



May 13, 2024

John J. Howard, MD, JD
 Director
 National Institutes for Occupational Safety and Health
 1600 Clifton Road Room 4505, MS E-20
 Atlanta, GA 30329

Re: Comment on Centers for Disease Control and Prevention’s (CDC) National Institute for Occupational Safety and Health (NIOSH)’s Request for Information on Outdoor Workers Exposed to Wildland Fire Smoke, Docket # - CDC-2024-0019-0001

Dear Director Howard:

On behalf of the undersigned public health, medical and nursing organizations, we appreciate the opportunity to comment on NIOSH’s Request for Information on Outdoor Workers Exposed to Wildland Fire Smoke. Wildfire smoke poses risks to the health of everyone, especially to vulnerable populations including outdoor workers, who often bear the brunt of exposures to air pollution and extreme weather conditions. As climate change intensifies the frequency and severity of wildfires and prolongs wildfire seasons, strong federal protections and guidance are needed to adequately safeguard outdoor workers from the increasing impacts of wildfire smoke. The following comment considers the health effects of exposure to wildfire smoke and recommends federal action and research priorities to protect outdoor workers.

I. Health Impacts of Wildfire Smoke Exposure

Wildfire smoke contains a mixture of particles and gaseous pollutants that are harmful to health, including coarse and fine particulate matter (PM), carbon monoxide and nitrous oxides,

hazardous air pollutants (HAPs) such as polycyclic aromatic hydrocarbons, and volatile and semi-volatile organic compounds (VOC), as well as secondary pollutants such as ozone generated by the reaction of nitrous oxides and VOCs in the atmosphere.¹ There is a well-established link between exposure to wildfire smoke and adverse respiratory health impacts, including reduced lung function, asthma exacerbation and aggravation of other lung diseases including chronic obstructive pulmonary disease (COPD), as well as increased risk of respiratory-related mortality and morbidity.^{2,3} Fine (less than 2.5 microns) and ultrafine (under 1 micron) PM, the main pollutant in wildfire smoke, can penetrate deep into the lungs and can be absorbed into the bloodstream, causing both local damage and systemic harm.⁴

Research on the link between wildfire smoke and cardiovascular health impacts is still evolving. There is consistent evidence that all-source PM contributes to cardiovascular morbidity and mortality,⁵ and there is growing evidence that wildfire smoke exposures are associated with acute cardiovascular effects.⁶ Research suggests wildfire smoke is also associated with several other health outcomes, including adverse pregnancy and birth outcomes, cancer, eye conditions, and declines in mental and cognitive health.^{7,8,9} As wildfires grow in frequency and intensity, and increasingly contribute to ambient PM concentrations,¹⁰ more research is needed to understand the cumulative short-term and long-term health effects of exposure to wildfire smoke, as well as the differences between wildfire smoke composition and toxicity compared to other sources of air pollution.

II. Outdoor Worker Vulnerability to Wildfire Smoke Exposure

Wildfire smoke poses a health hazard to anyone who breathes it. Outdoor workers are at an increased risk from wildfire smoke because they are less able to seek shelter indoors. They may also fit within certain groups that face greater health risks from wildfire smoke, including children, older adults, individuals who are pregnant, and people with lung or cardiovascular disease. However, few studies have looked specifically at the impacts of wildfire smoke on outdoor workers and other vulnerable populations. Outdoor workers, including wildland firefighters, other emergency responders, park rangers, athletes, and agricultural, forestry, construction, oil and gas, landscaping, transportation, and delivery workers, face a disproportionate risk of exposure to wildfire smoke due to the outdoor nature of their work. Conventional measures that prevent or reduce worker exposure to air pollution, including engineering controls and ventilation, are not feasible in the outdoor environment.¹¹ Additionally, annual peaks in construction employment and harvest season for agricultural workers often coincide with peaks in wildfire season and the greatest potential for exposure to fine particulate matter (PM_{2.5}).^{12,13}

The physical demands of many outdoor occupations may also result in higher breathing rates,¹⁴ increasing outdoor workers' inhalation of wildfire smoke, and may make it more difficult to use respiratory protective equipment, including NIOSH-approved N95 respirators. One study of farmworkers in California's San Joaquin Valley found that some workers opted out of wearing masks even when supplied by employers during poor air quality events due to heat-related discomfort, chaffing and reluctance to carry a disused mask during field work, and reported that employers did not enforce mask use.¹⁵ Very few participants reported receiving formal training on health and safety protection measures. A 2018 study from the University of Washington found that while 72% of interviewed farmworkers reported exposure to an unhealthy amount of smoke, 72% of interviewees overall reported no changes to their routine or activities.¹⁶ Less than half (44%) reported wearing a mask, due in part to discomfort. One hundred percent of

those interviewed reported little to no information on how to protect themselves, and nearly all (94%) desired more information and resources from their supervisors.

Climate change is not only increasing the number of days and severity of exposure to wildfire smoke. It is also increasing the likelihood of other extreme weather events, including days with extreme heat.¹⁷ Outdoor workers are at the highest risk of adverse effects from increases in ambient temperatures compared to workers in other sectors. Workers in agriculture, forestry, fishing and hunting industries have 35 times the risk of occupational heat-related death than workers in other sectors, and construction workers have 13 times the risk.¹⁸ Notably, outdoor workers may be at risk of heat-related illness (HRI) even at conditions below state heat protections. For instance, a study of workers' compensation claims in Washington found that many cases of HRI occurred below 89°F, the temperature above which the state's heat rule requires paid, preventative rest periods.¹⁹ Another study of traumatic worker injury claims in Oregon found that injury rates were significantly associated with a max heat index of 75°F or higher, though Oregon's heat standard requirements take effect when the heat index equals or exceeds 80°F.²⁰ Heat and wildfire smoke are individually associated with adverse health effects, and research indicates concurrent exposure may have compounding effects.^{21,22,23,24} Additional factors, including limited access to medical care, language access, work authorization status and fear of retaliation, may impact outdoor workers' ability to protect their health from exposure to heat and smoke.²⁵

More research is needed to evaluate the health risks of concurrent exposure to smoke, heat and other intersecting threats to outdoor worker health. Further research is also needed on the long-term physical and mental health impacts of climate change on outdoor workers, as well as the effectiveness of mitigation strategies specifically tailored to outdoor workers.

III. Recommendations

1. Establish comprehensive workplace smoke and heat exposure standards for outdoor workers.

There are currently no federal smoke or heat standards for outdoor workers. While some states, including California, Oregon and Washington, have established smoke rules, setting a federal standard is a key step toward protecting workers across the country. A federal smoke standard should include requirements for employers to regularly monitor the air quality index (AQI) for PM_{2.5} forecasts and alert employees of when levels reach an AQI of 101, which is considered unhealthy for sensitive groups. At an AQI of 101, NIOSH-approved respirators, such as N95 respirators, should be made available for voluntary use, and at an AQI of 151 or above (considered unhealthy for everyone) employers should directly distribute respirators to employees. The current AQI breakpoints reflect the annual national ambient air quality standard for PM_{2.5} of 9 µg/m³ and the 24-hour standard of 35 µg/m³; however, the Lung Association and other health organizations have called for the U.S. Environmental Protection Agency to strengthen the annual standard to 8 µg/m³ and the 24-hour standard to 25 µg/m³ based on what the latest science shows is necessary to protect health.

It is important to note that N95 respirators may not fit properly for all individuals, including people with beards, and may be difficult to use for people with underlying health conditions such as lung disease. As noted in the section above, respirators may not be practical for outdoor worker use due to heat-related discomfort and other factors, and are often not used when air

quality levels are unhealthy. For this reason, further measures are needed to protect outdoor workers during poor air quality events.

Additional measures include reducing time spent outdoors, allowing frequent rest breaks, access to clean air refuges, rotating workers, restricting work times, and having an emergency medical plan in place.²⁶ Employers should also provide training and information on how workers can protect their health ahead of wildfire smoke events, including information on symptoms and effects of exposure, as well as information on how to use respiratory protective equipment. Employers should provide training resources and communicate wildfire smoke hazards in multiple languages. Additionally, workers should be protected from retaliation for exercising their rights under the standard. The standard should be regularly updated to reflect the latest available science about what measures are most appropriate to adequately protect workers' health.

Employers should also be required to monitor the National Weather Service's heat index and implement additional safety measures during high heat days. Measures include providing access to shade, cool air spaces, drinking water, rest breaks, and establishing emergency medical plans and trainings on the risks, symptoms and effects of exposure to extreme heat, and steps workers can take to protect their health. As indicated above, workers may be susceptible to heat-related injury at temperatures below current state standards. This should be considered when setting a federal heat standard.

2. Develop tailored guidance and training for workers.

NIOSH should work with other relevant federal agencies and community-based organizations to develop targeted, tailored guidance and trainings for outdoor workers on how they can protect their health from wildfire smoke, including information on the symptoms and risks of exposure to smoke and training on how to use respiratory protective equipment. Guidance and messaging should account for co-exposures to smoke, heat and other climate-related hazards.²⁷ These tailored training courses and materials can build on worker training programs available from the National Institute of Environmental Health Sciences and should be available in multiple languages. Outreach efforts at the local level, including those done by community health workers, can help ensure workers are aware of how to protect their health.

3. Improve emergency notification systems and air quality monitoring and surveillance near outdoor worksites.

Emergency notifications about unhealthy air quality may not reach farmworkers and other outdoor workers in remote areas. Additionally, federal, state and local air monitors may be insufficient to monitor PM_{2.5} near outdoor worksites, especially as climate change increases the likelihood of exposure to wildfire smoke in previously unaffected areas.²⁸ Greater investments in emergency notification systems can ensure workers are informed about the air quality in the area they are working, and investments in an expanded network of real-time air monitors and improved surveillance can ensure more accurate estimates of air quality levels near outdoor worksites.

4. Expand research on the physical and mental health impacts of wildfire smoke exposure on outdoor workers, as well as co-exposures.

Very limited research exists on the risks and effects of wildfire smoke on outdoor workers. Research should focus on the short- and long-term physical and mental health impacts of smoke exposure on outdoor workers and should consider other factors of susceptibility, such as age, sex, gender, race and ethnicity, as well as the risks of co-exposure to smoke, heat and other climate-related hazards. Research is also needed to evaluate the efficacy of mitigation measures and innovative strategies and technologies to protect outdoor workers' health from wildfire smoke. Further research is needed to understand the long-term impacts of wildfire smoke exposure on the general public and the relative toxicity of wildfire smoke compared to other sources of air pollution.

We thank you for the opportunity to provide comment on this important topic and look forward to seeing NIOSH's final recommendations.

Signed,

Allergy & Asthma Network

Alliance of Nurses for Healthy Environments

American Lung Association

American Public Health Association

Children's Environmental Health Network

International Society for Environmental Epidemiology: North America Chapter

Medical Students for a Sustainable Future

National Association of Pediatric Nurse Practitioners

National Environmental Health Association

National Hispanic Health Foundation

National Hispanic Medical Association

Oncology Advocates United for Climate and Health – International

The Medical Society Consortium on Climate and Health

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