



HEALTHIER WORKPLACES | A HEALTHIER WORLD

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John J. Howard
Director
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention
Department of Health and Human Services

AIHA's Recommendations on NIOSH's Request for Information on Outdoor Workers Exposed to Wildland Fire Smoke

Agency/Docket Numbers: Docket No. CDC-2024-0019, NIOSH-352
Document Number: 2024-05403

Dear Director Howard:

AIHA, the association for scientists and professionals committed to preserving and ensuring occupational and environmental health and safety (OEHS), appreciates the opportunity to provide feedback on NIOSH's request for information on approaches to assess and control the hazards of wildland fire smoke to outdoor workers. We hope you find our feedback useful and are happy to answer any questions you may have. Please note that the scope of these comments includes occupations other than firefighting. Firefighting and adjacent support activities to directly address wildland fires and their aftermath are not addressed in these comments.

Properties and Characteristics of Wildland Fire Smoke Mixtures and/or Combustion Byproducts

Canada OSHA¹

Wildfire smoke is a complex mixture of gases, particles, and water vapor. Potential components include ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, VOCs, and fine particulate matter.

¹ <https://www.canada.ca/en/health-canada/services/publications/healthy-living/wildfire-smoke-health.html>

EPA²

1. Wildfire smoke is comprised of a mixture of gaseous pollutants, hazardous air pollutants, water vapor, and particle pollution.
2. Particle pollution poses the greatest risk to outdoor workers who are not near an active wildfire.
3. Particle pollution components can include acids (e.g., sulfuric acid), inorganic compounds (e.g., ammonium sulfate), organic chemicals, soot, metals, soil and dust, and biological materials (e.g., pollen, mold, etc.).

Health Effects of Exposures

While the respiratory and cardiovascular health effects of smoke exposure are well known and often discussed, it's important not to overlook cognitive impairment. This health effect can compound other health and safety issues, reducing workers' situational awareness and impairing their judgement, possibly making themselves, other workers, and bystander members of the public at risk for additional injury.³

Canada OSHA⁴

1. Mild and common symptoms of smoke exposure to urban and wildfire smoke include headaches, mild cough, runny nose, phlegm production, and eye, nose, and throat irritation.
2. Serious symptoms of smoke exposure to urban and wildfire smoke include dizziness, chest pains, severe cough, shortness of breath, wheezing (including asthma attacks), and heart palpitations. Exposure can lead to a heart attack, stroke, or premature death.

EPA⁵

Workers should be concerned with particles that are 10 µm in diameter or smaller because these particles can pass through the nose and throat, enter the lungs, and potentially enter the circulatory system.

Outdoor Worker Populations at Risk

At-risk populations include but are not limited to construction workers, arborists, utility workers, landscapers, farm workers, emergency responders, outdoor recreation and tourism workers, road maintenance workers, delivery and transportation workers, etc.

² <https://www.epa.gov/wildfire-smoke-course/why-wildfire-smoke-health-concern>

³ <https://ehp.niehs.nih.gov/doi/full/10.1289/EHP10498>

⁴ <https://www.canada.ca/en/health-canada/services/publications/healthy-living/wildfire-smoke-health.html>

⁵ <https://www.epa.gov/wildfire-smoke-course/why-wildfire-smoke-health-concern>

Canada OSHA⁶

In addition to simply working outdoors, those who are involved in strenuous labor or those with chronic illnesses such as cancer, diabetes, or lung/heart conditions are at increased risk when working outdoors.

Risk Management and Control

It's important to consider that for most outdoor work, administrative controls are not feasible – the work cannot stop, be relocated, or move indoors. Wildland fire smoke events can continue for many days or weeks and work usually cannot feasibly be paused. Crowd control, for example, is essential and must take place during events. Often, construction is essential and cannot be delayed for long. Most outdoor work is site-specific and must take place where the work needs to be done.

Therefore, it is vitally important for NIOSH and OSHA to provide clear guidance on personal protective equipment selection and use. Employers need actionable guidance. For example, What are the thresholds, and which data should they use? The AQI is a good example of data that employers could be directed to. Employers also need to know what they are protecting workers from – which types of filtration need to be included in the respirators they assign? AQI data may be insufficient to inform that decision. Should CO monitoring be conducted, and what actions should be undertaken with which results? Time-related thresholds should be included in guidance that answers questions such as, What duration of work is acceptable under which conditions?

Risk levels should be assessed by considering several factors, including ambient particulate levels, the presence of gaseous by-products, the proximity and type of work being performed, the likelihood of disturbing soot/ash or other products, and current and forecasted weather conditions. What resources can be provided or developed to support the assessment of the above for all worker populations?

Canada OSHA⁷

1. Use the Air Quality Health Index (AQHI), special air quality statements from the National Weather Service, and other community smoke level indicators to determine when it is “unsafe” to work outdoors.
2. Consider moving all feasible operations inside buildings with closed windows, doors, and loading docks to reduce exposure.
 - a. Install HEPA filters where possible in ventilation systems.

⁶ <https://www.canada.ca/en/health-canada/services/publications/healthy-living/wildfire-smoke-health.html>

⁷ Ibid.

3. Tight-fitting respirator types (e.g., N95) can reduce exposure to fine particles in smoke if outdoor work is necessary.
 - a. Fine particles pose the greatest risk to the outdoor worker population, especially those who are not in the immediate vicinity of an active fire.
 - b. Half-face respirators with VOC cartridges are necessary to protect outdoor workers from gases and other combustion byproducts.

Research Needs

One of the questions that should be addressed is, “Do industrial vehicle cab filters work effectively against wildland fire smoke?”

Another question is, “How representative are the results of research that’s been conducted on firefighter exposures on the exposures of other outdoor workers performing activities not directly related to wildland fires?”

Research needs to be conducted to better understand the psychosocial effect of wildland fire smoke on outdoor workers who are not directly involved in firefighting and related support activities. There is data indicating that exposure to wildfire smoke may have mental health impacts. (Reference 1) Some research explores the mental health and wellbeing impacts experienced by community members who identified a variety of negative mental health and wellbeing impacts of wildfire smoke events, including heightened anxiety, depression, isolation, and a lack of motivation, as well as physical health impacts (e.g., respiratory issues and lack of exercise). Both positive and negative economic and social impacts, as well as temporary or permanent relocation impacts, were also described. (Reference 2) Other research examines the impact of wildfires on the mental health of children. (Reference 3) Additional research to describe the impact of wildfire smoke on outdoor workers would be useful in the design of communication strategies and interventions.

Research needs to be conducted on the epidemiology of work-related illness of outdoor workers who experience exposure to wildfire smoke (i.e., those workers not directly involved in firefighting and related support activities). Significant research has been done to better understand the health impacts of wildfire smoke exposure and identify susceptible populations. (Reference 1) However, few epidemiological studies have investigated whether specific populations are more susceptible to wildfire smoke exposure than the general population. To fill a gap a research gap, research needs to be conducted to determine if outdoor workers are at more or less risk of disease than other worker populations and the general population.

Research into a type of control banding or SEGs for various radii around a wildfire.

- For example, first responders who are responding to emergencies within the direct vicinity or path of a fire will require different control measures than first responders performing their regular duties hundreds of miles away, but still within the smoke plume.
- Research should take into consideration indoor workers who are forced outdoors due to the wildfire path (e.g., healthcare workers evacuating patients from a hospital in the path of the fire).
- Banding and/or SEGs would also account for unique jobs (e.g., a zookeeper may care for animals that cannot be relocated indoors during a wildfire or ranch hands scattered among thousands of acres providing care for livestock).
- It may be easiest to separate out using a risk matrix that takes into account both the density of smoke and time spent outdoors.
- Research should leverage lessons learned during Hawai'iian and Australian fires, which offer insight into fast-moving, destructive fires that allowed for little warning (and therefore little time to implement controls for outdoor workers), as well as fires that are long-burning and impact large metropolitan areas, affecting large numbers and types of outdoor workers, including lifeguards and restaurant support staff.

Conclusion

If you have any questions about AIHA's comments on this request for information or other matters, please contact me at mames@aiha.org or (703) 846-0730. Thank you for your time and consideration.

Sincerely,



Mark Ames
Chief Advocacy Officer
AIHA

About AIHA

AIHA is the association for scientists and professionals committed to preserving and ensuring occupational and environmental health and safety in the workplace and community. Founded in 1939, we support our members with our expertise, networks, comprehensive education programs, and other products and services that help them maintain the highest professional and competency standards. More than half of AIHA's nearly 8,500 members are Certified Industrial Hygienists, and many hold other professional designations. AIHA serves as a resource for those employed across the public and private sectors as well as to the communities in which they work. For more information, please visit www.aiha.org.

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