



PEHSU Information on Health Risks of Wildfires for Children – Acute Phase Guidance for Health Professionals

The Pediatric Environmental Health Specialty Units (PEHSU) Network encourage families, pediatricians, and communities to work together to ensure that children are protected from exposure to environmental hazards.

Wildfires expose children 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 burning structures and furnishings. During the acute phase of wildfire activity, the major hazards to children are fire and smoke. Acute stress from fire activity and response to the fires and the emotional responses of those around them can also impact children during this time.

Children, individuals with pre-existing lung or cardiovascular problems, pregnant women, elderly, and smokers are especially vulnerable to environmental hazards such as smoke. 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.

The **acute phase environmental hazards** for children and their family are highlighted below.

- **SMOKE** consists of very small organic particles, liquid droplets, and gases such as CO, CO₂, and other volatile organic compounds, such as formaldehyde and acrolein. The actual content of smoke depends upon the fuel source.
- **HEALTH EFFECTS OF SMOKE:** Symptoms from smoke inhalation can include chest tightness, shortness of breath, wheezing, coughing, respiratory tract and eye burning, chest pain, dizziness or lightheadedness, and other symptoms. Asthma symptoms may flare up. The risk of developing cancer from short-term exposures to smoke is vanishingly small.

RECOMMENDATIONS

- **Stay indoors** with windows and doors closed and any gaps in the building envelope sealed. Avoid strenuous activity.
- If available and if needed for comfort, run an **air-conditioner** on the "re-circulate" setting. Be sure to change the filter at appropriate intervals. Other types of room or central air filtration systems may help remove airborne particles, but they need to be selected to adequately filter the area in which they serve. Some electronic air cleaners and ozone generating "filters" can generate dangerous amounts of ozone indoors (see the *Wildfire Smoke – A Guide for Public Health Officials* resource). These ozone filtration systems do not remove harmful contaminants from the air and are not recommended.

- Never operate gasoline powered generators indoors – they produce dangerous carbon monoxide. Avoid smoking, using wood stoves, and other activities that add to indoor air contamination.
- If there is a period of improved air quality, open up (air out) the house and clean to remove dust particles that have accumulated inside.
- Humidifiers or breathing through a wet washcloth may be useful in dry climates to keep mucous membranes moist, although this does nothing to prevent inhalation of contaminants.
- When riding in a car, keep the windows and vents closed. If comfort requires air circulation, turn the air-conditioning on “re-circulate” to reduce the amount of outside air drawn into the car.
- Children with asthma, heart disease, and others considered at high risk from health effects from contaminant inhalation should be moved to an adequate “clean air” shelter, which may be in their home, in the home of a friend or relative, or in a publicly-provided “clean air” shelter.

Use of Masks

Paint, dust, and surgical masks are not effective obstacles to inhalation of the fine airborne particles generated by wildfires. For information on use of respiratory protection for adults see “Wildfire Smoke – A Guide for Public Health Officials.”

Although smaller sized masks may appear to fit a child’s face, none of the manufacturers of masks recommend their use in children. If a child is in air quality severe enough to warrant wearing a mask, they should be removed to an indoor environment with cleaner air.

Air Quality Index

The Air Quality Index indicates how dangerous the air is to breathe based upon the measurement of various pollutants such as ozone and small particles (PM_{2.5}). The smoke from wildfires contains large amounts of these hazardous particles. In areas where the Air Quality Index is not determined, measuring PM_{2.5} is a good substitute for determining the air quality. Ranges of the Air Quality Index or PM_{2.5} concentrations reflect how dangerous it is to breathe the air:

Level of Health Concern	Air Quality Index	PM_{2.5} Level
Good	0 – 50	0 – 40
Moderate	51 – 100	41 – 80
Unhealthy for Sensitive Groups	101 – 150	81 – 175
Unhealthy	151 – 200	176 – 300
Very Unhealthy	201 – 300	301 – 500
Hazardous	> 300	>500

Recommended actions for each level of air quality can be found in the *Wildfire Smoke – A Guide for Public Health Officials* and *Air Quality Index – A Guide to Air*

Quality and Your Health resources cited below. The current air quality index can be found at <http://www.airnow.gov>.

- **CLOSING OF SCHOOLS AND BUSINESSES** may become necessary because of smoke exposure risk when air quality is so poor that even traveling between indoor locations places people at risk. However, in some situations the school may be a relatively protected indoor environment with better air quality and where children's activity can be monitored.
- **CONSIDERATION OF EVACUATION** because of smoke should weigh the effects of smoke exposure during the evacuation versus what the exposure would be while resting quietly inside one's home. A disorderly evacuation can unnecessarily increase the duration and extent of smoke exposure. Remember to pack **at least 5 days of any medications** taken by family members.
- **ASH:** Recent fires may have deposited large amounts of ash on indoor and outdoor surfaces in areas near the fire. This ash may be irritating to the skin and may be irritating to the nose and throat and may cause coughing. The following steps are recommended:
 - Do not allow children or animals to play in ash.
 - Wear gloves, long sleeved shirts, and long pants when handling ash, and avoid skin contact.
 - Wash any home-grown fruits or vegetables before eating.
 - Avoid spreading the ash in the air; wet down the ash before attempting removal; do not use leaf blowers or shop vacuums.
- **PSYCHOLOGICAL EFFECTS ON CHILDREN:** During the acute phase, parents and caregivers should also be alert to children's emotional health and psychological wellbeing. It is important to keep in mind the youngest members of our society may easily become saturated with graphic pictorial images and incessant talk of smoke, flames and destruction. Resulting stress and anxiety may be manifested in a variety of ways, depending upon the developmental stage of an individual child:
 - Clinging, fears
 - Uncooperative behaviors, irritability
 - Nightmares
 - Physical complaints
 - Changes in eating or sleeping patterns
 - Regression
 - IndifferenceParents and caregivers can support children in a number of ways:
 - Maintain previously established routines and structures as much as possible.
 - Provide an open door and a listening ear for children; encourage the expression of feelings through a variety of pathways, e.g., music, art, journaling, talking.

- Answer questions openly and honestly, remaining mindful of the age of the child will determine how information is shared.
- Reassure and hug when hugs are wanted; practice patience and adopt a peaceful demeanor, as children take their cues from the clues given by their parents and the environment.

To contact your local Pediatric Environmental Health Specialty Unit with any questions about this fact sheet please visit www.pehsu.net

RESOURCES

More details on the health effects of wildfires and ash cleanup are available at the following sites, from which some of this material was adopted:

Wildfire Smoke – A Guide for Public Health Officials:
www.oehha.ca.gov/air/risk_assess/wildfirev8.pdf

Safe Clean up of Fire Ash: <http://www.calepa.ca.gov/Disaster/Documents/FireAsh.pdf>

Fires and Wildfires (National Library of Medicine):
sis.nlm.nih.gov/enviro/californiafires.html#a1

Helping Young Children After a Disaster: National Association for the Education of Young Children
http://www.naeyc.org/newsroom/Resources_on_coping_with_disasters

National Association of School Psychologists: Helping Children after a Wildfire:
www.nasponline.org/resources/crisis_safety/wildfire_teachers.pdf

National Association of School Psychologists: Responding to Natural Disasters: Helping Children and Families:
www.nasponline.org/resources/crisis_safety/naturaldisaster_teams_ho.aspx

Air Quality Index – A Guide to Air Quality and Your Health: <http://www.airnow.gov/>

Acknowledgement: James M. Seltzer, M.D., Mark Miller, M.D., M.P.H., and Diane L. Seltzer, M.A., Pediatric Environmental Health Specialty Unit Region 10

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