



## **Wildfire Smoke**

### Guidance for Clinicians

September 6, 2017

#### Contents of smoke

- Wildfire smoke may contain respiratory irritants (e.g., formaldehyde, acrolein), polycyclic aromatic hydrocarbons (PAHs), benzene, cyanide and carbon monoxide.

#### Effects of smoke exposure

- Particles in the air can irritate the eyes, nose, and throat, causing cough, phlegm production, wheezing, dyspnea, and pulmonary inflammation.
- Most healthy adults and children will recover quickly from smoke exposure and will not suffer long-term health consequences. Exposures to carcinogens found in wildfire smoke over short periods (days to weeks) are small relative to total lifetime exposures in more common combustion sources.
- Persons with reactive airways disease are at risk for exacerbations.
- Persons with cardiovascular disease may experience shortness of breath, chest tightness or pain, palpitations, or unusual fatigue or lightheadedness.
- Children are at higher risk from smoke exposure, because they tend to spend more time outside, engage in more vigorous activity, and inhale more air per pound of body weight.
- Pregnant women are at increased risk of adverse health effects, as is the developing fetus. Physiologic changes during pregnancy, such as increases in blood and plasma volumes and increased respiratory rates, increase a woman's vulnerability to environmental exposures. While there is limited data related to wildfire smoke, chronic maternal exposure to cigarette smoke and ambient particulate matter have been linked to decreased infant birth weight.
- Persons age 65 and older are more likely to have pre-existing heart or lung disease, and have a greater risk than younger persons of hospitalization and premature mortality associated with smoke exposure.
- Urban firefighters occupationally exposed to smoke over an entire working lifetime have been found to have an increased risk of developing lung cancer and other cancers.

#### Advice for patients

- Stay indoors with doors and windows closed. This reduces exposure to particulate matter in the air.
  - Use air conditioning to keep your home cool if it becomes too warm.
  - Other sources of particles within the home should be reduced or eliminated: smoking, using gas, wood-burning stoves or furnaces, aerosol sprays, frying or broiling meat, burning candles or incense, vacuuming.

- High-efficiency particulate air (HEPA) filters and Electro-static precipitator (ESP) filters can help provide protection. These trap or remove harmful particles in the air.
- Avoid vigorous physical activity when outdoors because it increases oxygen requirements (VO<sub>2</sub>), and, hence, can increase air intake—as much as 20 times over the resting level.
- When riding in a car, keep the windows and vents closed; turn the air conditioning on “re-circulate.”
- Patients can refer to the Oregon Smoke Blog <http://oregonsmoke.blogspot.com> for smoke information in their area as a tool to help guide their health behaviors and actions.
- Patients with reactive airways disease should be advised to watch for symptoms of exacerbations and to take prescribed medications or seek additional care accordingly.
- Patients with underlying cardiovascular disease should be advised to watch for symptoms and to seek additional care as needed.
- Particularly sensitive individuals, including children with asthma, heart disease, and others should consider relocation out of smoky areas if possible. Another option is moving them to a “clean air” shelter, which may be in their home, the home of a friend or relative or publicly provided shelter.

### Masks

- Surgical-type masks are typically relatively loose fitting and are not designed to capture a large percentage of small particles; therefore, they are insufficient to protect against inhalation of particles generated by wildfires.
- Breathing through a wet cloth, bandana or other common mask does nothing to prevent inhalation of particulate matter.
- Filtering facepiece respirators:
  - “R” stands for resistant to oil
  - “N” stands for not resistant to oil
  - “P” stands for oil-proof
  - “95” indicates devices that capture ≥95% of all particles ≥0.3 microns in diameter
  - “100” indicates devices that capture ≥99.97% of all particles ≥0.3 microns in diameter
  - NIOSH-approved N95 (used in health care settings to protect against inhalation of infectious particles) or P100 (more expensive; used to protect against toxic dusts, e.g., lead or asbestos) particle-filtering respirators will provide similarly higher levels of protection against particles found in wildfire smoke, but require a tight seal. To avoid a false sense of security, and to ensure a proper seal, patients will need to consult with someone trained to fit the mask, test the seal and teach them how to properly use the device. These two types of particle respirators cannot seal on persons with significant facial hair, are not sized for children and increase the work of breathing.
- For further guidance on the use of masks in occupational settings, please also consult Oregon Occupational Safety and Health Administration [www.osha.oregon.gov](http://www.osha.oregon.gov)
- For additional information, visit Oregon Public Health’s Prepare for Wildfire page: <http://www.oregon.gov/oha/PH/Preparedness/Prepare/Pages/PrepareForWildfire.aspx>