

When Disaster Strikes: The Role of Nurses in Protecting Human Health During and After Wildfire Events

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Article

Abstract

Wildfires are increasing globally and pose significant health risks, particularly for vulnerable populations, including pregnant individuals, infants, children, older adults, people with mental health conditions, and those with chronic illnesses. Climate change has intensified these events, making them a pressing health equity concern. Nurses play a vital role in communicating prevention strategies, supporting vulnerable populations and other at-risk individuals and families, and advocating for policies that reduce wildfire exposure and advance health equity. This article aims to equip readers with a practical understanding of wildfire-related health impacts and vulnerabilities, as well as the nurse's role in risk assessment, planning, and response when wildfires occur. Standardizing training and providing resources can strengthen nurses' capacity to respond to wildfires and other climate-related disasters.

Key Words: wildfire events; environmental health; health equity; vulnerable populations

As wildfires increase in frequency, duration, and severity worldwide, they pose a growing threat to essential infrastructure—such as transportation, communication systems, and utilities—and significantly jeopardize human health ([Barria, 2019](#)). Climate change has intensified global exposure to wildfire-related air pollution, with approximately 44 million people affected by unhealthy air quality each year due to wildfire smoke ([Could et al., 2024](#)). Since 2001, 77% of countries have experienced an increase in daily population exposure to wildfire smoke. Experts project that by 2050, as many as 80 million individuals may face regular exposure—an increase primarily driven by climate change, which is intensifying the frequency, scale, and duration of wildfires ([Watts et al., 2019](#); [Webster, 2023](#)).

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Wildfires pose a significant threat to human health and represent a critical issue of health vulnerability and equity, particularly within the broader context of climate change ([Baker et al., 2024](#)). Vulnerable populations, especially those from historically marginalized communities, often face disproportionate health risks due to structural and environmental factors, such as employment in outdoor labor with minimal environmental protections and limited access to filtered heating and cooling systems ([United States \[U.S.\] Department of Energy, 2023](#)). Understanding these vulnerabilities is essential for nurses, who are uniquely positioned to mitigate wildfire-related health impacts through prevention, clinical response, and policy advocacy aimed at reducing exposure and promoting environmental justice.

Given the escalating risk of wildfire exposure, it is imperative that nurses understand the full continuum of related health impacts, including immediate effects such as respiratory distress, short-term outcomes like hospitalizations and the worsening of chronic conditions, and long-term physical, emotional, and financial consequences, which remain insufficiently understood (U.S. Environmental Protection Agency [EPA], 2025b; Webster, 2023). This knowledge is essential for informed clinical practice, community preparedness, advocacy for protective health policies and to best support vulnerable populations.

Human Impact of Wildfires

A clear understanding of how wildfires are defined and classified enables nurses to respond effectively to their health impacts. Wildfires, or unplanned fires in natural areas caused by lightning, volcanic activity, or human actions, are a type of wildland fire, as described by the National Wildfire Coordinating Group (2025). The U.S. EPA (2025a) defines wildland fires more broadly as those occurring in undeveloped areas such as forests and grasslands, often contributing to severe air pollution and environmental disruption. Wildfire-related events include any unplanned fire incidents that may exceed suppression efforts. Table 1 outlines key definitions for types of wildfire-related events.

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Table 1. Types of Fires, Description, and Causes

Type of Fire	Description		Cause
Wildfire	Unplanned and uncontrolled fire burning in vegetative fuels, often spreading rapidly	Lightning, human negligence, arson	
Prescribed Fire	Intentionally ignited and carefully managed fire for ecological or hazard reduction purposes	Land management agencies	
Escaped Prescribed Fire	A prescribed burn that exceeds control boundaries and becomes unintentional	Wind shifts, dry conditions	
Surface Fire	Burns low vegetation (e.g., grasses, shrubs, forest floor litter); most common and often least intense	Any ignition source	
Crown Fire	Burns through the canopy of trees; very intense and fast-moving	Often starts as surface fire	
Ground Fire	Burns organic material below the surface (e.g., peat); can smolder for long periods	Lightning, prolonged drought	
Spot Fire	Smaller fire ignited by wind-blown embers from a main fire, often ahead of the fire front	Embers from wildfires	
Human-Caused Fire	Any unplanned fire resulting from human activity (e.g., campfires, equipment, powerlines, cigarettes)	Accidental or intentional human ignition	
Natural Fire	Typically caused by lightning or volcanic activity	Natural phenomena	

National Wildfire Coordinating Group. (2025). *NWCG glossary of wildland fire terminology (PMS 205)*. Retrieved from <https://www.nwcg.gov/publications/pms205/nwcg-glossary-of-wildland-fire-pms-205>

According to the National Academies/National Center for Biotechnology Information ([NA/NCBI], 2022), wildfire smoke represents a chemically complex and highly variable mixture of particulate and gaseous pollutants generated through biomass combustion, posing substantial risks to human health. Its composition includes multiple toxic constituents that vary depending on combustion and environmental conditions. Wildfire emissions include a mix of particulate matter, gases, and secondary pollutants, including:

- Fine particulate matter (PM 2.5):** Capable of penetrating deep into the respiratory tract and entering systemic circulation.
- Carbon monoxide (CO):** Interferes with oxygen transport and contributes to cardiovascular stress.
- Volatile organic compounds (VOCs):** Reactive gases that contribute to ozone formation and airway irritation.

- **Reactive nitrogen and oxygen species:** Promote oxidative stress and inflammation at the cellular level.

The exact composition and toxicity of wildfire smoke are influenced by factors such as fuel type, burn conditions, and atmospheric aging, all of which contribute to the formation of secondary pollutants (EPA, 2025c; NA/NCBI, 2022).

Exposure to wildfire smoke has been associated with a range of physiological responses, including:

- **Oxidative stress and inflammation**, which can exacerbate respiratory and cardiovascular disease.
- **Immune dysregulation**, increasing susceptibility to infection and chronic conditions.
- **Systemic toxic effects**, as ultrafine particles like PM 2.5 can travel beyond the lungs and affect multiple organ systems (Xu et al., 2024).

These biological responses have been documented even in populations geographically distant from fire events, underscoring the widespread reach and health consequences of wildfire smoke exposure (Xu et al., 2024).

Nurses must understand the health impacts of wildfire smoke to respond effectively across clinical and community settings.

Nurses must understand the health impacts of wildfire smoke to respond effectively across clinical and community settings. A key tool for monitoring air pollution is the Air Quality Index (AQI), a standardized scale ranging from 0 to 500 that communicates how clean or polluted the air is and what associated health effects may be a concern (AirNow.gov, n.d.). These impacts can unfold over immediate, short-term, and long-term timeframes, requiring informed, proactive care (Xu et al., 2024). In addition to environmental and health consequences, wildfire smoke imposes substantial economic burdens, including increased emergency department visits, hospitalizations, and decreased workplace and school productivity (Fadadu et al., 2024). Table 2 summarizes the impact of wildfires with the corresponding short- and long-term consequences.

Table 2. Impact of Wildfires

Category		Specific Effects	Population	Impact
Respiratory Effects	Respiratory distress, exacerbation of asthma, bronchitis, COPD; coughing, wheezing, dyspnea; risk for chronic illness		Children, elderly, individuals with pre-existing respiratory conditions	Short- and long-term
Cardiovascular Effects	Increased risk of heart attacks, strokes, hypertension; risk for chronic illness		Elderly, individuals with heart disease	Short- and long-term
Eye & Skin Irritation	Redness, itching, tearing, dryness, rashes, discomfort		General population	Short-term
Physical Trauma	Burns, falls, other traumatic injuries, death		General population	Short-term
Mental Health Effects	Stress, anxiety, PTSD due to evacuation and property loss		Evacuees, first responders, general population	Short- and long-term
Increased Emergency Visits	Surge in ER visits and hospital admissions		Healthcare systems, vulnerable populations	Short-term
Disruption of Medical Services	Interrupted access to care, medications, treatments		Chronically ill, displaced individuals	Short-term
Ecological Effects	Alteration of forest composition, soil degradation, water contamination		General population	Long-term
Economic Effects	Loss of timber resources, agricultural losses, impact on ranching, decline in tourism/recreation industries, increased insurance cost, community displacement, housing insecurity, reduced property values		General population	Long-term

(CDC, 2024; EPA, 2025a; IERE Team, 2025)

Disproportionate Impact on Vulnerable Populations

While wildfire smoke does affect the general population, certain groups face heightened risks due to exposure to fine particulate matter (PM 2.5) and other pollutants. Children, older adults, and individuals with chronic conditions such as heart or lung disease are especially vulnerable, as exposure can worsen underlying health issues (Fadadu et al., 2024). Additionally, pregnant individuals and those affected by social determinants of health, such as outdoor workers, people experiencing homelessness, and individuals without access to masks or air filtration, also face disproportionate exposure and limited resources for protection (Abdo et al., 2019; Barria, 2019; Comtesse et al., 2021; Evans et al., 2022; Foo et al., 2024; To et al., 2021; Zheng, 2023).

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Psychological vulnerability further compounds these risks, particularly for individuals with pre-existing mental health conditions who may be more susceptible to wildfire-related stress and emotional impacts (Fadadu et al., 2024; To et al., 2021). These intersecting vulnerabilities highlight the importance of nurses understanding not only physical and social risk factors but also patterns of wildfire exposure and the broader institutional and systemic influences on health outcomes. Table 3 summarizes key populations at elevated risk and underscores the need for targeted nursing interventions.

Table 3. Population, Risk, and Health Effects

Population	Risk/Vulnerability	Observed Health Effects
Older adults (≥65 years)	Higher prevalence of lung/heart disease and reduced physiological defenses	Increased emergency visits, hospitalizations, and mortality from PM _{2.5} exposure
People with respiratory disease	Compromised airway function and heightened sensitivity to irritants	Coughing, wheezing, chest tightness; exacerbation of asthma/COPD; increased Emergency Department (ED) visits/hospitalizations
People with cardiovascular disease	Impaired cardiovascular systems susceptible to smoke-related triggers	Risk of heart attacks, strokes, arrhythmias, heart failure; increased ED visits and mortality
Children (<18 years)	Developing lungs, higher breathing rates, and more outdoor activity	Respiratory irritation, decreased lung function, increased asthma attacks
Pregnant individuals	Physiological changes and fetal vulnerability	Potential low birth weight and preterm birth among fetus
Outdoor workers	Prolonged smoke exposure during work	Eye/respiratory irritation; exacerbation of asthma or cardiovascular conditions
Low socioeconomic status	Limited access to healthcare, air conditioning, and protective measures	Greater smoke exposure and untreated health conditions underlie higher risk of all effects above

(EPA, 2019)

Vulnerability and Wildfires

Wildfire Risk and Exposure

Geographic factors play a fundamental role in shaping wildfire risk, behavior, and health consequences, highlighting the importance of spatial analysis in health and emergency planning (Balch et al., 2024; Bhattarai et al., 2025). Geographic factors such as climate, weather, wind, drought, vegetation type and density such as forests and undergrowth, landform features like slope and elevation, human geography and land use, latitude and other seasonal changes are also critical in determining community risk (Vose et al., 2017) Understanding these geographic dynamics is essential for nurses involved in disaster preparedness and response. Key geographic features influencing wildfire impacts include:

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- Location and ecosystem type:** Wildland–urban interface zones and fire-adapted ecosystems, such as chaparral and boreal forests, experience heightened fire risk due to increasing development and vegetation patterns (Balch et al., 2024; Bhattarai et al., 2025).
- Regional climate patterns:** Local conditions (e.g., drought, high winds, and extreme temperatures) drive fire frequency and severity, with Mediterranean climates especially prone to severe wildfires (Balch et al., 2024; Bhattarai

et al., 2025).

- **Topography:** Fires spread more rapidly uphill on steeper slopes through convective preheating, and terrain features like narrow canyons can escalate fire behavior and complicate evacuations (Harris & Taylor, 2017; Maillard, 2023).
- **Population distribution and land use:** Urban expansion into the wildland–urban interface and rural communities with limited infrastructure face elevated exposure and barriers to emergency services (Balch et al., 2024; Harris & Taylor, 2017).
- **Geographic health disparities:** Disadvantaged or remote regions often lack clean-air shelters and timely response systems, resulting in uneven protection during wildfire events (Bramer et al., 2024; Vose et al., 2017).

Together, these geographic dimensions shape not only where and how wildfires occur, but also who is most vulnerable. These factors underscore the need for place-based, equity-oriented strategies in wildfire health response.

Wildfires are a global phenomenon, with particularly high activity concentrated in fire-prone regions such as the western United States, southern Europe, Australia, the Amazon basin, and parts of sub-Saharan Africa. These areas experience a confluence of dry climates, flammable vegetation, and increasingly extreme weather patterns that create ideal conditions for wildfire ignition and spread (Bowman et al., 2020; Moritz et al., 2014). In recent years, climate change has intensified the severity, frequency, and duration of wildfires across these regions, while also expanding fire risk into previously less-affected zones, including parts of the Arctic and eastern North America (Abatzoglou et al., 2021).

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While wildfire activity has historically been concentrated in specific regions, its growing geographic range and intensity demand greater global awareness among nurses and other health professionals. Climate change plays a pivotal role in intensifying wildfire activity by creating hotter, drier conditions that extend fire seasons and increase the likelihood of ignition and rapid spread. Rising global temperatures, prolonged droughts, and shifts in precipitation patterns have contributed to more frequent and severe wildfires in regions such as North America, Australia, and southern Europe (Abatzoglou et al., 2021; Bowman et al., 2020). In turn, wildfires can exacerbate climate change by releasing large quantities of carbon dioxide and other greenhouse gases into the atmosphere, creating a feedback loop that accelerates global warming (Fadadu et al., 2024; Van der Werf et al., 2017). Additionally, wildfire smoke contains hazardous air pollutants, as described previously, which contribute to atmospheric pollution on a global scale (Fadadu et al., 2024). This relationship between climate change and wildfire activity highlights the urgent need for integrated public health, environmental, and policy responses by nursing professionals and all members of the interdisciplinary healthcare team.

Human Vulnerability Dimensions

Understanding the multiple dimensions of human vulnerability is essential for nurses who respond to the health impacts of wildfires. Recognizing how physical, social, and psychological factors shape individual and community susceptibility enables nurses to provide more equitable, targeted, and trauma-informed care during and after wildfire events.

Physical vulnerability. Physical vulnerability refers to individual characteristics (e.g., age, disability, and pre-existing health conditions) that may increase a person's susceptibility to the adverse health effects of wildfire exposure. These factors can influence how the body responds to environmental stressors like smoke and heat, making it critical to consider vulnerability both across the lifespan and in relation to current health status. Consequently, it is important to examine how wildfire-related risks manifest across different population groups.

Pregnancy involves physiological changes that increase vulnerability to environmental hazards like wildfire smoke. Exposure during pregnancy can harm both maternal and fetal health, affecting outcomes such as preterm birth, low birth weight, and congenital anomalies including omphalocele and cleft lip (Basilio et al., 2022; Zhang et al., 2024). Inhalation of PM 2.5 from wildfire smoke may cause systemic inflammation and interfere with fetal development (Basilio et al., 2022). Maternal risks include gestational diabetes, hypertension, and fetal macrosomia, with first-trimester exposure posing the greatest risk (Abdo et al., 2019; Evans et al., 2022; Foo et al., 2024).

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Children and young adults are especially vulnerable to wildfire smoke due to ongoing organ development and unique physiological characteristics. Their faster respiratory rates and greater air intake relative to body weight increase particulate matter exposure (Holm et al., 2021; Rappold et al., 2017; Zhang et al., 2024). Reduced nasal filtration and deeper lung penetration further heighten risk (Holm et al., 2021; Zhang et al., 2024). Wildfire-related neurodevelopmental concerns have also been reported, including associations with attention–deficit /hyperactivity disorder (ADHD), autism, and metabolic or growth disorders, beginning as early as prenatal exposure (Holm et al., 2021; Zhang et al., 2024). Respiratory health impacts are significant, with increases in asthma exacerbations and emergency visits during wildfire events (Holm et al., 2021;

[Oerther et al., 2024](#); [Pratt et al., 2019](#); [Rappold et al., 2017](#); [Zhang et al., 2024](#)). Other common symptoms include respiratory infections, throat pain, pneumonia, bronchitis, and skin and eye inflammation ([Holm et al., 2021](#); [Oerther et al., 2024](#); [Zhang et al., 2024](#)).

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Wildfires pose heightened health risks for disadvantaged pediatric populations due to social and environmental inequities. Children in under-resourced communities face greater exposure to wildfire smoke, with limited access to clean indoor air and fewer protections during outdoor play ([Holm et al., 2021](#); [Oerther et al., 2024](#)). These children are also more likely to develop chronic conditions, such as poorly controlled asthma, with higher morbidity when untreated ([Pratt et al., 2019](#)). Geographic proximity to fires, especially within 10 miles downwind, further increases risk ([Holm et al., 2021](#)). The questionable fit and efficacy of N95 respirators in children, due to facial structure and growth, also limits protection ([Holm et al., 2021](#); [Zhang et al., 2024](#)). Children with underlying pulmonary disease are particularly vulnerable and may face compounded health risks in wildfire-prone regions ([Holm et al., 2021](#)). [Table 4](#) presents a summary of the impact of wildfires on these populations.

Table 4. Risk of Wildfires on Pregnant Women and Children

Health Impact	Description
Preterm Birth	Exposure to wildfire smoke during pregnancy is linked to increased risk of preterm birth.
Low Birth Weight	Wildfire exposure, especially in early pregnancy, is associated with lower birth weight.
Gestational Hypertension	Toxic gases and particulate matter from wildfire smoke may increase risk of gestational hypertension.
Developmental Delays	Long-term exposure to wildfire smoke may be linked to developmental delays in children.
Disruption in Prenatal Care	Wildfire-related displacement can interrupt access to prenatal and newborn care.

([Abdo et al., 2019](#); [Basilio et al., 2022](#); [Evans et al., 2022](#); [Foo et al., 2024](#); [Hauptman et al., 2016](#); [Holm, 2021](#); [Pratt, 2019](#); [Watts, 2019](#))

Older adults, particularly those with chronic illnesses, face disproportionate health risks during natural and man-made disasters. Wildfire smoke and particulate matter can worsen respiratory and cardiovascular conditions, contribute to cognitive decline, and negatively impact mental health ([Bell et al., 2020](#); [Elser et al., 2024](#)). Chronic heart and lung conditions heighten older adults’ vulnerability to short-term smoke exposure, increasing risk of emergency visits, hospitalizations, and mortality from fine particle pollution ([EPA, 2019](#)). Disasters also increase mortality risk among this population and compound challenges related to mobility, access to health information, and injury prevention ([Ashida et al., 2017](#)). Disruptions to healthcare infrastructure during wildfires often limit access to primary care, medications, therapeutic treatments, and mental health services, posing further threats to older adults and those with chronic conditions ([Durant, 2011](#); [Jenkins et al., 2009](#)). The need for further research about the impact of disasters on these populations is well-documented ([Bell et al., 2020](#); [Grant & Runkle, 2022](#)).

Social vulnerability. Social vulnerability is an emerging focus in wildfire-related health research. This framework highlights that populations who lack access to social, economic, and political resources face greater risks from environmental disasters like wildfires ([Lambrou et al., 2023](#)). Historical events such as Hurricane Katrina demonstrated that marginalized groups, often living in resource-limited areas, are disproportionately affected by disasters ([Zoraster, 2010](#)). Factors such as poverty, inadequate housing, and other systemic inequalities increase susceptibility to wildfire-related harm ([Lambrou et al., 2023](#)).

Communities with majority Black, Hispanic, or Native American residents face a 50% higher wildfire health risk ([Davies et al., 2018](#)). In California, Hispanic/Latino individuals, older adults, and those with disabilities have limited shelter access ([Ermagun & Janatabadi, 2024](#)). Other at-risk groups include women, young adults, non-English speakers, and recent movers ([Baker et al., 2024](#)). Additional research is needed about the impacts of wildfire among chronically ill individuals, children, pregnant people, and those from other high-risk populations ([Grant & Runkle, 2022](#)).

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Geographic location significantly influences wildfire-related health disparities. In the United States, for example, while the West Coast bears the greatest wildfire burden, similar vulnerabilities exist in Eastern U.S. communities with high levels of socioeconomic disadvantage ([Morgan et al., 2024](#); [Winker et al., 2024](#)). As emphasized in the *Future of Nursing 2020–2030*

report ([National Academies of Science, Engineering, and Medicine, 2021](#)), nurses have a critical role in reducing health inequities through disaster preparedness and response, including in wildfire contexts.

Psychological vulnerability. Psychological vulnerability encompasses factors such as stress, trauma history, and coping capacity, all of which can influence an individual’s mental and emotional response to wildfire events. Mental health and emotional well-being are fundamental to human resilience, and many individuals living with psychiatric or mental health conditions depend on stable environmental conditions and supportive ecosystems to maintain their well-being ([American Psychiatric Association, 2021](#)). Wildfires pose significant threats to mental health by disrupting individuals’ emotional connections to the environment and altering their sense of identity. Climate or ecological grief can emerge when people lose access to familiar landscapes or ways of life shaped by the environment, leading to emotional distress and a sense of dislocation ([Comtesse et al., 2021](#)).

Children are particularly vulnerable to the mental health impacts of wildfire exposure.

Children are particularly vulnerable to the mental health impacts of wildfire exposure. Disruptions to routine, such as school closures and separation from peers, can exacerbate stress and anxiety. Research has shown that children affected by wildfires are at increased risk for depressive symptoms and post-traumatic stress disorder ([Holm et al., 2021](#); [Oerther et al., 2024](#)). In broader populations, wildfire exposure has been associated with elevated rates of posttraumatic stress disorder (PTSD), major depressive disorder, generalized anxiety, economic hardship, and substance use disorders ([Fadadu et al., 2024](#); [To et al., 2021](#)). These effects highlight the urgent need to address the compounding psychological consequences of wildfires on both individual and community well-being. See [Table 5](#) for a summary of the impact of wildfires on mental health.

Table 5. Wildfires and Mental Health

Mental Health Impact	Description		Population
Post-Traumatic Stress Disorder	Wildfire survivors and firefighters often experience PTSD due to traumatic exposure and loss.		General population with increased impact on vulnerable populations
Depression	Increased rates of depression have been observed following wildfire events, especially among displaced individuals.		General population with increased impact on vulnerable populations such as the elderly or those with a history of substance abuse
Anxiety	Anxiety symptoms are common during and after wildfires, exacerbated by evacuation, smoke exposure, and uncertainty.		General population with increased impact on vulnerable populations such as children and adolescents
Solastalgia	A form of emotional distress caused by environmental change, such as the destruction of familiar landscapes by wildfires.		General population with increased impact on vulnerable populations

([To et al., 2021](#))

Intersectionality and Compounding Vulnerabilities

Intersectionality is a framework that examines how overlapping social identities (e.g., age, race, gender, income, housing status) combine to shape individual experiences of risk and resilience ([Kuran et al., 2020](#)). Nurses must recognize that the health impacts of wildfires are not experienced equally across populations and are shaped by the interaction of these social, economic, and environmental factors. According to the Public Health Agency of Canada ([2024](#)), individuals are at greater risk when these intersecting characteristics limit their ability to avoid exposure to, access care during, or recover fully from wildfire events.

In the context of wildfires, relying on single-category definitions of vulnerability may obscure how multiple factors interact to increase health risks. For example, an older Indigenous adult experiencing homelessness and living with a chronic condition may face compounded risks during wildfires due to intersecting barriers that limit access to protection and care. For nurses, applying an intersectional perspective to care enables more accurate identification of at-risk populations and promotes a more equitable, informed response both during and after disaster events such as wildfires ([Kuran et al., 2020](#)).

Institutional and Systemic Vulnerability

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Wildfire impacts are not experienced equally across populations, as institutional and systemic vulnerabilities shape how risks are distributed and managed. *Institutional vulnerability* refers to gaps within governance, emergency response, and public health systems that limit effective preparedness and recovery (Papathoma-Köhle & Thaler, 2018). *Systemic vulnerability* reflects structural inequalities (e.g., poverty, racial marginalization, housing insecurity) that increase exposure and reduce resilience (Adger, 2006). Together, these interconnected factors highlight the need for more equitable, coordinated approaches to wildfire mitigation and responsiveness.

A study of wildfire governance in Southern Europe illustrated institutional vulnerability stemming from fragmented and uncoordinated policy frameworks. In Italy, for example, wildfire management responsibilities are dispersed across multiple agencies at varying scales, resulting in inconsistent legislation and a sense of reliance on reactive emergency responses rather than a coordinated, proactive risk reduction. This lack of streamlining of resources and accountability undermines preparedness efforts and has contributed to greater exposure to the detrimental effects both during and after wildfire events (Kirschner et al., 2023).

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Systemic vulnerability was evident in Ventura County, California among marginalized groups, such as non-English speakers, low-income residents, and communities of color, who faced greater wildfire risk due to structural barriers like poverty, limited transportation, and exclusion from emergency planning. These intersecting disadvantages reduced their ability to prepare for, respond to, and recover from wildfire events (Baker et al., 2024). Intersecting forms of vulnerability underscore the urgent need for proactive, equity-focused nursing interventions.

Implications for Nursing Practice: A Call to Action

Nurses play a vital role in addressing the health risks of wildfires through education, direct care, advocacy, and interprofessional collaboration. The following list outlines actionable responsibilities for nursing professionals across settings. Following that Table 6 offers additional details about nursing interventions to improve air quality.

- Educate patients and communities about wildfire-related health risks and prevention strategies.** Nurses must provide clear, age-appropriate, and culturally sensitive guidance on health impacts of smoke exposure. This includes interpreting and explaining the Air Quality Index (AQI) and encouraging behavior change during periods of poor air quality (Fauteux & Simon, 2024; Gaudreau et al., 2024; Kloster, 2024).
- Engage across all phases of disaster management, to include mitigation, preparedness, response, and recovery.** Nurses should actively consult evidence-based resources (e.g., U.S. Department of Health and Human Services, U.S. EPA, for nurses in the United States have) to guide their practice and participate in local emergency response planning efforts (Barria, 2019).
- Identify and support high-risk populations with tailored interventions.** Vulnerable groups include older adults, pregnant people, children, those with respiratory or mental health conditions, outdoor workers, and members of marginalized communities. Nurses must recognize these disparities and provide equitable, targeted support. Nurses must also evaluate the presence of multiple vulnerabilities among individuals and within communities (Haymond & Jesrani, 2022).
- Recognize and address the mental health impacts of wildfires.** Nurses should assess for signs of PTSD, anxiety, depression, and climate-related distress, especially in children and those with preexisting mental health conditions. Trauma-informed care and timely mental health referrals are essential (Fadadu et al., 2024; Holm et al., 2021; Oerther et al., 2024; To et al., 2021).
- Promote preparedness planning at the individual and household level.** Nurses should educate patients about assembling emergency kits, developing evacuation plans, and creating “clean rooms” to reduce indoor smoke exposure. It is also important to acknowledge barriers to implementation (Centers for Disease Control and Prevention [CDC], 2024; EPA, 2025d).
- Implement harm reduction strategies during wildfire events.** Patients should be encouraged to monitor real-time air quality alerts using mobile applications (e.g., Federal Emergency Management Agency [FEMA] app) and reduce indoor pollution by avoiding activities that increase particulates (CDC, 2024; U.S. Department of Energy, 2023).
- Incorporate occupational and environmental health principles into nursing care.** Nurses should counsel outdoor workers and advocate for workplace protections (e.g., rest breaks, masks, relocation when possible), while integrating exposure screening into routine assessments and electronic record documentation (Holm et al., 2021; Zhang et al., 2024).

- **Advance public health and policy advocacy.** Nurses must advocate for systemic changes that promote health equity, including access to clean air, safe housing, school-based protections, and healthcare infrastructure. School nurses, in particular, can lead efforts to improve indoor air quality in educational settings ([EPA, 2026](#); [Fauteux & Simon, 2024](#)).
- **Support innovation in nursing education and climate-health integration.** Nursing schools and health systems should embed climate-related health competencies into curricula, professional development, and clinical guidelines to ensure that future nurses are prepared to address environmental health threats ([Gaudreau et al., 2024](#)).

Table 6. Nursing Interventions to Improve Air Quality During Wildfires

Category	Nursing Interventions		Purpose	Timing
Education & Communication	Disseminate wildfire smoke safety info via hotline, SMS, social media, community partners	Increase awareness; empower patients in emergency planning	Before, during, and after wildfire season	
Air Filtration Support	Distribute air purifiers to vulnerable patients and educate on use	Reduce indoor particulate matter exposure	Before and during wildfire season	
Protective Equipment Distribution	Provide N95 masks and educate on proper use	Protect respiratory health from smoke particles	Before and during events	
Access to Clean Air Spaces	Connect patients to cleaner air shelters and council on creating clean air rooms	Offer safe environments for high-risk individuals	During wildfire events	
Monitoring & Assessment	Use consumer-grade air quality monitors, assess for symptoms, address psychological impact	Track air quality and patient health status	Ongoing	
Remote Wellness Checks	Conduct virtual check-ins with vulnerable patients	Ensure continuity of care and early intervention	During and after wildfire events	
Medication Management	Ensure patients have access to rescue inhalers and other necessary medications	Prevent exacerbation of chronic conditions	Before and during wildfire season	
Community Engagement	Partner with community organizations to strategize, share resources, promote preparation, advocate for policy change	Expand reach and support for vulnerable populations	Ongoing	

([Americares, 2024](#))

Conclusion

As wildfires grow in frequency, duration, and severity, nurses and other healthcare professionals must be prepared to recognize, prevent, and respond to their wide-ranging health impacts. This requires comprehensive, evidence-based, and innovative interventions to reduce human suffering and promote population health. Nurses play a central role in assessing risk, educating patients and families, participating in research, and advocating for policies that address climate-related health threats. The profession must continue to develop and sustain climate-responsive practices that support adaptation and mitigation, transforming healthcare systems to better protect vulnerable communities ([Portela Dos Santos et al., 2023](#)). Addressing the social determinants of health through policy advocacy is vital, as wildfires represent a critical health equity issue. It is the responsibility of nurses to help close these gaps.

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