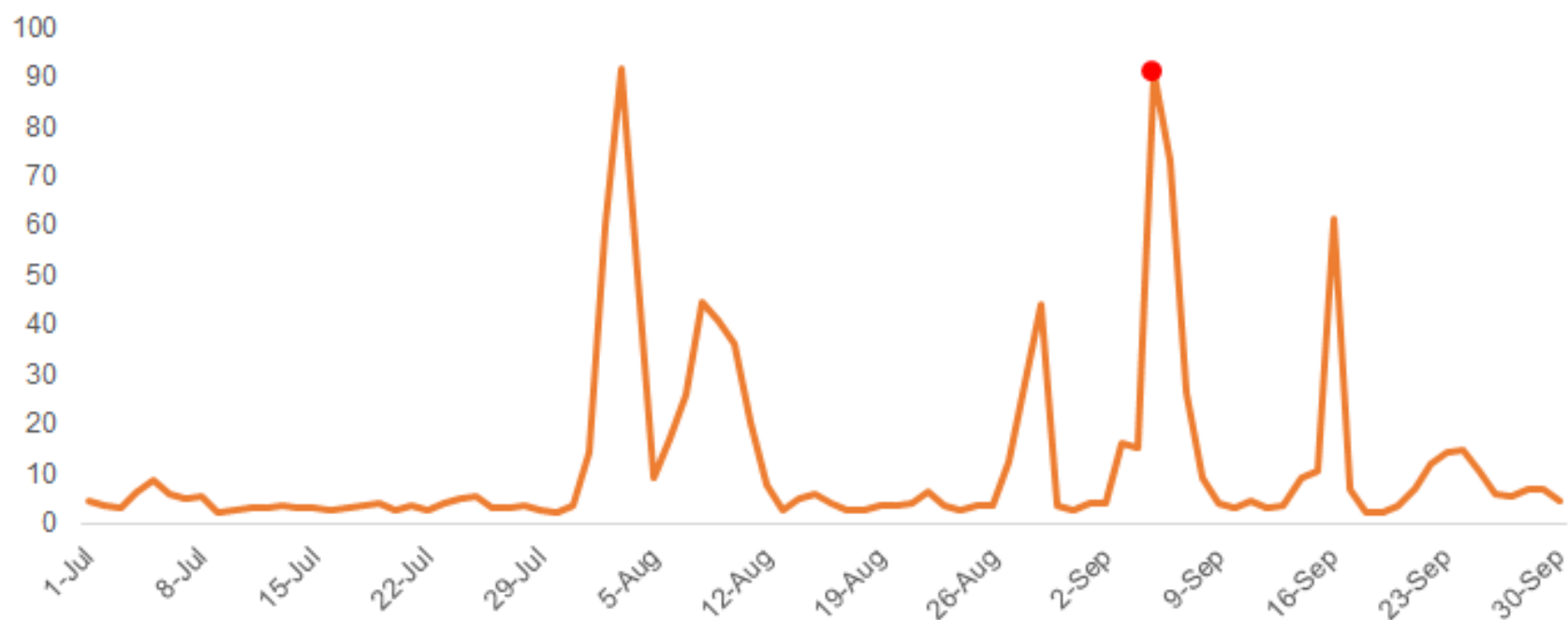








24 hour PM2.5 concentration ( $\mu\text{g}/\text{m}^3$ ) SE Lafayette monitor  
July-Sept 2017





## Sept. 16 air quality poor for sensitive populations

September 7, 2017

**Updated for Saturday, Sept. 16:** Air quality today is unhealthy for sensitive groups. Children, elderly and those with chronic health conditions like heart and lung conditions should stay inside. If they must be outside, avoid intense activity.

The Multnomah County Health Department reports wearing a mask on a day like today is of little help unless it has been specially-fitted with a tight seal around the face that is confirmed.

The County Health Department continues to work closely with the Oregon Health Authority and Department of Environmental Quality to monitor these issues. Read more about considerations for vulnerable populations.

### The elderly and people with chronic heart and lung problems

People over age 65 and those with known heart and lung problems like asthma and emphysema are more sensitive to lung irritation from breathing in small particles.

They may have cough, wheezing, trouble breathing, chest tightness, lightheadedness or unusual tiredness. It is especially important that anyone with these conditions stay inside and have their usual medications on hand. Anyone with symptoms that are severe or don't get better should contact their healthcare provider right away.



Eagle Creek Fire, Sept. 5, 2017. The National Wildfire Coordinating Group





# Local Perspective: Los Angeles County

May 21, 2018

**Elizabeth Rhoades, PhD**

Director, Climate Change and Sustainability Program

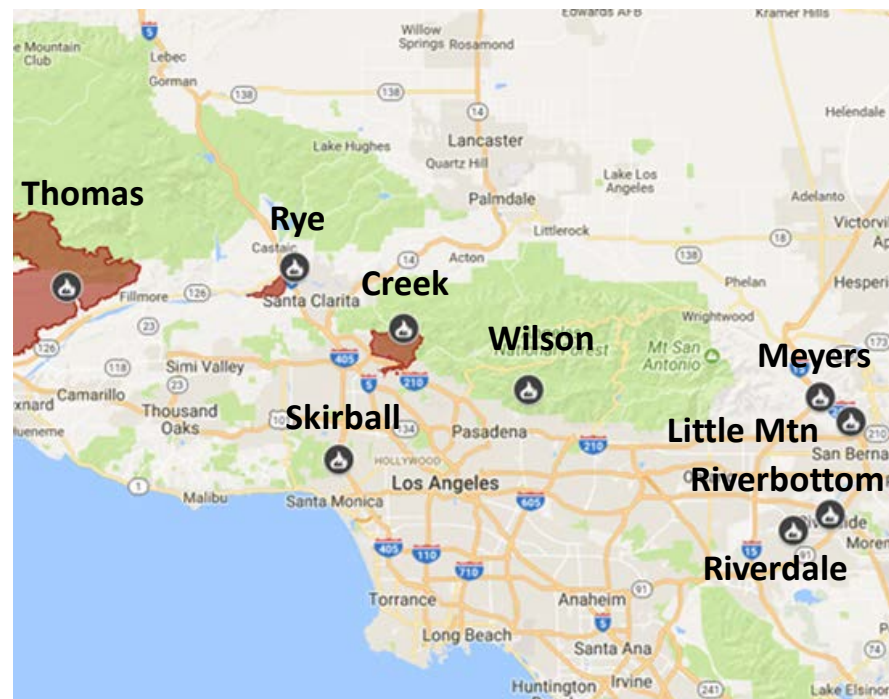
Los Angeles County Department of Public Health





# Wildfires in California, 2017

- Most destructive wildfire season in California history
  - ~ 9,133 wildfires
  - Burned >1.3 million acres
  - Killed 43 people
- 29 wildfires across Southern California in December 2017
  - Burned >308,000 acres
  - 230,000 people evacuated
  - Caused traffic disruptions, school closures, hazardous air conditions, power outages, deaths, and billions of dollars in insured damages alone.



Major Fires, December 2017. Source: [CAL FIRE 2017 Statewide Fire Map](#)

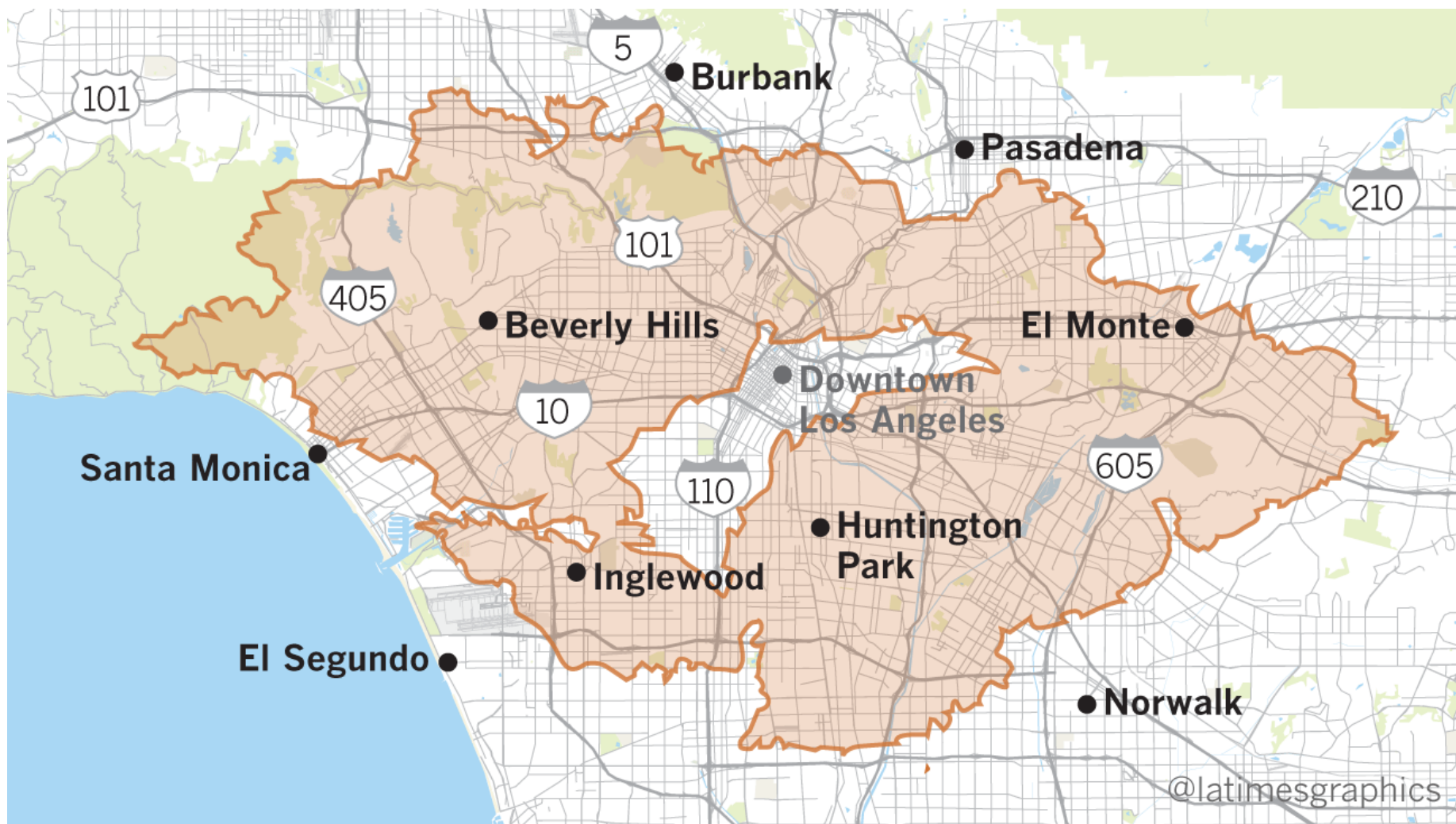


# Thomas Fire





# Thomas Fire - comparison

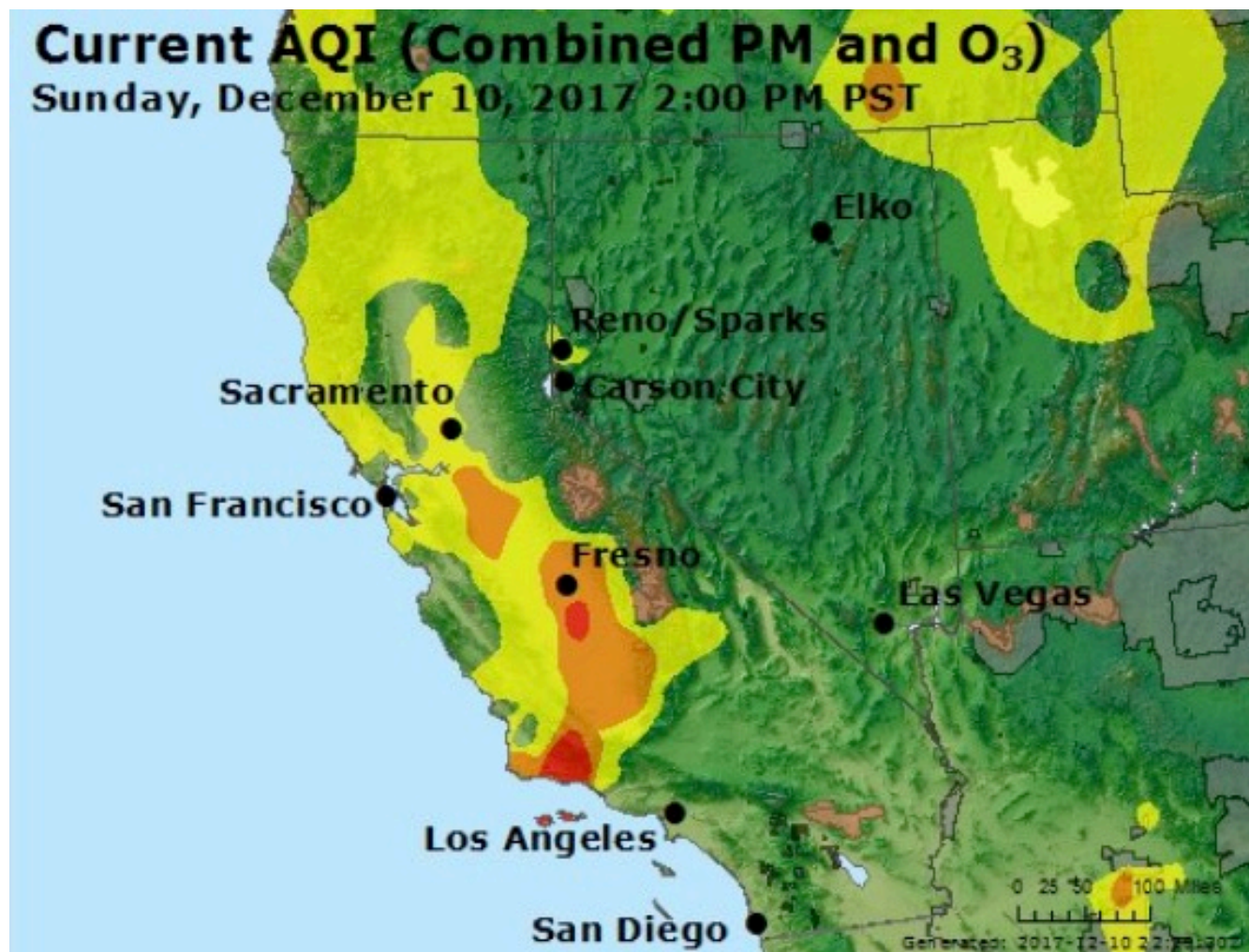




# Thomas Fire

- Largest fire in CA's recorded history: 281,893 acres
- Santa Barbara and Ventura Counties
- Destroyed more than 1,000 structures, cost over \$177 million to fight

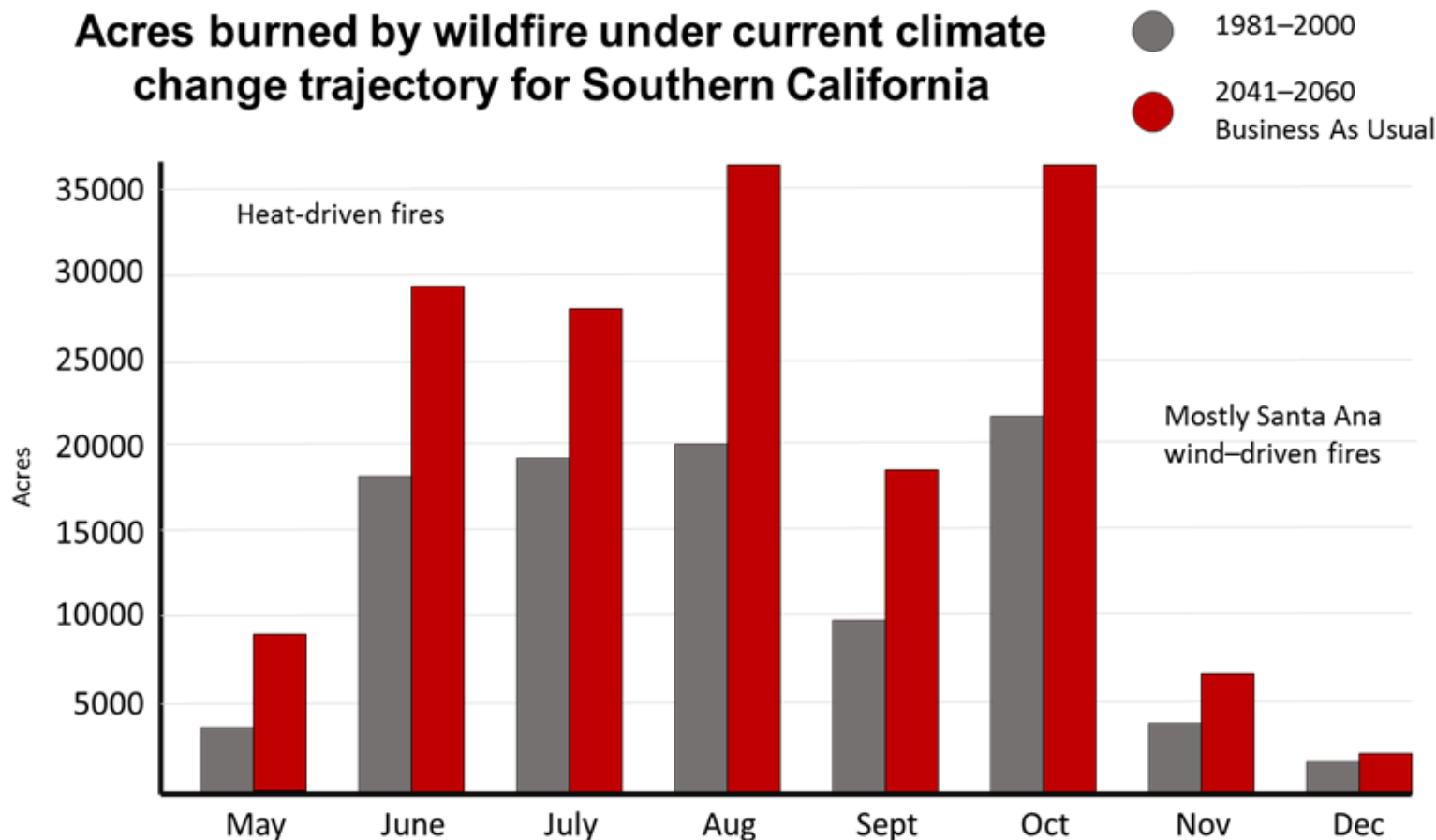
# Thomas Fire





# Wildfires

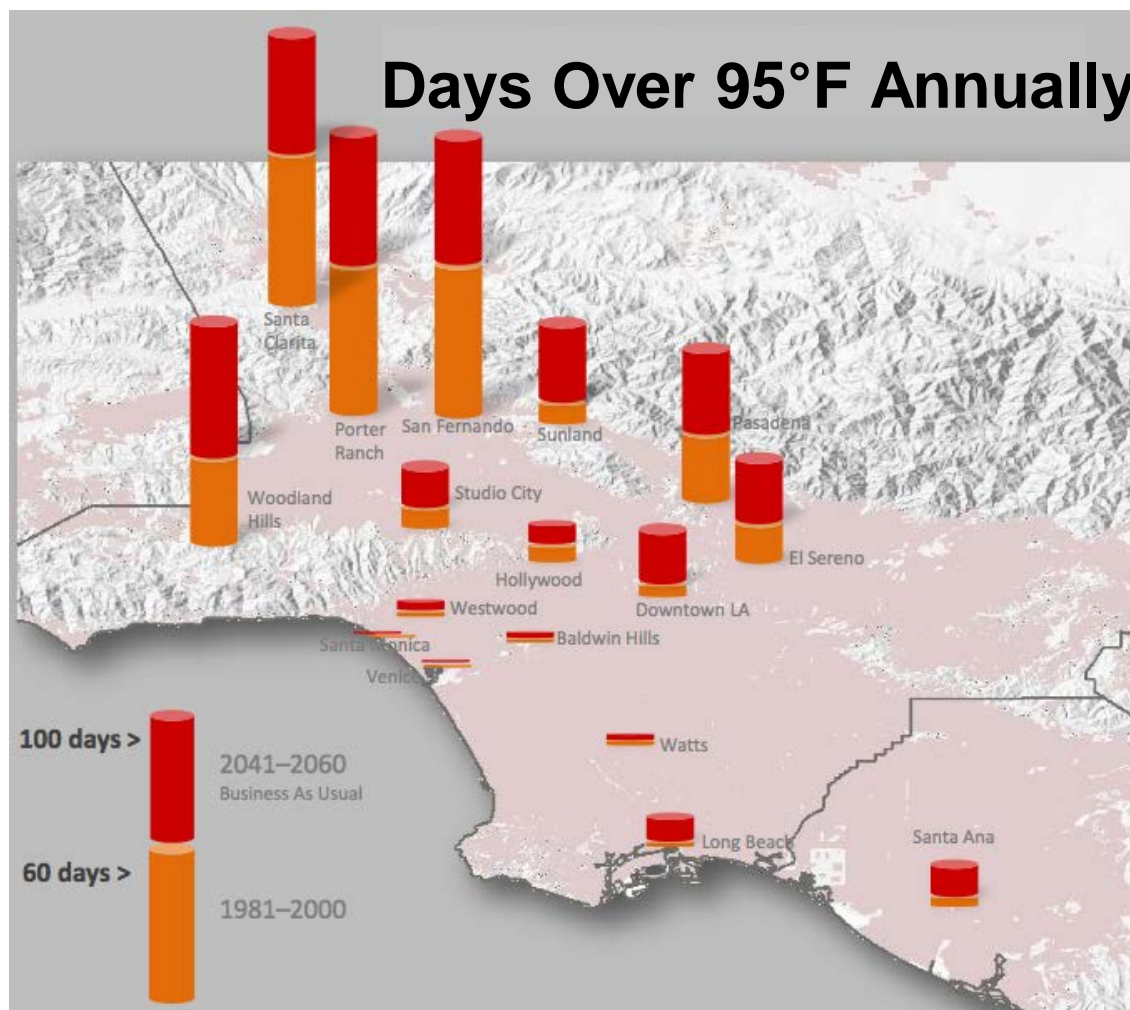
## Acres burned by wildfire under current climate change trajectory for Southern California



Source: UCLA IoES Center for Climate Change [ioes.ucla.edu/climate](https://ioes.ucla.edu/climate)

Jin et al. 2015

# Hotter Temperatures



Source: [UCLA IoES Center for Climate Science](#). Sun F, D Walton, and A Hall, 2015: A hybrid dynamical-statistical downscaling technique, part II: End-of-century warming projections predict a new climate state in the Los Angeles region. *Journal of Climate*, 28(12): 4618-4636. DOI: 10.1175/JCLI-D-14-00197.1



# Los Angeles County Department of Public Health Response

- Issued air quality advisories
- Inspected shelters
- Inspected restaurants and other facilities once reopened
- Staffed Local Assistance Center, distributing supplies (such as N95 masks) and information
- Provided mutual aid to Santa Barbara County following mudslides caused by rains following wildfires



# Local Resource Centers

Our Vision: Healthy People in Healthy Communities

June 11, 2013

## How to Clean Up Smoke and Soot from a Fire

Smoke and soot can travel and penetrate into other rooms affecting paint, carpet, upholstery, drapes, clothing and any other belongings. Ventilation of the fire scene or debris removal is an effective first step to clean up after fire. Thorough cleaning and neutralizing of both the deposits and odors are required prior to any redecoration.

### How to Start – General Cleaning Techniques

Different types of fire require different cleaning techniques. Typically, high-oxygen fires will result in dry dusty soot, whereas slow-burning, low-oxygen fires will result in greasy wet deposits that easily smear. The cleaning regimen must take into account these variations.

Here are some clean-up recommendations and guidelines:

- Wear gloves such as household dish washing gloves, long sleeved shirts and pants to avoid skin contact. If you get any ash on your skin, wash it off as soon as possible.
- Wear personal protective gear, such as a dust mask, to avoid breathing in ash and other airborne particles.
- Ventilate the area (open windows, etc.) to remove soot and odor.
- Remove burned debris to reduce odors.
- Install dehumidifiers to control moisture in the air (relative humidity), especially where water was used to extinguish the fire.
- Wipe all metallic finishes with cooking oil to prevent rust and staining.
- Clean plastic or surfaces such as PVC windows and white painted surfaces using a mild alkali detergent to remove possible acidic soot which may activate with moisture in the air (humidity) and cause permanent staining.
- Undertake triage assessments to clean or remove all contents as quickly as possible and in order of value.
- Deodorants should not be used as they mask odors, which is a significant indicator of health concerns.
- Where surface staining cannot be removed, consider the use of specialist paint to obliterate the stain and anti-bleed characteristics. Typically these paints are lacquers or oil-based.

### Cleaning Techniques for Specific Types of Damage

**For Damage Due to High-Oxygen Fires:** Use dry sponges to remove initial deposits and follow with a low-alkali detergent, then rinse.

**For Damage Due to Low-Oxygen Fires:** Do not use a dry sponge as this may create smears and cause the soot to spread. High-alkali detergents are recommended with warm water and wash down. Remember to rinse thoroughly, as residue may affect subsequent paint applications.

**For Damage Due to Kitchen Fires:** Thorough cleaning is required, as residue may not be readily visible. Remember that usually kitchen cabinets and drawer contents will need to be removed to allow access to hidden areas.

PAGE 1 of 2



313 N. Figueroa Street, Room 806 · Los Angeles, CA 90012 · (213) 240-8144 · media@ph.lacounty.gov

For Immediate Release:  
August 28, 2009

### Health Advisory: Practice Safe Clean-Up After Fire

LOS ANGELES – The Los Angeles County Health Officer, Dr. Jonathan E. Fielding, advises people to take precautions during clean-up following a fire. Ash, soot, dust, and other airborne particles may have been deposited inside and outside of homes and businesses. While ash from wildfires is relatively non-toxic and similar to ash that may be found in a home fireplace, it may be irritating to the skin, nose and throat. Exposure to ash in air might trigger asthmatic attacks in people who already have asthma.

#### Ash Clean-up:

- Do not allow children to play in ash, especially in wet or damp ash.
- Wash toys before children play with them.
- Bathe pets to rid them of ash.
- During clean-up, wear gloves such as household dish washing gloves, long sleeved shirts and long pants to avoid skin contact. If you do get ash on your skin, wash it off as soon as possible.
- If you have a vegetable garden or fruit trees, wash the fruit or vegetables thoroughly before eating them.
- Avoid getting ash into the air as much as possible. Do not use leaf blowers or take other actions that will put ash into the air. Instead, gentle sweeping of indoor and outdoor surfaces, followed by wet mopping, is the best way to clean an area with ash. A solution of bleach and water may be used to disinfect an area, if desired.
- Shop vacuums and regular household vacuum cleaners do not filter out small particles, but instead blow such particles into the air where they can be breathed. Use of regular vacuums is not advised however HEPA-filter vacuums could be used.
- A dust mask, such as a surgical mask or a mask rated N-95, may be worn during clean-up to avoid breathing in ash and other airborne particles.
- Avoid washing ash into storm drains whenever possible. Use as little water as possible when cleaning an area of ash.
- Collected ash may be disposed of in the regular trash by placing it in a plastic trash bag first.
- If a job appears to be too big, hire a professional cleaning service. There are several businesses in LA County that specialize in post-fire clean-up that may be found in the phone book. Please contact a professional if there is substantial damage or destruction to a structure.

-MORE-



# Mutual Aid

- Four Environmental Health staff spent a week conducting site hazard assessments for household chemicals





# Mutual Aid







# Thank you!

**Elizabeth Rhoades, PhD**

Director, Climate Change and Sustainability program

Los Angeles County Department of Public Health

[erhoades@ph.lacounty.gov](mailto:erhoades@ph.lacounty.gov) | 626-430-5537



# Speakers

- **Colleen Reid, Ph.D., MPH**, Assistant Professor of Geography, University of Colorado – Boulder



- **Dr. Wayne Cascio, MD**, Director, U.S. EPA's National Health and Environmental Effects Research Laboratory





# Wildfire Smoke Exposure and Population Health

NACCHO Webinar

May 21, 2018

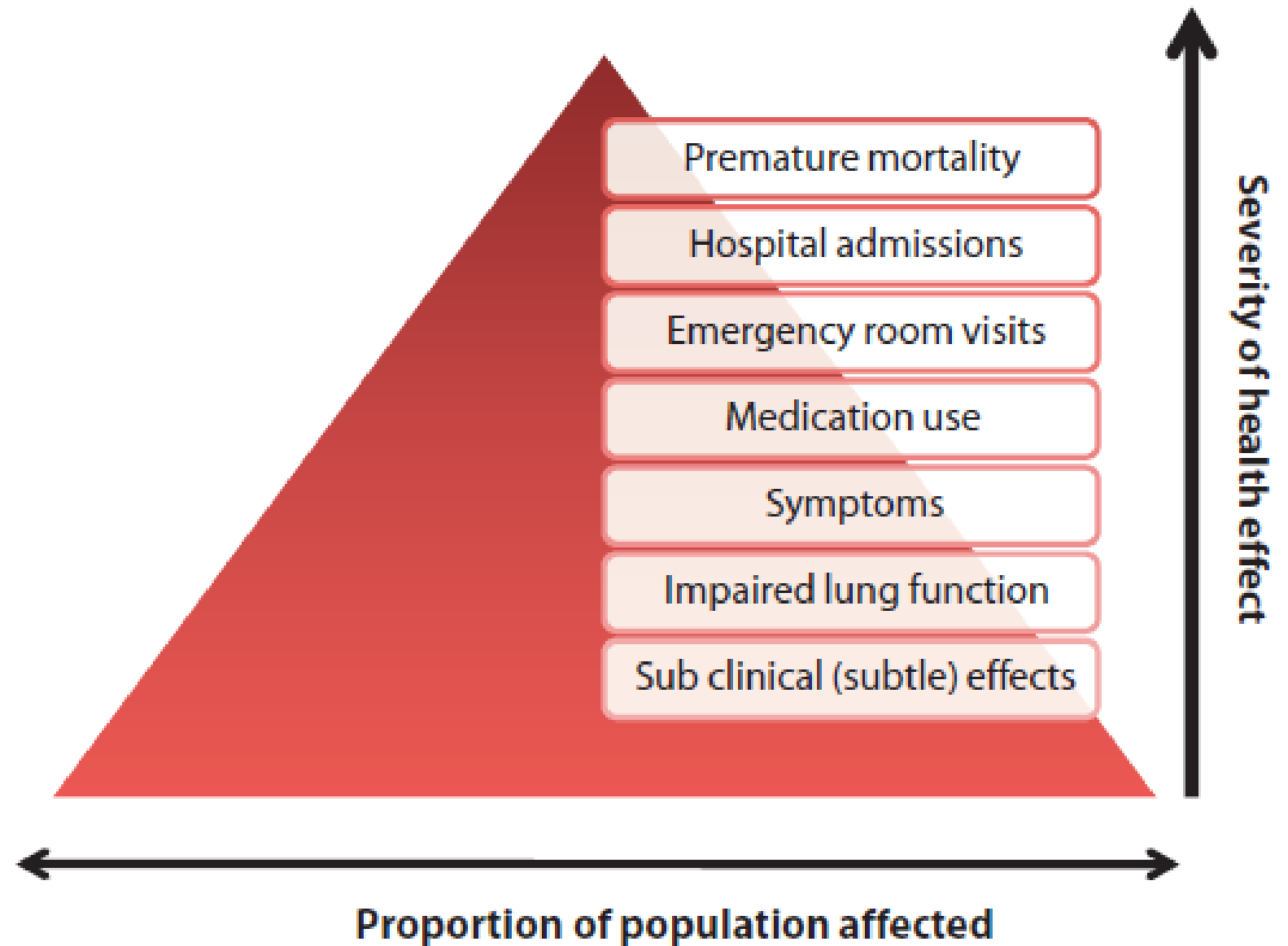
**Colleen Reid, PhD MPH**

**Assistant Professor, Department of Geography  
Faculty Associate, Institute of Behavioral Science**

**University of Colorado Boulder**

**Email: [Colleen.Reid@Colorado.edu](mailto:Colleen.Reid@Colorado.edu)**

# Epidemiological Difficulties



**Figure 2** The air pollution health effects pyramid (adapted from American Thoracic Society 2000).<sup>43</sup>



# Emissions from Wildfires with Health Concerns

## Primary air pollutants

- CO
- NO<sub>2</sub>
- PAHs – polycyclic aromatic hydrocarbons
- VOCs – volatile organic compounds
- Particulate Matter (PM)

## Secondary air pollutants

- Particulate Matter (PM)
- Ozone



Image courtesy of the U.S. EPA

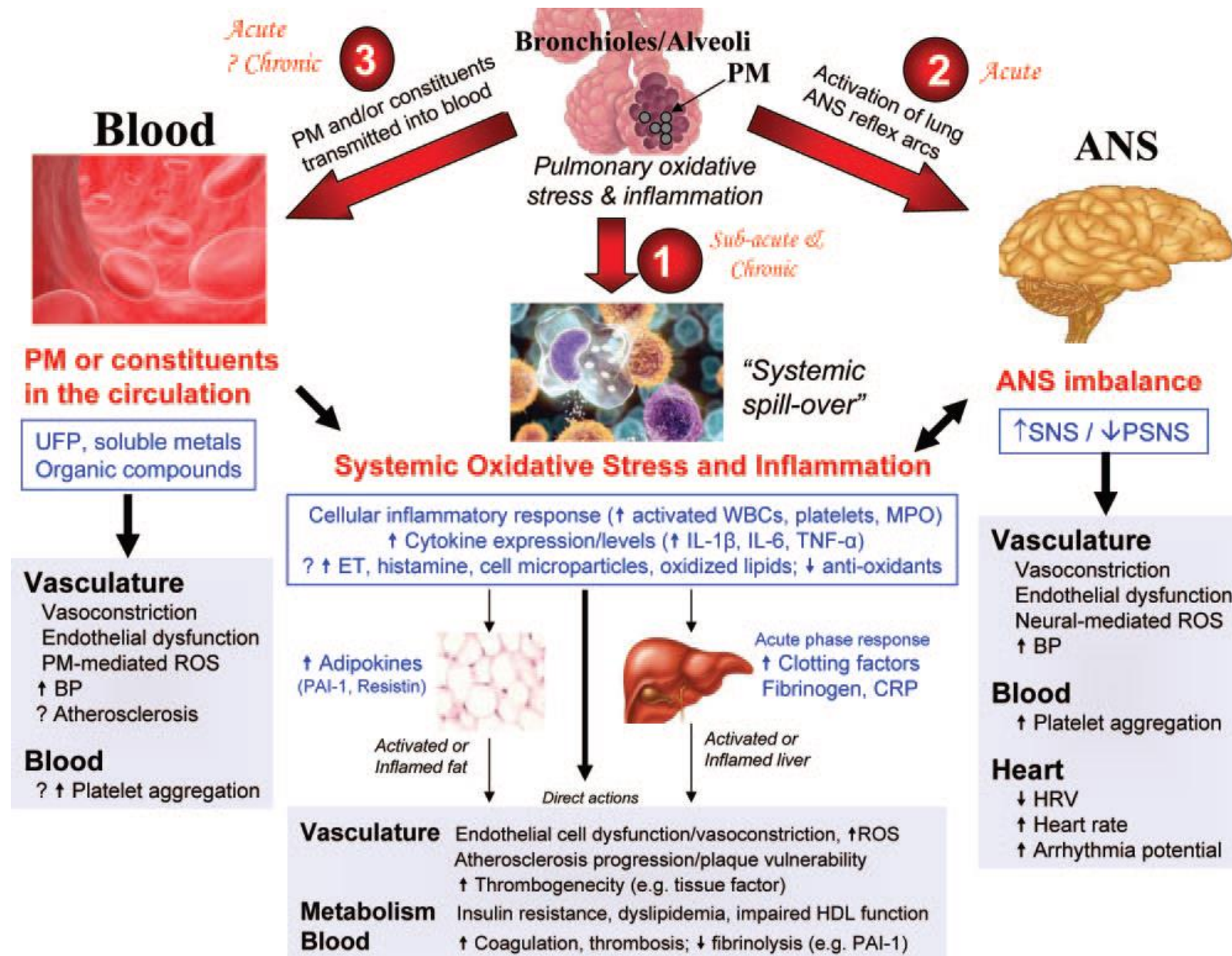


# Clear evidence of an association between wildfire smoke and respiratory health

Asthma and chronic obstructive pulmonary disease (COPD) significantly associated with higher wildfire smoke ***in nearly every study***

- Increased medication usage
- Increased visits to physicians
- Increased emergency department visits
- Increased hospitalizations
- Growing evidence of a link between wildfire smoke and respiratory infections (pneumonia, bronchitis)







# Wildfire smoke and cardiovascular disease

- Most studies to date have been null
- A few **recent studies** have found significant results
  - ED visits for all-cause cardiac symptoms in California (Wettstein et al. 2018)
  - Out-of-hospital cardiac arrests in Victoria, Australia (Haikerwal et al. 2015) and in Sydney, Australia (Salimi et al. 2016)
  - ED visits for congestive heart failure in North Carolina (Rappold et al. 2011)
- Some borderline significant
  - ED visits for hypertension (Tinling et al. 2016)
- Unsure as to the cause of these differences across studies

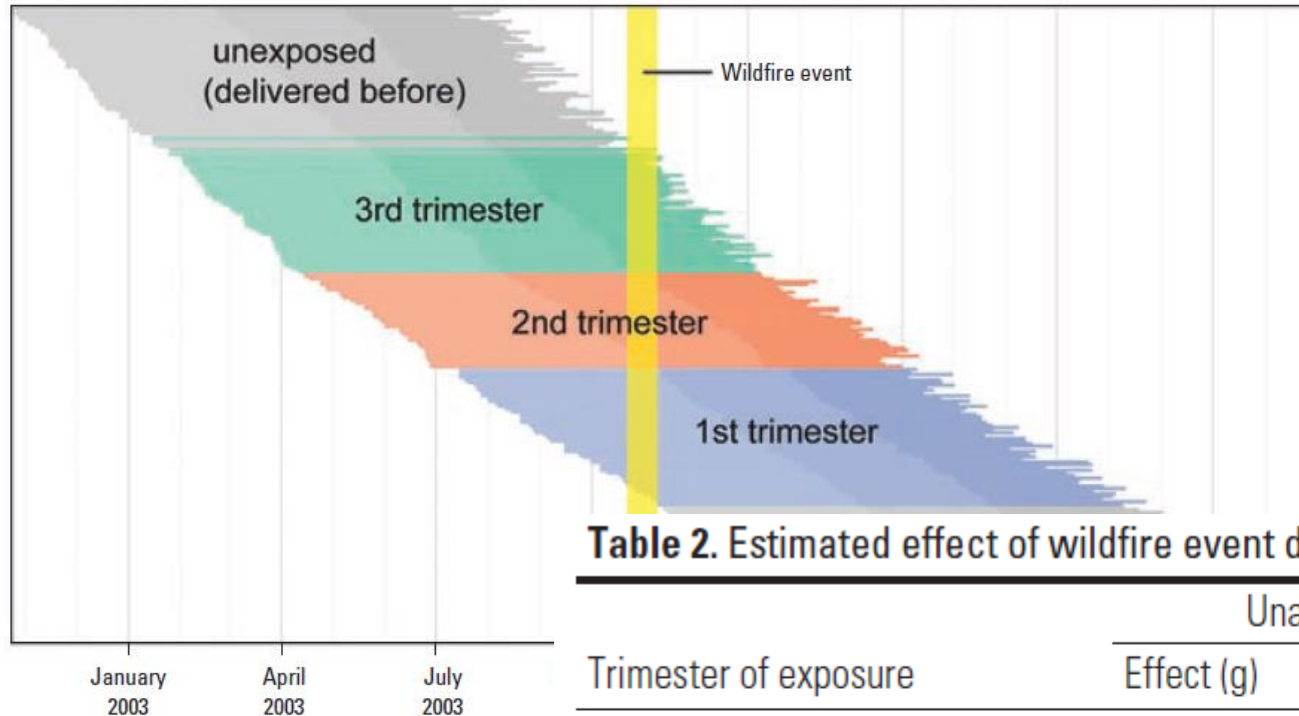


# Wildfire Smoke and Mortality

- Clear evidence of wildfire smoke impacts on all-cause mortality
  - But no clear evidence for specific causes of mortality such as respiratory or cardiovascular deaths



# Fires effect on birth weight



**Figure 2.** Schematic illustrating exposure as lap between the wildfire event (yellow) and clarity, gestational intervals are shown order from 2002–2004 is shown. Dates on the x-axis seasonality.

**Table 2.** Estimated effect of wildfire event during gestation on birth weight (g), by trimester.

Trimester of exposure	Unadjusted model		Adjusted model	
	Effect (g)	95% CI	Effect (g)	95% CI
Third ( $\geq 29$ weeks)	–7.9	(–12.8, –3.1)	–7.0	(–11.8, –2.2)
Second (17–28 weeks)	–17.1	(–21.9, –12.3)	–9.7	(–14.5, –4.8)
First (1–16 weeks)	–3.9	(–7.8, 0.0)	–3.3	(–7.2, 0.6)
Any trimester	–8.8	(–11.5, –6.1)	–6.1	(–8.7, –3.5)

Adjusted model includes terms for fetal sex, gestational age, parity, maternal age, maternal education, maternal race/ethnicity, secular trend, and season.



# Who is most vulnerable?

- Age
  - Some studies find older adults are more vulnerable
  - Some studies find younger adults are more vulnerable
- Pre-existing conditions
  - Only a few studies have looked at this with mixed results
  - But exacerbations of asthma and COPD are the clearest health findings for wildfire smoke



# Who is most vulnerable?

- Socio-economic status
  - No differential effects by SES in British Columbia (Henderson et al. 2011)
  - More vulnerable in lower income areas found in studies in North Carolina (Rappold et al. 2012), California (Reid et al. 2016), and the western US (Liu et al. 2017)
- Race-ethnicity
  - Elderly Blacks had higher respiratory admissions associated with wildfires than elderly Whites in western US (Liu et al. 2017)
  - Indigenous Australians (Johnston et al. 2007; Hanigan et al. 2008)



# What do we still not know?

- Why we have different findings for CVD
- Need more research into vulnerable populations
- There are likely other health endpoints related to smoke that have not been studied
- The health impacts of repeated exposures to wildfires
- Need more research into the effectiveness of public health interventions
- Health impacts of other air pollutants from wildfires not just PM
- Whether smoke from different types of fires affect health differently
- → need more connections between public health departments and researchers about what we should be researching

# References

- Haikerwal A, Akram M, Del Monaco A, Smith K, Sim MR, Meyer M, et al. 2015. Impact of Fine Particulate Matter (PM<sub>2.5</sub>) Exposure During Wildfires on Cardiovascular Health Outcomes. *J Am Heart Assoc* 4; doi:10.1161/JAHA.114.001653.
- Henderson SB, Brauer M, Macnab YC, Kennedy SM. 2011. Three measures of forest fire smoke exposure and their associations with respiratory and cardiovascular health outcomes in a population-based cohort. *Environ. Health Perspect.* 119:1266–1271; doi:10.1289/ehp.1002288.
- Holstius DM, Reid CE, Jesdale BM, Morello-Frosch R. 2012. Birth weight following pregnancy during the 2003 Southern California wildfires. *Env. Health Perspect* 120:1340–5; doi:10.1289/ehp.1104515.
- Rappold AG, Stone SL, Cascio WE, Neas LM, Kilaru VJ, Carraway MS, et al. 2011. Peat Bog Wildfire Smoke Exposure in Rural North Carolina Is Associated with Cardiopulmonary Emergency Department Visits Assessed through Syndromic Surveillance. *Env. Health Perspect* 119:1415–20; doi:10.1289/ehp.1003206.
- Rappold AG, Cascio WE, Kilaru VJ, Stone SL, Neas LM, Devlin RB, et al. 2012. Cardio-respiratory outcomes associated with exposure to wildfire smoke are modified by measures of community health. *Environmental health : a global access science source* 11:71; doi:10.1186/1476-069X-11-71.
- Reid CE, Brauer M, Johnston FH, Jerrett M, Balmes JR, Elliott CT. 2016a. Critical Review of Health Impacts of Wildfire Smoke Exposure. *Env. Health Perspect* 124:1334–43; doi:10.1289/ehp.1409277.
- Salimi F, Henderson SB, Morgan GG, Jalaludin B, Johnston FH. 2016. Ambient particulate matter, landscape fire smoke, and emergency ambulance dispatches in Sydney, Australia. *Env. Int*; doi:10.1016/j.envint.2016.11.018.
- Tinling MA, West JJ, Cascio WE, Kilaru V, Rappold AG. 2016. Repeating cardiopulmonary health effects in rural North Carolina population during a second large peat wildfire. *Env. Health* 15:12; doi:10.1186/s12940-016-0093-4.
- Wettstein ZS, Hoshiko S, Fahimi J, Harrison RJ, Cascio WE, Rappold AG. 2018. Cardiovascular and Cerebrovascular Emergency Department Visits Associated With Wildfire Smoke Exposure in California in 2015. *J Am Heart Assoc* 7; doi:[10.1161/JAHA.117.007492](https://doi.org/10.1161/JAHA.117.007492).





# *Research Perspectives on the Health Impacts of Wildfires and Wildfire Smoke*

**Wayne Cascio, MD, FACC**

**Director**

***National Health and Environmental Effects Research Laboratory***

***Office of Research and Development***

**US EPA**

*The Sand Fire*

*Santa Clarita Valley July*

*2016<sup>[1]</sup><sub>SEP</sub> Credit: Kevin Gill/flickr*

*NACCHO Webinar  
Western Wildfires: Keeping  
Communities from Polluted Air  
Research Triangle Park, NC  
May 21, 2018*

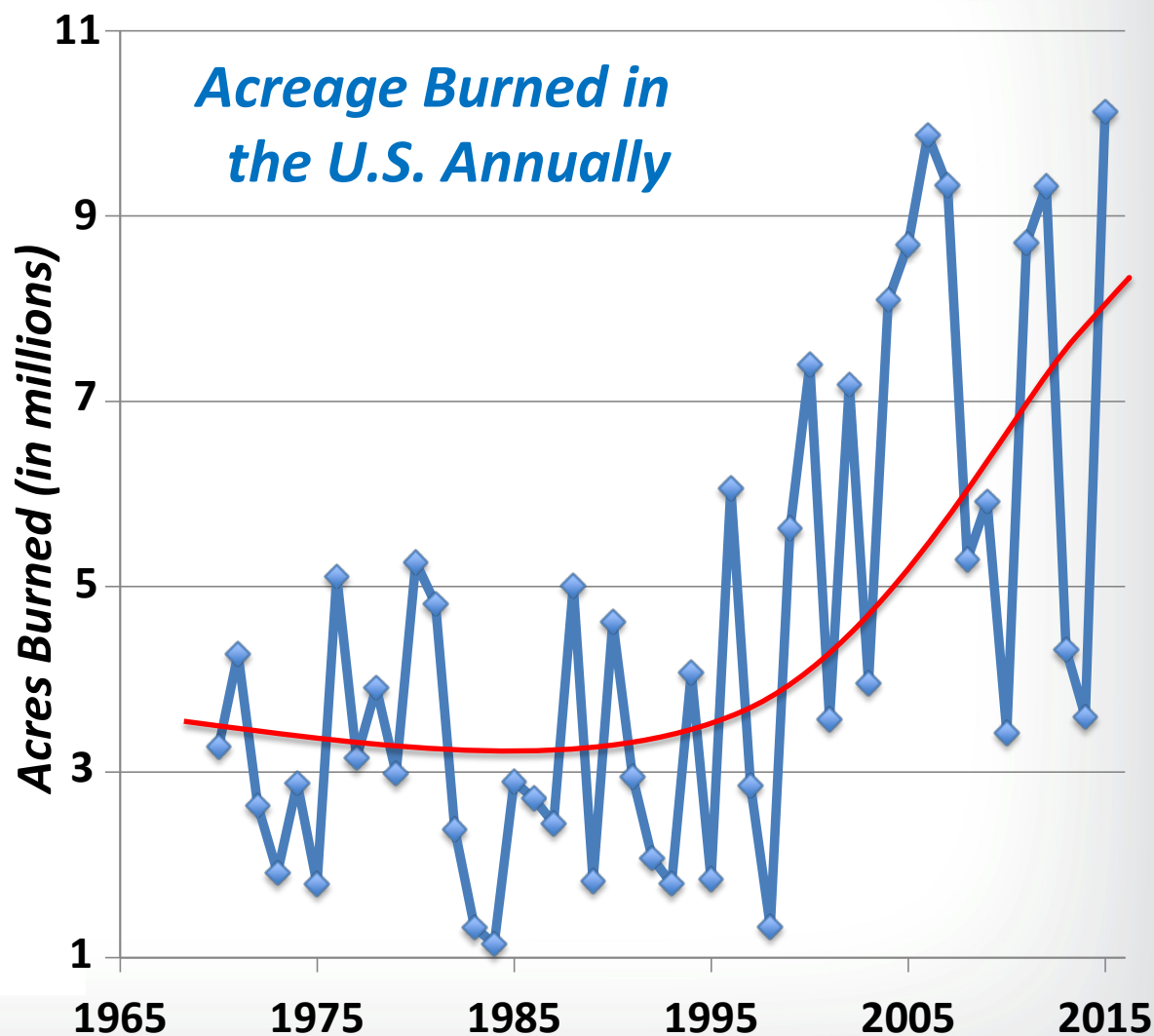


# Wildfire Smoke is an Increasing Health Hazard in the U.S.

## Present Concerns

- **Increasing acreage burned**
- **Increasing impact on urban areas**
  - 10% of all land with housing are situated in the wildland-urban interface
  - 38.5% of U.S. housing units
- **Increasing vulnerability of sensitive populations**

(Radeloff et al. 2005)







# *Californian Forests are in Peril*

## Dead Trees Increase Risk of Wildland Fire



*Dead trees near Bass Lake in Sierra National Forest – US Forest Service*



# *Wildland Fires & Their Emissions*

## A Large Urban Environmental Health Issue

**San Francisco Bay Area experienced hazardous levels of smoke**

Smoke From Northern California Fires Creates Haze Over Bay Area

**LIVE**



WINE COUNTRY  
**WILDFIRES**

**Smoke Creates Hazy Conditions**  
Bay Bridge

12:09 PM  
**5**  
KPIX

0.23% 51.28  
▲ DJI 22,812.35





# *Wildland Fires & Their Emissions*

A Costly Individual and Public Health Issue



*Estimated Economic  
Value of Wildfire-  
Attributed PM<sub>2.5</sub>-  
Premature Deaths &  
Respiratory Admissions*

**Short-term  
\$10-20 billion/yr**

**Long-term  
\$76-130 billion/yr**

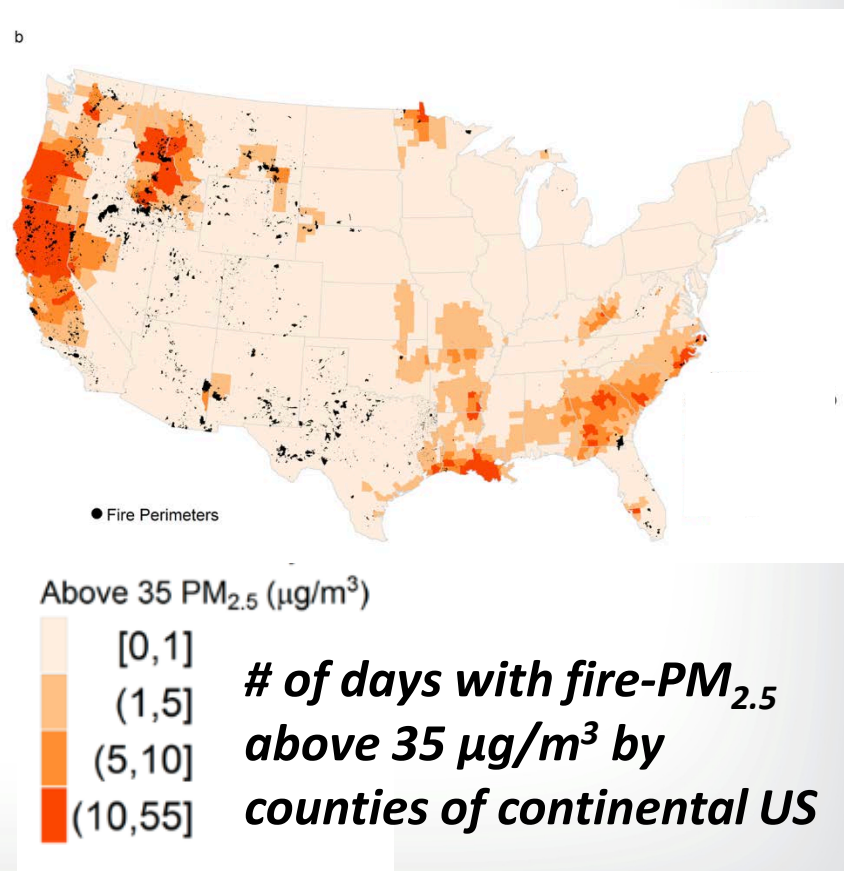
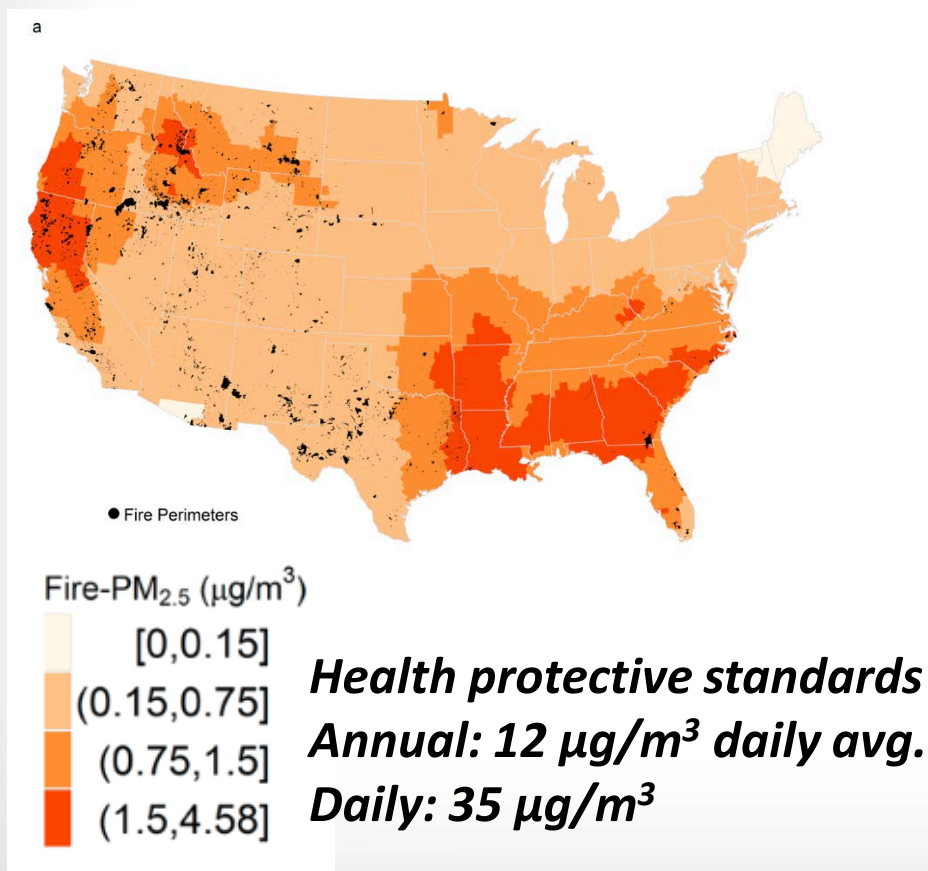
Fann N et al. *Science of the Total Environment* 610–611 (2018) 802–809



# Air Quality Impacts of Wildland Fires

*Annual average daily fire-PM<sub>2.5</sub> footprint for US counties*

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

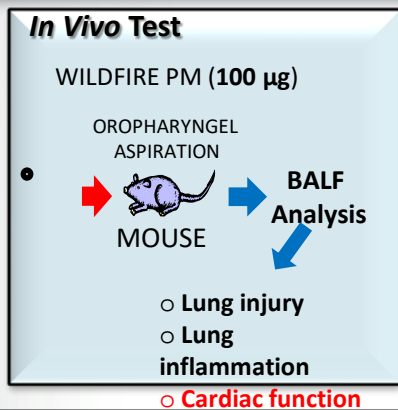




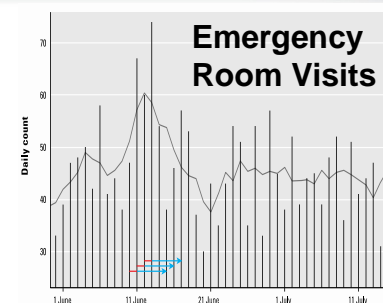


# Doing Solution Directed Science

## ORD's Translational Wildland Fire Research

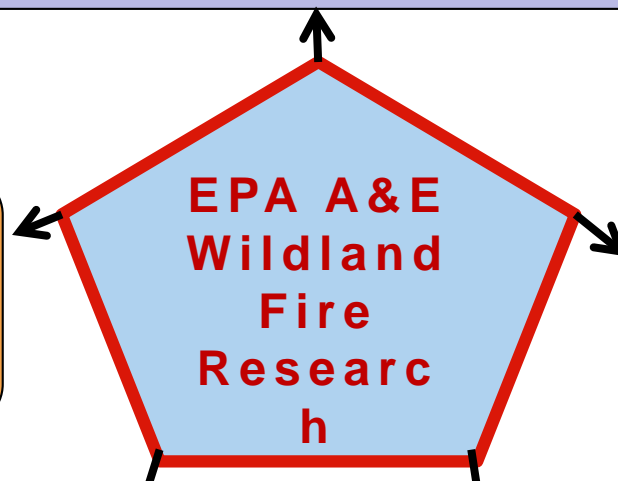


**Smoke Toxicology**  
Ian Gilmour, NHEERL  
David DeMarini, NHEERL  
Andy Ghio, NHEERL

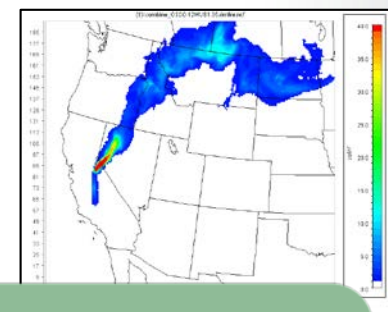


**Smoke Epidemiology**  
A. Rappold, W. Cascio, NHEERL  
B. S. Stone, OAQPS  
**Public Health**

**Smoke Exposure (Monitors/Sensors)**  
M. Landis, G. Hagler NERL  
A. Holder, NRMRL

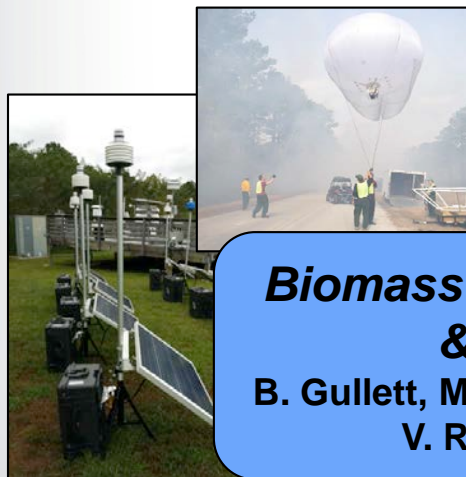


**FASMEE Initiative w/ OAR-OAQPS**



**Biomass Emissions Factors & Speciation**  
B. Gullett, M. Hays, A. Holder NRMRL  
V. Rao, OAR-OAQPS

**Smoke Emissions and AQ Impacts Modeling**  
G. Pouliot, T. Pierce, NERL  
K. Baker, OAR-OAQPS





# Smoke Ready Toolbox for Wildfires

[epa.gov/air-research/smoke-ready-toolbox-wildfires](https://epa.gov/air-research/smoke-ready-toolbox-wildfires)



## Airnow.gov: Current Fire Conditions

Get current air quality conditions and learn what to do to protect your health from air pollution, including smoke from wildland fires. Airnow.gov provides local air quality forecasts using EPA's science-based air quality index. [https://airnow.gov/index.cfm?action=topics.smoke\\_wildfires](https://airnow.gov/index.cfm?action=topics.smoke_wildfires)

## How Smoke From Fires Can Affect Your Health

Learn who is more at risk from smoke, how to tell if it is affecting you, and steps you can take to protect your health. Learn what to do before, during and after a wildfire. <https://airnow.gov/index.cfm?action=smoke.index>

## Wildfire Smoke: A Guide for Public Health Officials

The guide is an easy-to-use resource that outlines whose health is most affected by wildfire smoke, how to reduce exposure to smoke, what public health actions are recommended, and how to communicate air quality to the public. The recommendations are based on science conducted by EPA and others. [https://www3.epa.gov/airnow/wildfire\\_may2016.pdf](https://www3.epa.gov/airnow/wildfire_may2016.pdf)

## Wildfire Smoke Exposure Infographics

Two infographics provide information on actions to take to reduce health risks from smoke exposure in areas with wildfire smoke and what respirator (mask) to wear if you have to go outside and how to wear it properly. [https://www3.epa.gov/airnow/smoke\\_fires/reduce-health-risks-with-wildfire-smoke.pdf](https://www3.epa.gov/airnow/smoke_fires/reduce-health-risks-with-wildfire-smoke.pdf) and <https://airnow.gov/static/topics/images/epa-infographic-respirator.jpg>

## Smoke Sense App

The Smoke Sense mobile app, developed by EPA researchers, enables you to get information on air quality and learn how to protect your health from wildland fire smoke. The app is being used in a citizen science study to determine how smoke from fires impacts public health. The app is available for anyone to use and can be downloaded on Android or iOS. [www.epa.gov/air-research/smoke-sense](http://www.epa.gov/air-research/smoke-sense)

## Particle Pollution and Your Patients' Health Course

Particle pollution, also known as particulate matter or PM, is the main component of haze, smoke, and dust. This course provides health professionals with knowledge they can share with patients to help reduce overall risk of PM-related health effects, particularly in individuals with heart and lung disease. [www.epa.gov/pmcourse](http://www.epa.gov/pmcourse)

## Online Healthy Heart Toolkit

Breathing in fine particulate matter (PM<sub>2.5</sub>) can trigger heart attacks, ischemic stroke, abnormal heart rhythms and worsen heart failure in people with cardiovascular disease or older adults with medical conditions that put them at risk. Particle pollution is a main component of smoke. Use the toolkit to protect your heart. <https://www.epa.gov/air-research/healthy-heart-toolkit-and-research>



## Smoke Ready Toolbox for Wildfires

- Resources health officials can use to educate the public about the risks of smoke exposure and actions people can take to protect their health

[https://www.epa.gov/sites/production/files/2018-04/documents/smoke\\_ready\\_toolbox\\_for\\_wildfires\\_tagged.pdf](https://www.epa.gov/sites/production/files/2018-04/documents/smoke_ready_toolbox_for_wildfires_tagged.pdf)





## Local Air Quality Conditions

Zip Code:

Go

State : Alabama



Go

[National Summary](#)

[Forecast](#)

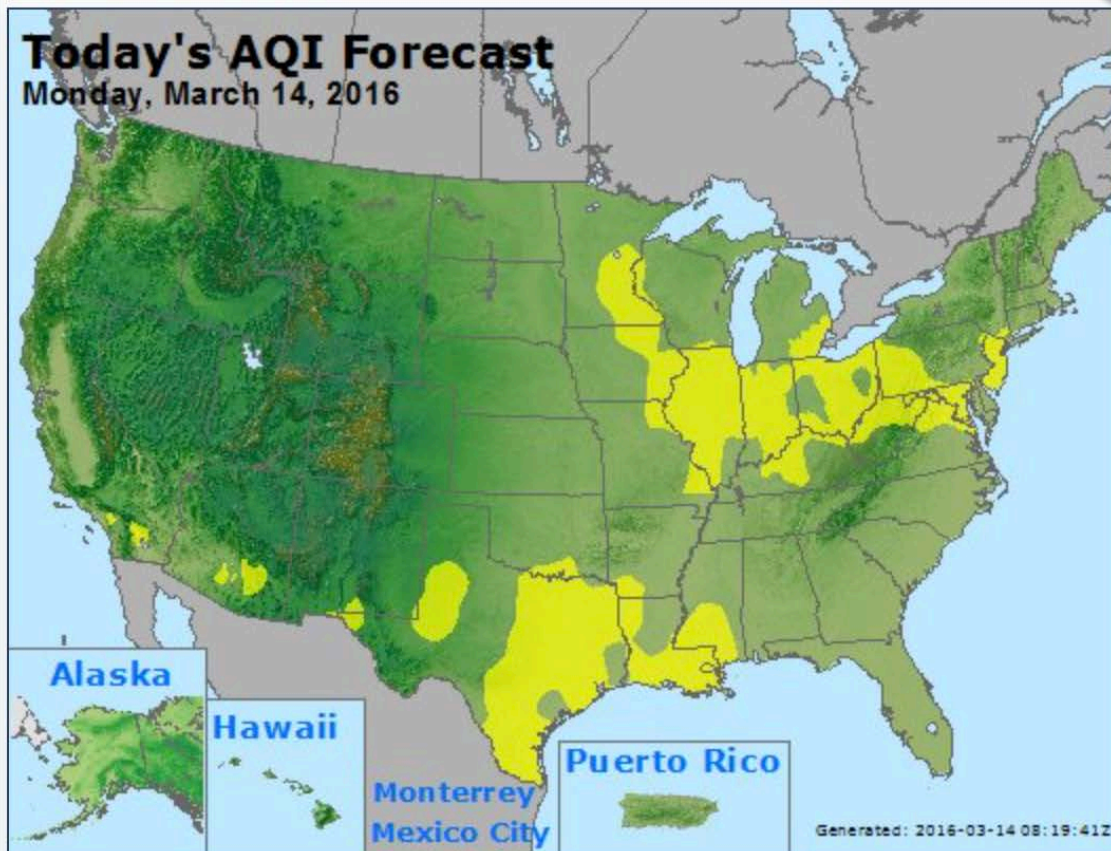
[Current AQI](#)

[AQI Loop](#)

[More Maps](#)

## Today's AQI Forecast

Monday, March 14, 2016



Alaska

Hawaii

Monterrey  
Mexico City

Puerto Rico

Generated: 2016-03-14 08:19:41Z

Good

Moderate

USG

Unhealthy

Very  
Unhealthy

Hazardous



Action Day

## Fires: Current Conditions

[Click to see map](#)



### U.S. Embassies and Consulates

Data from air quality monitors at select U.S. embassies and consulates around the world

## Announcements

3/9/16: NEW: [Spanish-language website](#) for Air Quality Flag Program - NEUVO: [En español—El sitio web](#) de la programa de banderines sobre la calidad del aire

03/03/16: Now available! Heart Disease, Stroke, and Outdoor Air Pollution (en Español) - [Enfermedades del corazón, ataques cerebrales y contaminación del aire](#)

[more announcements](#)

## Air Quality Basics

[Air Quality Index](#) | [Ozone](#) | [Particle Pollution](#) | [Smoke from fires](#) | [What You Can Do](#)

[Health](#)

[Learning Center](#)



Apps



EnviroFlash Email



## Local Air Quality Conditions

Zip Code:

Go

State :

Alabama



Go

[National Summary](#)

[Forecast](#)

[Current AQI](#)

[AQI Loop](#)

[More Maps](#)

Today's AQI Forecast  
Monday

## Fires: Current Conditions

[Click to see map](#)

## Fires: Current Conditions

[Click to see map](#)



[U.S. Embassies and Consulates](#)



[corazón, ataques cerebrales y contaminación del aire](#)

[more announcements](#)

## Air Quality Basics

[Air Quality Index](#) | [Ozone](#) | [Particle Pollution](#) | [Smoke from fires](#) | [What You Can Do](#)

[Health](#)

[Learning Center](#)

Good

Moderate

USG

Unhealthy

Very Unhealthy

Hazardous

! Action Day



Apps



EnviroFlash Email





# Fires: Current Conditions Page

- **Current Smoke Map generated by NOAA Hazard Mapping System**
- **Current Advisories – State/Local/Tribal agency blogs**
- **Wildland Fire Air Quality Response Program**

Current Advisories

Fires and Health

Before, During, and After a Wildfire

## More Fire Tools

- [Prepare for Fire Season](#) (2 pp., 260KB, [about PDF](#)) - Learn how to protect your health from wildfire smoke.
- [Wildfire Smoke, A Guide for Public Health Officials, 2016](#) (76 pp., 2.3MB, [about PDF](#)) - This document is designed to help local public health officials prepare for smoke even the public when smoke is present, and communicate with the public about wildfire smoke and health. It was updated assistance and expertise from a number of federal and state agencies.
- The right respirator and proper fit can reduce your exposure to wildfire smoke.



See [Infographic enlarged JPG](#) 127.36 KB  
See [Infographic enlarged PNG](#) 26.17 KB



See [Infographic enlarged PDF](#) (1 p., 2.2 KB)

## Fires and Your Health

Local Air Quality Conditions  
Zip Code:  Zip Go State:  Go

My Current Location

### Fires and Your Health

Smoke is made up of a complex mixture of gases and fine particles produced when wood and other organic materials burn. The biggest health threat from smoke is from fine particles. These microscopic particles can get into your eyes and respiratory system, where they can cause health problems such as burning eyes, runny nose, and illnesses such as bronchitis. Fine particles also can aggravate chronic heart and lung diseases - and even lead to premature deaths in people with these conditions.

If you are healthy, you're usually not at a major risk from short-term exposures to smoke. Still, it's a good idea to avoid breathing smoke if you can. Everyone should take the steps below when wildfires are present.

Questions? Visit our [Frequently Asked Questions](#) page for answers to some common questions about health and smoke from wildland fires.

#### Use common sense.

If it looks smoky outside, it's probably not a good time to mow the lawn or go for a run. And it's probably not a good time for your children to play outdoors.

#### Pay attention to local air quality reports.

Stay alert to smoke-related news coverage or health warnings.

#### Visit AirNow

to find out the Air Quality Index in your area. As smoke gets worse, the amount of particles in the air changes - and so do the steps you should take to protect yourself. AirNow recommends precautions you can take to protect your health when air pollution gets bad.

#### If you are advised to stay indoors,

take steps to keep indoor air as clean as possible. When smoke levels are high, try to avoid using anything that burns, such as wood fireplaces, gas logs, gas stoves - and even candles. Don't vacuum. That stirs up particles already inside your home. And don't smoke. That puts even more pollution in your lungs, and in the lungs of people around you.

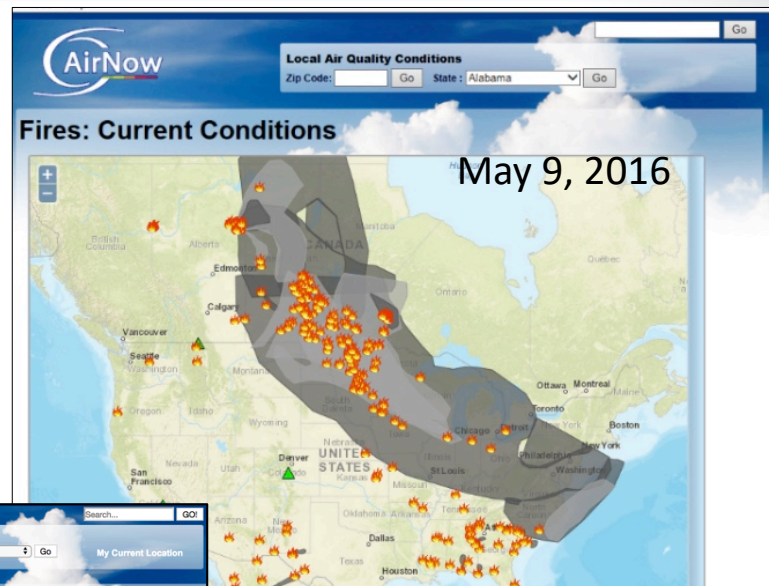
If you have asthma or other lung disease, make sure you follow your doctor's directions about taking your medicines and following your asthma management plan. Call your doctor if your symptoms worsen.

#### Health Resources

- [Wildfire Smoke, A Guide for Public Health Officials, 2016](#) (76 pp., 1.5MB, [about PDF](#))
- [How Smoke from Fires Can Affect Your Health](#) - Learn steps you can take to protect your health.
- [Particle Pollution and Your Health](#) - Find out if you are at risk from exposure to particle pollution, and what health effects can be caused by particles.

#### Educational Resources

- [CDC Wildfire Fact Sheet](#) - Information on emergency preparedness and response
- [California Air Resources Board SMP Public Outreach Protocol - Tools and Materials](#)
- [FOR KIDS- Follow Smoke Bear's advice when wildfires are in your area!](#)



Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives, Protecting People™

SEARCH

CDC A-Z INDEX

### Natural Disasters and Severe Weather

Natural Disasters and Severe Weather

Earthquakes

Extreme Heat

Floods

Hurricanes

Landslides & Mudslides

Lightning

Tornadoes

Tsunamis

Volcanoes

Wildfires

Before a Wildfire

During a Wildfire

After a Fire

Wildfires PSAs

Related Links

Winter Weather

Disaster Resources

Health and Safety Concerns for All Disasters

Are You Prepared?

Information for Specific Groups

#### Wildfires

More and more people make their homes in areas that are prone to wildfires. You can take steps to be ready for a wildfire and prepare your home and landscaping to reduce your risk. Learn how to protect yourself and your family from a wildfire, evacuate safely during a wildfire, and how to stay healthy when you return home.

Language:  English (US)

#### Before a Wildfire

- [Wildfire, Are You Prepared?](#)
- [Is your home firewise?](#)
- [Make a Plan](#)

[More >](#)

#### During a Wildfire

- [Wildfire Smoke](#)
- [Wound Care](#)
- [Ready.gov Wildfires](#)
- [Protecting Pets](#)
- [Animals in Evacuation Centers](#)

[More >](#)

#### After a Wildfire

- [What to Do After a Home Fire](#)
- [Preventing Injury](#)
- [Returning Home After a Disaster](#)

#### Be Ready! Wildfires

View a full-sized image of the Be Ready! Wildfires infographic. Share it on social media or print it out to post in your office, school, or home.

[Info for Specific Groups](#)

- [Evacuees & Other Affected Persons](#)
- [Evacuation Centers](#)
- [Pregnant Women](#)
- [Responders](#)

## CDC: Before, During and After a Wildfire



# Wildfire Smoke Guide 2018

## Anticipate Availability Late Summer/Fall



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





# Wildfire Smoke Guide 2018

## Fact Sheets Being Release as Approved



### WILDFIRE SMOKE FACTSHEET

## Children and Families

#### Background

- **Wildfires** expose children and women of reproductive age to a number of environmental hazards, e.g., fire, smoke, psychological stress, and the byproducts of combustion of wood, plastics, and other chemicals released from burnings structures and furnishings.
- **During the acute phase** of wildfire activity, the major hazards are fire and smoke.
- **Children, Pregnant Women**, individuals with pre-existing lung or cardiovascular diseases (e.g. asthma), impoverished populations are especially vulnerable to hazards due to wildfires.

#### Environmental Hazards

- **Wildfire Smoke:** Consists of very small organic particles, liquid droplets, and gases such as carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>) and other volatile organic compounds (VOCs), such as formaldehyde and acrolein. The actual content of the smoke depends on the fuel source.

#### Health Effects from Smoke

- 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.
- Underlying conditions such as allergies and asthma symptoms may be exacerbated.
- The risk of developing cancer from short-term exposures to smoke is vanishingly small.

#### Recommendations

##### Prepare Before Wildfire Season

- **Stock up** so you don't have to go out if 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 air levels.
- **Create a "clean room"** in your home. Choose a room with as few windows as possible, such as a bathroom. Use a portable air cleaner and avoid sources of pollution.
- **Buy a portable air cleaner** before the smoke event. High-efficiency particulate (HEPA) filter air cleaners, and electrostatic precipitators that do not produce ozone, help reduce indoor particle levels.
- **Organize** your important items ahead of time and know where to go in case you have to evacuate.



### 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. Replacing this filter with a medium efficiency filter can significantly improve the air quality. Higher efficiency filters (MERV 6-16) in the central system can reduce indoor PM by as much as 95%. However, these filters offer more resistance to air flow, which may increase energy used by the blower motor. You may wish to consult a HVAC technician or the manufacturer of your system to confirm that the system can handle a more efficient filter. If you are not sure, simply switching to a "Auto" or "On" filter has been shown to reduce concentrations by as much as 50%.

##### Portable Air Cleaners

Portable air cleaners are self-contained units that can be used in any room. They enhance central filtration by capturing particles. Their effectiveness depends on several factors such as the size of the air cleaner, the filter efficiency, and whether the unit is turned on and at what fan speed. Cleaners fitted with high efficiency filters can reduce indoor PM concentrations by as much as 90%.

#### Portable Air Cleaners: How to Choose

There is a wide variety of air cleaners available, ranging in price from about \$50 to \$500. Air cleaners under about \$200 are typically the air well and would not be the best choice.

##### Types of Air Cleaners

Most air cleaners fall under two categories: mechanical and electronic. Mechanical air cleaners use a fan to pull air through a filter.

### 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 to 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.





# Wildland Fire Air Quality Response Program

## Wildland Fire Air Quality Response Program



HOME DEPLOYMENTS OUTLOOKS SMOKE MONITORING SMOKE MODELING INTERAGENCY COORDINATION RESOURCES EDITOR UPLOAD

### Wildland Fire Air Quality Response Program

Recognition of the growing threat that wildfire smoke poses to public health and safety has resulted in a proactive and determined response led by the USDA-Forest Service (USFS) and enhanced through partnership with many other agencies such as the National Park Service. The Wildland Fire Air Quality Response Program (WFAQRP) was created to directly assess, communicate, and address risks posed by wildland fire smoke to the public as well as fire personnel. The program depends on four primary components: specially trained personnel called Air Resource Advisors, air quality monitoring, smoke concentration and dispersion modeling, and coordination and cooperation with agency partners.

## Air Resource Advisors

- Employed nationwide during large smoke events
- Assist on incidents
- Analyze, summarize, and communicate these impacts

## Monitoring

- Smoke monitors measuring  $PM_{2.5}$  are tied into the GOES satellite system
- Near-real time data made available to the:
  - public via AirNow's website
  - Pacific Northwest Research Station's AirFire Team to support operational smoke forecasting





# Wildland Fire Air Quality Response Program

## ARA Deployment Map



## Modeling

- ARAs depend on daily smoke impact modeling of active wildfires
- Forecasts are produced by the USFS AirFire Team with their BlueSky smoke modeling system

## Coordination

- Success depends on contributions from numerous interagency partners





# *Particulate Matter Web Course* For Healthcare Professionals and Educators

Course website - <https://www.epa.gov/pmcourse>

Environmental Topics

Laws & Regulations

About EPA

Search EPA.gov



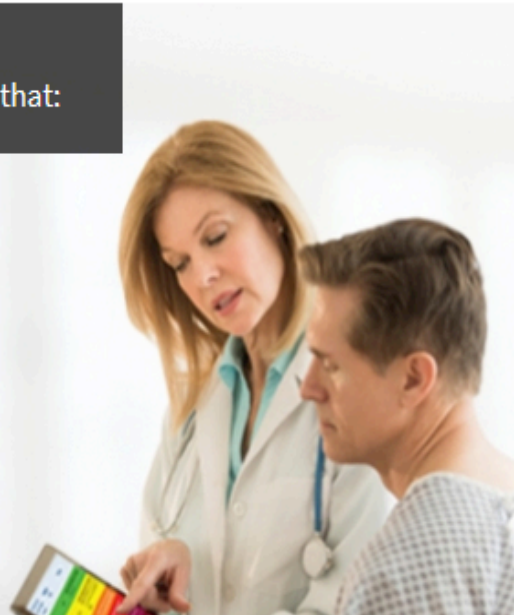
## Particle Pollution and Your Patients' Health

[Share](#)

[Contact Us](#)

An evidence-based training course for healthcare providers that:

- Describes the biological mechanisms responsible for the cardiovascular and respiratory health effects associated with particle pollution exposure.
- Provides education tools to help patients understand how particle pollution exposure can affect their health and how they can use the Air Quality Index to protect their health.



This course is designed for family medicine physicians, internists, pediatricians, occupational and rehabilitation physicians, nurse practitioners, nurses, asthma educators, pulmonary specialists, cardiologists, and other medical professionals.

[Start the Course](#)

**CME credit from CDC to physicians, nurses and health educators**





# *EPA's Healthy Heart Program*

## Increasing Environmental Health Literacy



*EPA's Healthy Heart program aims to prevent heart attacks and strokes by:*

- Raising public awareness about the role outdoor air pollution plays in cardiovascular health, and
- Steps individuals can take to reduce their pollution exposure



# *Partnering with Million Hearts<sup>®</sup>*

Joint HHS CDC and CMS Initiative



- EPA's contributes the **Healthy Heart** program*
- *to the National Prevention Strategy*
  - *and the fight against heart attacks and strokes*





# Million Hearts® Educational Tools on Particle Pollution

Connect with us:

Search the site

Home Tools & Protocols Data & Reports Partners & Progress Learn & Prevent

Undiagnosed Hypertension  
Self-Measured Blood Pressure  
Medication Adherence  
Treatment Protocols  
Action Guides  
Tools  
Health IT  
**Particle Pollution**  
Physical Activity  
Tobacco

**Tools & Protocols**  
Find treatment protocols, action guides, and other tools to help educate, motivate, and monitor your patients.

**Data & Reports**  
Access the latest data and published research on heart disease and stroke.

<https://millionhearts.hhs.gov>

**Million Hearts®**  
millionhearts.hhs.gov

e-update

**Tools You Can Use**

- **New Million Hearts® website on physical activity** promotes community programs and resources. Physical activity is one of the most effective ways to prevent and manage heart disease, but just half of U.S. adults get enough. Take advantage of resources and information about community-based programs to boost physical activity in your community.
- **Vermont Department of Health's Hypertension Management Toolkit.** The toolkit uses Lean quality improvement tools and methods to support evidence-based strategies that improve blood pressure control. A new statewide peer learning collaborative will share best practices to keep the toolkit updated.
- **Million Hearts' Tobacco Cessation Protocol now available on the go.** Find the CDC Protocol for Identifying and Treating Patients Who Use Tobacco on E-cigarettes, a free website and app for clinicians. (Registration may be required.)
- **A visual air quality alert makes air awareness easy.** The EPA's Air Quality Flag Program provides instructions on using physical and digital flags at your business or online to alert people to daily air quality.
- **New EPA toolkit details the link between heart problems and air pollution.** Use the Healthy Heart Toolkit to take steps to protect yourself and your community, sign up for air alerts, and download public education materials.

**Million Hearts® in the Community**

- **The District of Columbia Department of Health's Million Hearts® program builds a framework for success.** Learn how D.C.'s Million Hearts® program's strong partnerships, data monitoring, and targeted interventions have reduced CV disease morbidity and mortality in the nation's capital.
- **Find your niche when partnering with Million Hearts®.** Hospitals, employers, and clinical care teams in communities across the nation have tailored unique approaches to keeping people healthy, optimizing care, and helping priority populations. Learn how they did it—and then craft your own plan.
- **Million Hearts® continues engagement to find patients with hypertension "hiding in plain sight."** How many people in your practice have undiagnosed high blood pressure? Learn how to establish criteria for finding people with hypertension, implement evidence-based strategies to treat them, and improve their CV outcomes.
- **Pilot program with National Association of Community Health Centers (NACHC) shows progress in fighting hypertension.** In honor of National Heart Center Week (Aug. 12-19), take the time to learn how Million Hearts® partner NACHC is making strides in blood pressure control.

**The Science of Million Hearts®**

- **Physicians experienced in health information technology are more likely to achieve 75% blood pressure control.** (*Journal of the American Medical Informatics Association*)
- **Lowering prices of fruits and vegetables could reduce the number of deaths from CV disease.** (PLoS Medicine)
- **A cost-benefit analysis shows how indoor air filtration may reduce mortality due to particulate matter.** (*International Journal of Indoor Environment and Health*)

You are receiving this newsletter because you are a Million Hearts® supporter.

**Do This!**  
**Share the EPA Air Quality Index with networks and people at risk.**  
Particle pollution puts people with CV conditions at higher risk for heart problems or stroke. Post this tool on your websites and social media so people can check air quality before they go outside for physical activity. Those at risk should avoid going outside on days ranked "orange" or worse and instead choose indoor versions of their favorite activities.

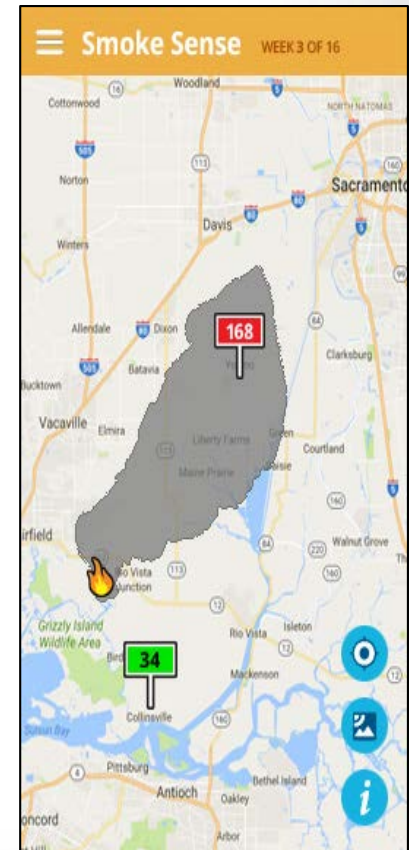
**Quick Fact**  
One in three American adults has heart or blood vessel disease and is at higher risk from air pollution, which can trigger heart attacks and strokes and arrhythmias.



# 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*
- *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*



## *Develop, Harmonize, Implement and Evaluate the Impact of Public Health Communication on Health Effects*

- Link wildfire smoke forecasts to public health messaging to decrease exposure
- Evaluate the effectiveness of:
  - interventions to decrease wildfire smoke exposures and associated adverse health outcomes
  - communication strategies





# Thank you

Wayne E. Cascio, MD, FACC

Director


National Health and Environmental Effects Research Laboratory

Office of Research and Development

U.S. Environmental Protection Agency

Email: [cascio.wayne@epa.gov](mailto:cascio.wayne@epa.gov)

- No conflicts of interest
- The presentation represents the opinions of the speaker and does not necessarily represent the policies of the US EPA



**Local Air Quality Conditions**

Zip Code:        State :        [My Current Location](#)

## How Smoke from Fires Can Affect Your Health

Updated January 2017

### Smoke may smell good, but it's not good for you


While not everyone has the same sensitivity to wildfire smoke, it's still a good idea to avoid breathing smoke if you can help it. And when smoke is heavy, such as can occur in close proximity to a wildfire, it's bad for everyone.

Smoke is made up of a complex mixture of gases and fine particles produced when wood and other organic materials burn. The biggest health threat from smoke is from fine particles. These microscopic particles can penetrate deep into your lungs. They can cause a range of health problems, from burning eyes and a runny nose to aggravated chronic heart and lung diseases. Exposure to particle pollution is even linked to premature death.

### Some people are more at risk

It's especially important for you to pay attention to local air quality reports during a fire if you are

- **a person with heart or lung disease**, such as heart failure, angina, ischemic heart disease, chronic obstructive pulmonary disease, emphysema or asthma.
- **an older adult**, which makes you more likely to have heart or lung disease than younger people.
- **caring for children, including teenagers**, because their respiratory systems are still developing, they breathe more air (and air pollution) per pound of body weight than adults, they're more likely to be active outdoors, and they're more likely to have asthma.
- **a person with diabetes**, because you are more likely to have underlying cardiovascular disease.
- **a pregnant woman**, because there could be potential health effects for both you and the developing fetus.



### How to tell if smoke is affecting you

<https://airnow.gov/index.cfm?action=smoke.index>

Please type your questions for our speakers in the Q&A box to the right.

**QUESTIONS?**



**THANK YOU!**