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CENTER FOR CLIMATE, HEALTH, AND THE GLOBAL ENVIRONMENT

Climate Resilience for Frontline Clinics Toolkit

Module for

Wildfire and Smoke

in collaboration with

americares

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How To Use This Toolkit

The Climate Resilience for Frontline Clinics Toolkit includes a wide variety of resources for several different hazards. There is more material here than anyone has time to read in one sitting. The following suggestions may help you make the best use of these resources. These suggestions are based on feedback, focus groups, and interviews with frontline clinic staff that implemented earlier versions of these toolkit materials.

Designate a weather resilience lead

Designate one person at your facility as a weather resilience lead. This person can:

- Take the time to review these documents in detail.
- Identify which materials will be most useful to colleagues in different parts of the organization.
- Track imminent weather threats.
- Sign up for and receive alerts from various systems, if desired.

See **Critical Roles and Responsibilities** for more details.

Identify your clinical engagement strategy

Set up a meeting with members of your healthcare team to determine how you would like to use the clinical and patient facing resources at your facility. Frontline clinics that participated in the development of these resources use them in several different ways, including the following:

- Educating clinicians on the impacts of climate hazards and approaches they can use when counseling patients.
- Making sure printouts of patient facing materials are easily accessible alongside other counseling materials that are used in the clinic.
- Adding patient facing materials to electronic after-visit summary documents so that it is easy to distribute these materials along with other parts of the after-visit summary.
- Printing out patient-facing materials and leaving them in a prominent location in the waiting room.
- Conducting education sessions on the contents of this toolkit for staff, administrators, or patients.
- Assign a specific member of the healthcare team to ask patients about relevant hazards and provide educational materials. This could include roles such as nurses, doctors, social workers, pharmacists, community health workers, and others.

Tailor these resources to the needs of your institution

In some cases, it may be desirable to modify details in these toolkit resources to meet specific needs at your organization or to reflect your local situation. Examples of this could include:

- Adding more detailed information about how to reach local authorities.
- Providing information about specific city, county, or state level resources.
- Providing information about specific policies and practices at your institution.
- Providing information about resources in your community, such as how to find cooling centers available in your city or town.

The easiest way to do this is to modify the provided **Documentation Templates**, which you can import into after-visit summaries for your patients.

Alternatively, you may find it helpful to make a separate flyer with a list of local resources and phone numbers to accompany the materials from this toolkit.

Integrate resources into your electronic health record system

You may find it helpful to integrate resources into your electronic health record system.

- You are welcome to include the attached PDFs and content in after-visit summaries, or to link to them from internal institutional reference documents or databases.
- We have provided a set of documentation templates that you can easily import into your electronic health record system.
- If you need more advanced integration support, such as creating templates of these materials within your electronic health record system, we may be able to help provide the content in a compatible format. Please contact our team for more information.

Share your experience and ideas

Many of the clinics that helped develop these materials found it helpful to share ideas and learn from each other about how they used the toolkit resources. If you have insights or experiences to share, please contact our team. In some cases, your contributions may be shared with other clinics or healthcare workers, with credit to you and your institution if desired. Examples of what you might share include:

- A description of how you have been using a specific resource in the toolkit.
- An anecdote about a climate hazard that you have dealt with successfully.

Conduct periodic reassessments

It may be beneficial to periodically reassess your climate resilience activities. Consider doing this:

- Annually in late fall, after the risk of climate hazards has decreased.
- After specific climate-related events, such as a hurricane or heatwaves, to review and learn from the experience.

Notes:

Wildfire Action Plan and Tip Sheet

For Patients

Use this plan and tip sheet to stay safe if there are wildfires near where you live. Review this information every year so that everyone is ready to act when there is wildfire smoke.

Wildfires are dangerous to your health

In addition to burns and injuries, they can lead to disruptions in normal medical care and access to medications.

Wildfire smoke is also dangerous to your health

Wildfire smoke increases the risk of lung problems, heart problems, and other health problems. It is particularly dangerous if you have ongoing health issues such as asthma, COPD, or heart or blood vessel disease. If you are affected by wildfires, you are likely to be exposed to smoke as well - see the **Wildfire Smoke Action Plan and Tip Sheet** for more information on how to protect yourself from smoke.

Before a wildfire

Protect your home from wildfires in advance by creating "defensible space" and "hardening your home"

Defensible space is the buffer you create between your home and the grass, trees, shrubs, or other items around it that can catch fire. This space can slow the spread of wildfire and gives firefighters a safer area to work. You can create defensible space around your home by removing any flammable material around the house. Other steps can be found at: bit.ly/wildfire-defensible-space.

You can also harden your home, which are changes you can make to the materials or structure to make it more resistant to fires. Find tips here: https://readyforwildfire.org/prepare-for-wildfire/hardening-your-home/

Sign up for emergency alerts which you can get to your cell phone or email

You can sign up for emergency alerts at NIXLE.

For general information on alerts: Emergency Alerts | Ready.gov

If you have a car or generator, make sure the fuel is full

Consider keeping your car out of the garage in case the door does not open to evacuate.

Know your evacuation route, how you will evacuate from wildfires, and where you will go

My evacuation route is: _____

My plan is to go to: _____

Keep copies of important documents ready and safe from wildfires

This includes insurance policies, medication lists, and birth certificates.

Have an emergency "grab and go" kit and a "stay at home" kit ready

In the **Building an Emergency Kit** sheet, you can find more information on what to pack in case of evacuating from a wildfire. Keep everything together, in a single bag, so you can easily grab it to go. You should also prepare a "stay at home" kit if you need to shelter in place with supplies for a week.

Plan for power outages

- Back up **medical equipment that needs electricity or batteries**.
- Have a backup cooler with ice for **medications that require refrigeration** and a thermometer to check the temperature inside the cooler.
- If you get water from a well with an electric pump, have a backup plan to have enough water to drink if the power goes out.
    - **My backup plan for drinking water is:** _____
- If heat or air conditioning is not working, **consider going where heat or air conditioning is available**.
- See more information on the general **Plan for Power Outages** sheet.

Look into your local community emergency response team (CERT) and think about signing up to volunteer to prepare yourself and your community for emergencies

Even if you do not sign up, there may be resources to help in disasters https://community.fema.gov/PreparednessCommunity/s/welcome-to-cert?language=en_

During a wildfire

Have a plan for evacuation and know who you can contact for help

Pay attention to local media outlets for evacuation orders. Know how to get out of your house - where the exits are and what windows can be opened.

Identify an emergency contact for everyone in your household to call.

My emergency contact person is: _____

Their phone number is: _____

Identify a preferred and backup evacuation location that has power if you need it. If possible, these two locations should be in different directions from where you live.

My evacuation locations are:

1. _____

2. _____

If I need to evacuate, the vehicle/transport I will use is: _____

If I need help evacuating, I can call:

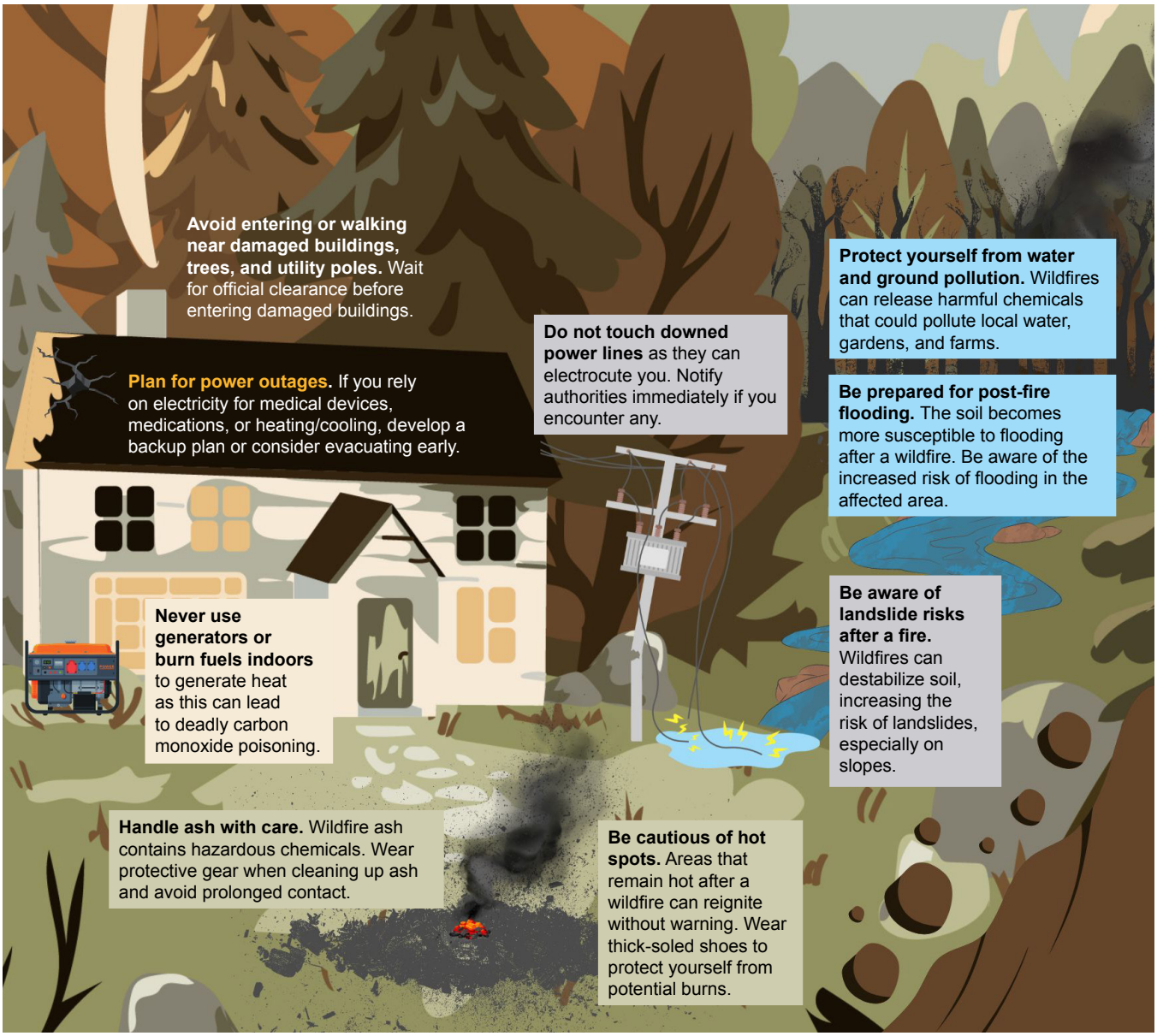
Name	**Phone**
1. _____	_____
2. _____	_____

Understand the risks to your health from ongoing fires

Fires can result in burns, as well as injury from collapsing buildings and structures, falls, and car accidents as people evacuate. Maps of current fires and wildfire smoke can be found at fire.airnow.gov. Smoke forecasts can be found at NOAA-HRRR (click the eye icon next to Near Surface Smoke, then click the play button at the bottom of the screen).

After a wildfire

Know the risks to your health after wildfires and how to minimize them



Notes:

Wildfire Smoke Action Plan and Tip Sheet

For Patients

Use this plan and tips to stay safe if wildfire smoke is in the air around you. Share this plan with everyone in your home and with friends and family members. Review this information every year so that everyone is ready to act when there is wildfire smoke.

Wildfire smoke is dangerous to your health

Wildfire smoke increases the risk of lung problems, heart problems, and other health problems. It is particularly dangerous if you have ongoing health issues such as asthma, COPD, or heart or blood vessel disease.

Before wildfire smoke

- Be aware that being outside when there is smoke may pose a health risk.
- Wildfires and wildfire smoke can make the air dangerous to breathe.

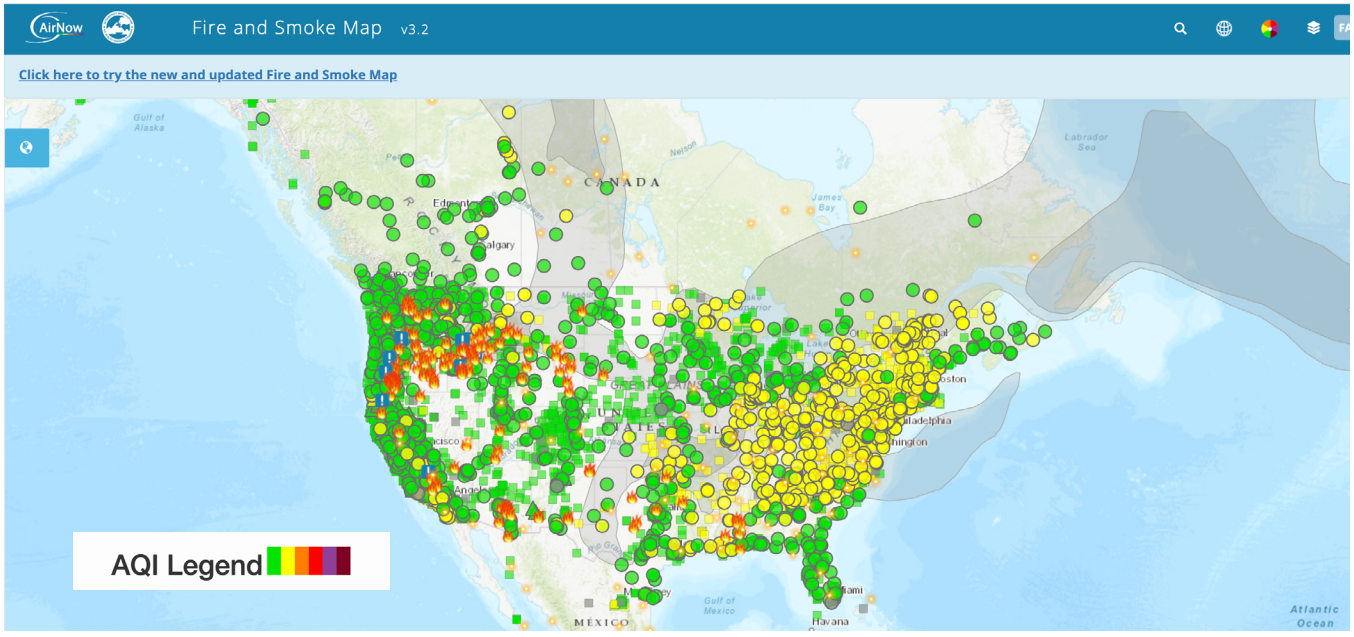
To know when the air outside may not be safe to breathe, I will check my local air quality at:

_____

Check for fires and wildfire smoke near you on your phone, computer, or local news or radio station. Most phone weather apps now include information on air quality.

You can also get information on wildfire location and smoke at fire.airnow.gov and NOAA-HRRR (click the eye icon next to Near Surface Smoke, then click the play button at the bottom of the screen).

The website will tell you how safe the air outside is to breathe by giving you an air quality index (AQI) number for your community.



When wildfire smoke is near where you live, or you can see smoke in the air, you may need to check every hour as air quality can change quickly.

Prepare your home for poor air quality.

- Learn how to seal indoor air and make or buy air cleaners. See the separate sheet on making an air filter.

Understand which individuals may be more at risk from wildfire smoke

Wildfire smoke harms everyone's health, but certain individuals may be more at risk. You could be extra sensitive to smoke if you:

- have a breathing condition, such as asthma or COPD
- have heart diseases, such as heart failure
- have chronic renal disease
- are over 65-years-old or under 18-years-old
- work outdoors
- are pregnant - smoke can harm the fetus leading to preterm births and stillbirth

During wildfire smoke

Know what to do when the air outside is not safe.

- Most websites will tell you how safe the air outside is to breathe by giving you an air quality index (AQI) number. The higher the AQI number, the less safe the air is.
- You can check the AQI at airnow.gov and access visualized smoke forecasts at NOAA-HRRR (click the eye icon next to Near Surface Smoke, then click the play button at the bottom of the screen).
- Take the steps below to protect yourself when the air is not safe. Check with your healthcare provider for any additional precautions based on your own risks.

Understanding wildfire smoke air quality index (AQI)

AQI Levels	Good AQI: 0-50	Moderate AQI: 51-100	Unhealthy for Sensitive Groups AQI: 101-150	Unhealthy AQI: 151-200	Very Unhealthy - Hazardous AQI: 201+
AQI Level Descriptions:	**Air quality is good**	**The air quality is acceptable. However, there may be a risk for some people, particularly those sensitive to air pollution.**	Members of sensitive groups may experience health effects. The general public is less likely to be affected.	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.	Health alert: The risk of health effects is increased for everyone. Health warning of emergency conditions: everyone is more likely to be affected.
Visibility & Smell For particulate pollution, such as smoke, if you do not have access to AQI information, you can estimate based on visibility to landmarks.	No smell or visible signs of pollution Visibility: 11+ miles	Light haze, no smell Visibility: 10- 5 miles	Visible haze, minor smell Visibility: 3 - 5 miles	Significant haze or change in sunlight and smell Visibility: 1 - 2 miles	Major haze or change in sunlight and strong smell Visibility: <1 mile
Activity [Sensitive Groups] People with heart or lung diseases, 65+ years old, children and teenagers, pregnant people, minority populations, and outdoor workers.	No restrictions	Consider making outdoor activities shorter and less intense. Watch for health-related symptoms.	Limit time spent outdoors and reduce physical activity. Watch for health-related symptoms.	Avoid the outdoors and physical activity. Use an N95 mask if outdoors.	Avoid the outdoors and reduce physical activity. Use an N95 mask if outdoors.
Activity [Non-sensitive Groups]: Individuals who are normally resistant to short-term effects of smoke and do not fall under any of the sensitive group categories.	No restrictions			Reduce long or intense activities. Take more breaks during outdoor activities.	

Adapted from:

Air quality Guide for Particle Pollution, August 2015, EPA-456/F-15-005 (airnow.gov)

AQMD - AB 661 AQI Chart (General Public Rebrand) - SMAQMD-0122-12 - V10 - PROOF (airquality.org)

NM-Tracking - Fires, Smoke and Health

When the air outside is dangerous, keep the air inside your home as clean as possible

Reduce indoor air pollution sources

Close windows.	Reduce cooking indoors.	Do not smoke or burn firewood, candles or incense.	Avoid vacuuming.

- Do not smoke, or burn firewood, candles, or incense or vacuum.
- Cooking stoves, especially gas cooking stoves, release air pollution. If you have an exhaust vent, use it when cooking.
- If you do not have an exhaust vent, **try to not cook with the stove or oven if the AQI is above 100 (or above 50 if you have asthma or COPD).**
- **Use indoor air cleaners to remove dangerous smoke particles from the air.** The information sheet on air cleaners has more information about these devices, including links to directions on how to make improvised air cleaners if you are unable to get a commercial air cleaner.

When the air outside is dangerous, wear a respirator, not a cloth mask.

Wear the right mask to protect yourself from wildfire smoke

Wildfire smoke has tiny, harmful particles that can damage your lungs and heart if you inhale enough of them.

Wear an N95 or P100 respirator mask to best protect yourself. These masks filter out at least 95% (N95) or 99% (P100) of these harmful particles.

Do not use cloth or surgical masks. They won't protect you from wildfire smoke because they can't filter out these tiny particles.

- Only masks labeled N95 or P100 will effectively filter wildfire smoke.
- The masks come in different sizes and must fit well to filter pollution.
- Children over about 7 years old can wear a small or extra small N95/P100 mask.
- Adults usually wear a small or “regular” size.
- Children younger than 2 years of age should not wear a respirator or mask.
- Respirators should be thrown away when they get visibly dirty.

For more instructions on how to put on a respirator visit bit.ly/cdc_n95.

For more information on respirators, visit: https://www.epa.gov/sites/default/files/2018-11/documents/respiratory_protection-no-niosh-5081.pdf

Notes:

All About Air Purifiers

For Patients

Learn how to seal indoor air and make or buy air cleaners before you experience wildfire smoke or poor outdoor air quality.

If a home has a forced air system (i.e., air gets blown into rooms through vents like an HVAC), it may have air filters. These should be changed regularly and be MERV 13 or higher. HVAC systems only filter air when they are on and can clean the whole house.

Portable air cleaners, however, are designed for use in individual rooms. **Air cleaners**, also known as air purifiers or sanitizers, typically come with either a MERV (minimum efficiency reporting value) rating or are HEPA certified. Ideally, people will have an air cleaner with a MERV rating of at least 13, which should remove at least 60% of particulate matter 2.5 microns in diameter or smaller. HEPA filters should remove even more.

To make an affordable and effective **indoor air cleaner**, you can use a box fan and air filters bought from a hardware store or ordered online. Follow the instructions below.

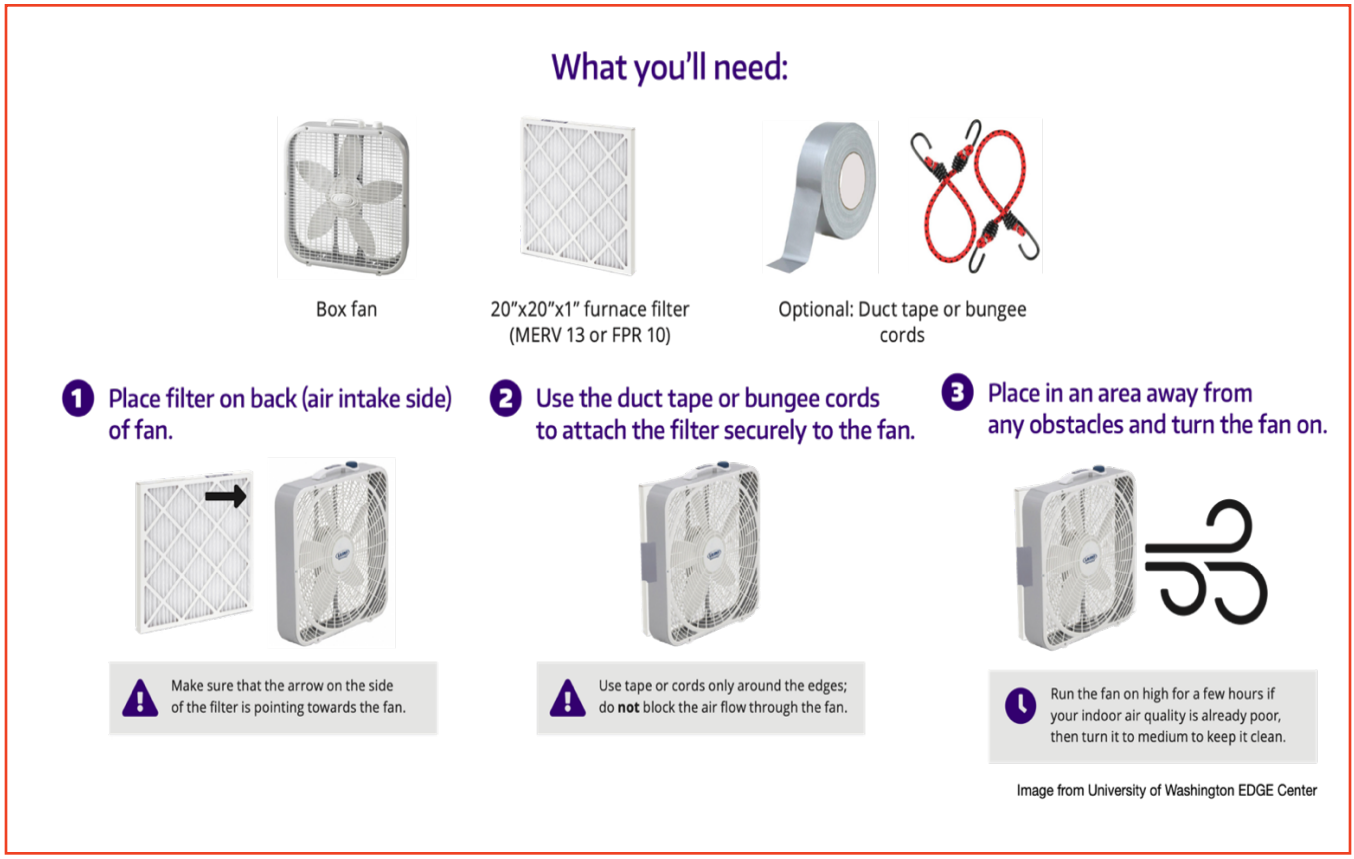
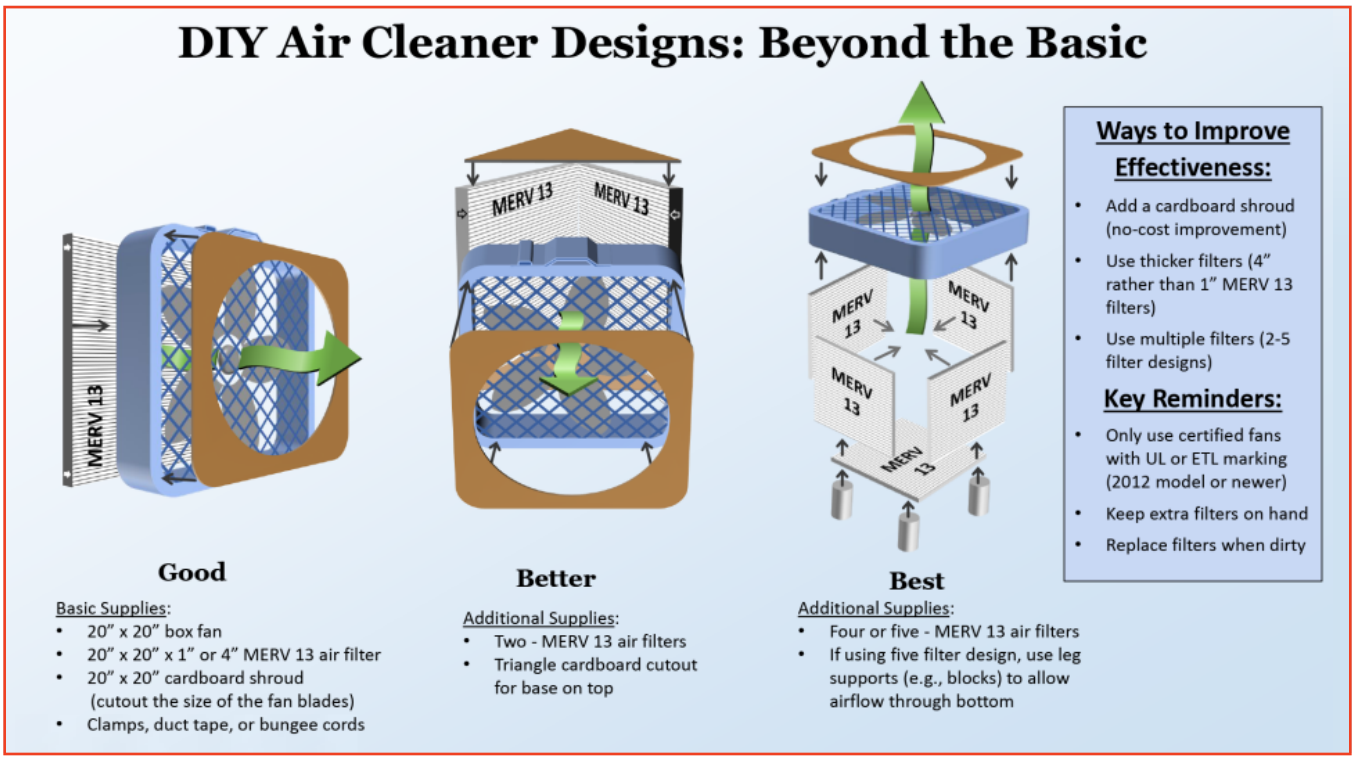


Image from University of Washington EDGE Center

You can create an improved air filtration device (called a Corsi-Rosenthal Box) using five filter squares and a box fan. Directions on how to do so can be found at https://www.epa.gov/air-research/research-diy-air-cleaners-reduce-wildfire-smoke-indoors



If you keep your windows and doors closed and use an indoor air filter, you can **create a clean room in your home.** To learn more about clean rooms that protect you from wildfire smoke and how to make one, visit bit.ly/create_clean_room. Ideally the filter should be MERV 13 or greater.

Notes:

Image: US EPA

Helping Patients Establish a Wildfire/ Wildfire Smoke Action Plan

For Providers

Wildfire frequency and intensity is increasing, with more wide-reaching health impacts from the smoke, including increases in respiratory disease, emergency department visits, and hospitalizations, particularly for populations most at-risk from exposure.

Below is anticipatory guidance to help you prepare for conversations with your patients that will inform completion of the **Wildfire Action Plan and Tip Sheet** *and the* **Wildfire Smoke Action Plan and Tip Sheet** *included in this toolkit.*

Before a wildfire

Make sure they know the risks of wildfires and wildfire smoke

Ask: Do you know the risks to your health from wildfires and wildfire smoke?

Discuss with your patient how wildfires may affect their health. You can find information to discuss in the **Wildfires and Health** document and local risks here: https://wildfirerisk.org/explore

Assess if and how they access weather, wildfire, wildfire smoke and air quality index (AQI) reports

Ask: Do you know how to learn whether there is a fire or smoke near where you live?

If patients do not know how to access wildfire and wildfire smoke information, you can suggest their phone weather app, their local news television station or fire.airnow.gov. If able, you can show them how to access forecast visualization data at NOAA-HRRR (click the eye icon next to Near Surface Smoke, then click the play button at the bottom of the screen).

There are now **low-cost sensors** that allow people to monitor air in their homes and communities. The EPA has resources available here on low-cost sensors https://www.epa.gov/air-sensor-toolbox and examples of use in communities are here: https://www.cleanairmethow.org/get-involved.

For more detailed instructions, you can provide the **Wildfire Action Plan and Tip Sheet** handout.

Assess the home environment for indoor air pollution sources

In guidance about actions to take in the event of wildfire smoke or elevated AQI, consider whether a patient may be exposed to high levels of indoor air pollution such as through tobacco smoke, wood fires, candles, incense, or cleaning products as well as vacuuming. Cooking can also release air pollutants, especially cooking with a gas stove top. Exhaust hoods for stoves should be used if available.

If a patient's home has a **forced air system** (i.e., air gets blown into rooms through vents), this may increase the delivery of outdoor air pollution indoors, even with air filtration. If the AQI is over 50, closing windows may help prevent outdoor air pollution getting inside, but this may also increase heat exposure, especially if no air conditioning is available.

Some patients may have **portable air cleaners**. If there is a medical necessity, a provider may be able to prescribe an air cleaner and potentially have it reimbursed by insurance. Portable air cleaners have a wide range of capabilities in removing air pollutants. The unit should be the right size for the square footage of the room it operates in.

Air cleaners typically come with either a MERV (minimum efficiency reporting value) rating or are HEPA certified. Ideally, patients will have an air filter with a MERV rating of at least 13, which should remove at least 60% of particulate matter 2.5 microns in diameter or smaller. HEPA filters should remove even more. You can also assess the Clean Air Delivery Rate (CADR), a measure of the efficiency of cleaning the air, with higher indicating more efficient cleaning.

Patients can also create improvised air cleaners suitable for short-term use with materials available at local hardware stores.

Patients can also create a **clean air room** by keeping windows and doors closed in a room and using an air cleaner. These are all described further on the **All About Air Purifiers** sheet.

Ask: Do you use an air cleaner in your home? If so, what kind is it and where does it sit?

Ask: Have you signed up for emergency alerts?

One option is to sign up for https://local.nixle.com/register/ or you can advise on other local alert options.

During a wildfire

Make a plan for each AQI level based on a patient's health status and indoor air quality

You can review the **Wildfire Action Plan and Tip Sheet** together with your patients and complete section 2 based upon the patient's health status and life circumstances.

Here is additional information on activities for different groups based on the AQI: https://www.airquality.org/Communications/Documents/AB%20661%20AQI%20Chart%20General%20Public%20Rebrand%20-%20FINAL.pdf

Options for a provider to select for a patient on the action plan include:

- safe to be outdoors (for AQI<50)
- limit time outdoors to no more than a few hours per day
- try to stay indoors until the air is safer
- keep windows and doors closed
- use an indoor air filter
- wear an N95, or P100 mask, especially outdoors
- stay in a clean air room
- evacuate to a location with better air quality

On the action plan, for each AQI range (e.g., 0-50, 51-100, etc.), you can select the actions you deem most appropriate based upon your knowledge of an individual patients' medical conditions, access to a clean air room, ability to evacuate, and other factors. More guidance on choosing appropriate actions can be found in the accompanying toolkit document titled **Wildfires and Health**.

Determine their likelihood of following an evacuation order and help them develop an evacuation plan

Ask: If there was an evacuation order, how likely would you be to evacuate?

For individuals who are unwilling to evacuate, especially individuals with chronic medical conditions or who rely on oxygen at home, reviewing the risks from wildfire and wildfire smoke (see **Wildfire Action Plan and Tip Sheet**) may help motivate them to evacuate when necessary.

Establishing a plan before an imminent threat from fire occurs can be lifesaving, especially if a patient requires assistance to evacuate. We encourage you to complete the **Wildfire Action Plan and Tip Sheet** with patients. You can find resources available at ready.gov to help establish plans.

> **Ask:** If you need to evacuate, where will you go?
>
> **Ask:** If you need to evacuate, how will you do so? Will you need help to evacuate? If so, who will you call?
>
> If a high-risk patient will not have the needed assistance to evacuate, a provider can ask permission to share the patient's contact information with local emergency managers.

After a wildfire

Advise them to make sure their home is safe to enter, and patients know the health risks after wildfires

> **Ask:** Do you know the risks to your health after a wildfire?
>
> Help your patient identify their health risks after wildfires. You can find information to discuss in the **Wildfires and Health** document.

Check in with your patients about control of long-term medical conditions and any mental health concerns after wildfires

The time after a wildfire can be particularly stressful, with patients experiencing exacerbations of chronic disease and issues accessing clean food, water, and shelter. Particularly for your higher risk patients with medical comorbidities or living with mobility issues, proactively check in on patients.

> **Ask:** How is your health doing after the wildfire? Do you have access to all the things you need- like food, water, shelter?
>
> There can also be significant mental health stresses after a wildfire, and it is important to bring it up and offer any local resources.
>
> **Ask:** How is your mental health after the wildfire? Do you have all the resources you need?

Notes:

Wildfires and Health

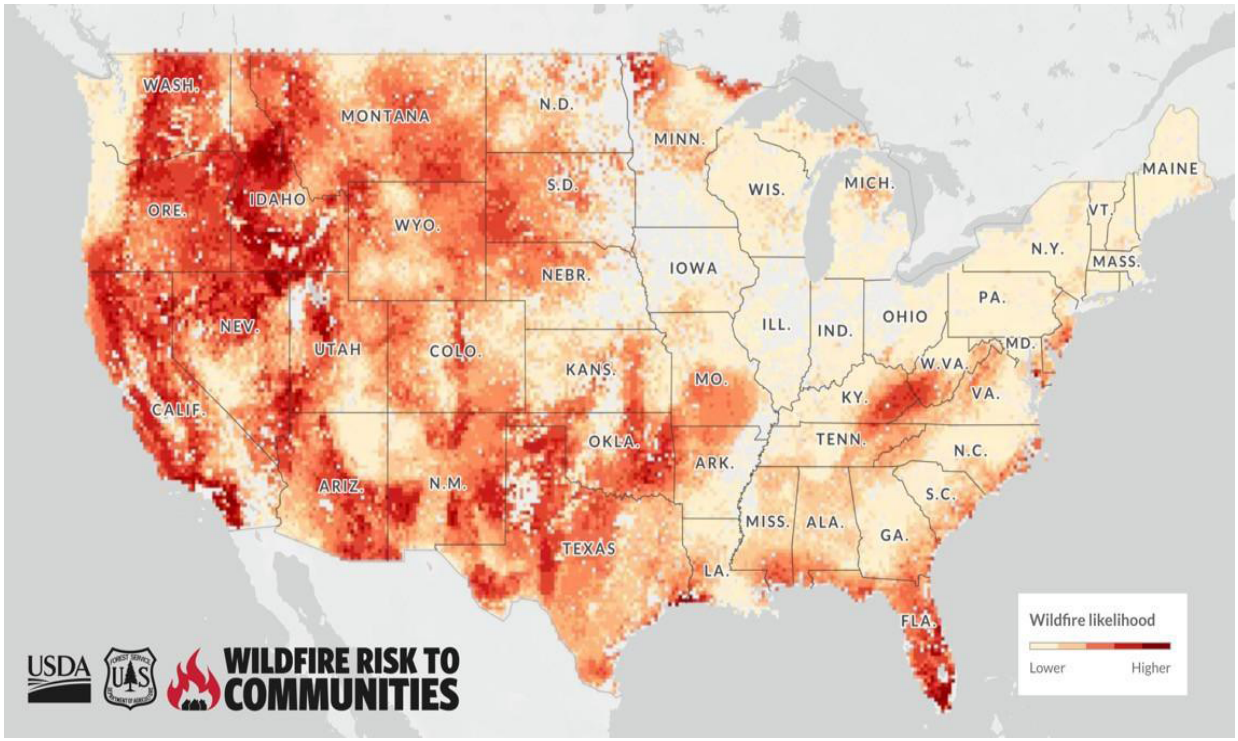
For Providers

This sheet is an overview on wildfires and wildfire smoke providing background on how wildfires impact health and how providers can help patients prepare.

Wildfires and climate change

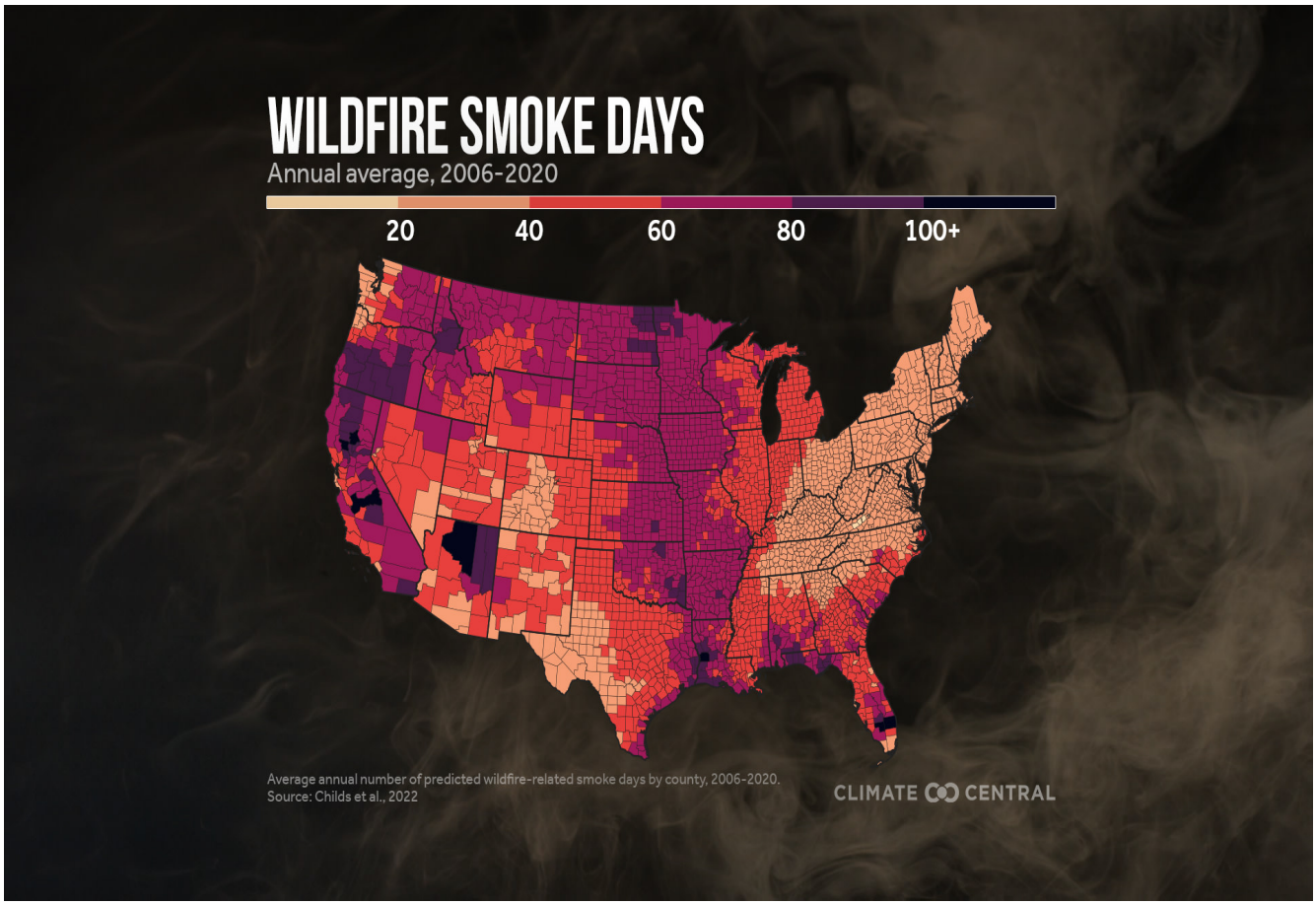
Wildfires and wildfire smoke have many effects on health, especially for individuals with certain chronic medical conditions, such as heart disease, chronic respiratory diseases (e.g., COPD and asthma), and neurodegenerative diseases (e.g., Alzheimer's and Parkinson's). Additionally, wildfires have adverse impacts during pregnancy, with increased incidence of preterm birth and low birthweight infants.

Historically, wildfires and wildfire smoke were contained to certain western states. However, due to climate change, many more regions of the country are increasingly at risk, with increasing chances of large wildfires. The map below shows where wildfires are likely to occur in the U.S. based upon where they have occurred over the past few decades. By mid-century, climate change is expected to increase the chances that a very large fire occurs in places such as Montana, the upper Midwest, and parts of the southern U.S.



Climate change has raised temperatures and lengthened the fire season; wildfire frequency and severity have increased every decade since the 1970s. Wildfires are complex events, influenced by many factors, including forest management and land development. Increasing populations are at risk from wildfires due to a combination of population growth, development at the urban-wildland interface, and climate change.

In addition to the increasing risk of large fires, there is also an increasing risk related to wildfire smoke across the United States. The map below shows that wildfire smoke has far-reaching impacts, affecting people far away from the fires themselves, with every county in the contiguous United States experiencing at least 16 days of poor air quality due to wildfires each year. Over 60% of wildfire smoke experienced in the Midwest and Northeast has come from Canadian wildfires. Wildfire smoke exposure is increasing over time but also varies widely from year to year; per capita smoke exposure in 2023 was more than double that of 2020.[1]



Although large landscape fires occur mostly in the West, the majority of smoke-attributable morbidity and mortality occurs in the Eastern US, due to the higher population.[2] Most smoke-related asthma morbidity occurs in the spring and summer.[2]

Prescribed or controlled burns

In certain areas with high risks of wildfires, there will be prescribed or controlled burns that are lit intentionally in carefully monitored conditions to allow the fire to consume some of the leaves and branches and other smaller trees to prevent severe wildfires. These are carefully controlled to improve forest resilience and by checking weather to send smoke away from communities, although there may be some smaller amounts of smoke for shorter times than uncontrolled large fires.3 It can be helpful to understand how these burns are planned and timed, and how they can reduce future wildfire risk; for example, the City of Ashland in Oregon has an Ashland Forest Resiliency Stewardship Project that is a collaborative forest restoration project that uses controlled burns and thinning overcrowded forests to reduce the risks of severe wildfire.

Wildfire smoke exposure risks

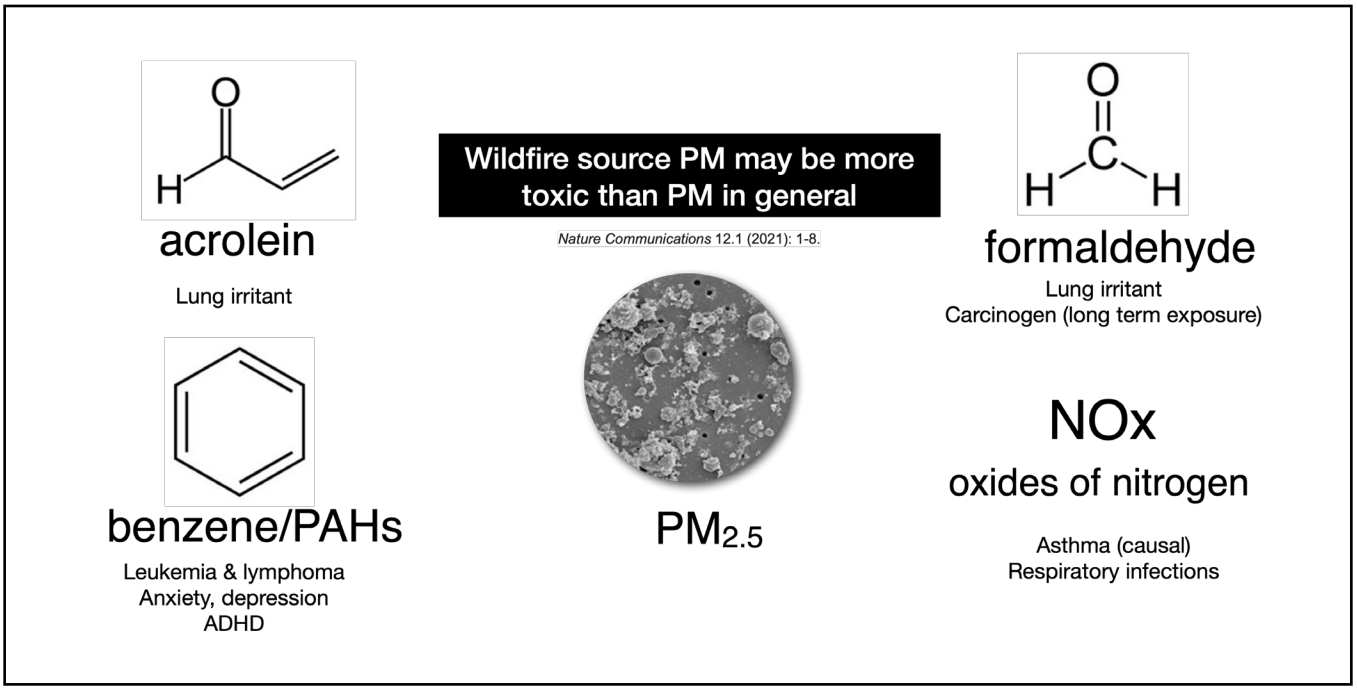
Wildfire smoke

Smoke is the most pervasive human health risk from wildfires. Wildfire smoke contains many harmful substances. In the United States, wildfire-$PM_{2.5}$ causes an estimated 6,300 deaths and between 1,300 and 5,900 ED visits per year. Because of increased population density, wildfire-$PM_{2.5}$ causes a higher number of deaths in the eastern United States than the West, despite more large landscape fires in the West. Wildfire- related hazardous air pollutants, such as acrolein and formaldehyde, are estimated to cause 309 disability-adjusted life years annually.[4] Wildfire smoke has also been shown to be enriched in heavy metals, especially when wildfires impact structures.[5]

Patient case

A 13-year-old female with asthma presents to your clinic with her mother requesting a refill of her inhaler. The mother notes that her daughter has been going through inhalers more frequently and wonders if it has to do with smoke from wildfires in an adjacent state. They live in a two-bedroom apartment in an older building that does not have central air, and air cleaner, or air conditioning.

How would you counsel the patient and her mother regarding the relationship between the wildfire smoke exposure and her asthma, and what actions would you suggest they take?



Several studies have identified wildfires as a more toxic source of particulate matter than other sources, although dependent on many factors. Wildfire smoke harms everyone's health, but certain individuals may be especially at risk.

Populations at increased risk from wildfire smoke exposure

Condition/individual with greater sensitivity to smoke exposure	Potential health effects from wildfire smoke exposure
Asthma, COPD, and other chronic respiratory diseases	Respiratory symptoms including breathing difficulties (e.g., coughing, wheezing, and chest tightness). Greater medication usage, emergency department visits, and hospital admissions.[6,7,8]
Cardiovascular disease (CVD)	Ischemic events; worsening of heart failure; or arrhythmias. Excess emergency department visits, hospital admissions, and even death from CVD.[9,10]
Children	Coughing, wheezing, difficulty breathing, chest tightness, decreased lung function, pneumonia.[11]
Chronic kidney disease	Excess same-day mortality for dialysis patients.[12] Decreased renal function and progression to end-stage renal disease.[13]
Low wealth individuals	Greater smoke exposure as well as lesser access to exposure reducing measures (e.g., air filtration) and healthcare.[14]
Older adults	Increased vulnerability to smoke effects, and therefore higher rates of healthcare utilization and mortality, due to higher prevalence of chronic medical conditions.[6]
Outdoor workers	Increased vulnerability to smoke effects due to extended periods of time exposed to high concentrations of wildfire smoke, possibly without adequate protection.
Pregnancy	Heat exposure increases risk of poor birth outcomes including low birth weight and preterm birth.[15,16]

Adapted from https://www.epa.gov/wildfire-smoke-course/which-populations-experience-greater-risks-adverse-health-effects-resulting

Racial inequities have been documented in wildfire-$PM_{2.5}$ exposure and health effects. A study of 5 million Medicare enrollees in the western U.S. found that Black American enrollees were more likely to be exposed to high levels of wildfire-$PM_{2.5}$ and had higher rates of hospital admission.[13,16] These discrepancies may result from variability in health status, occupational exposures, indoor air quality, and access to other protective measures.

Wildfire event risks

Flames

Fires can result in thermal burns, as well as physical trauma from falls, collapsing infrastructure, and auto accidents during evacuation. Real-time maps of fires and smoke plumes can be found from either AirNow, NOAA-HRRR (click the eye icon next to near surface smoke, then click the play button at the bottom of the screen), or the Incident Information System.

Ground and water pollution

Hazardous chemicals within buildings and homes get mobilized by heat and fire into air, water (including private drinking wells), and soil. They are also spread in wildfire ash, which often covers surfaces in homes and agricultural fields. Ash can be irritating to the skin, eyes, and cause breathing problems and care should be taken to keep your environment clean from ash and use respirators to protect breathing. Additional information and guidance for patients is available from the CDPH here:

- Reduce exposure to ash when returning home after a fire
- How to protect your home garden from ash

The composition varies based upon the materials consumed in the fire and may contain heavy metals and toxic chemicals. Older buildings may contain asbestos and lead.

Landslides and flooding

Fires that burn vegetation, such as trees and shrubs, on hillsides can destabilize soil and increase landslide risk. Soil affected by fires is also more prone to subsequent flooding.

Power outages

Power outages may occur due to wildfire damage but are also sometimes planned to prevent wildfires; Public Safety Power Shutoffs in California are one example of this practice. Alerts from PG&E (the major electricity supplier in much of California) are available and can be accessed here; there may be other local alert options available depending on your electricity provider. People with certain electricity-dependent medical and mobility needs can sometimes sign up for programs to ensure priority reconnection to electricity or other support services during planned outages. This is important because power outages can result in electric medical devices (e.g., ventilators, nebulizers, infusion pumps) and electric water wells becoming inoperable. Additionally, medications needing refrigeration may be lost in a power outage; please see the medication guidance sheet for more information. For instance, although insulin should be refrigerated, FDA guidance for emergencies indicates insulin may be left unrefrigerated at a temperature between 59°F and 86°F for up to 28 days and continue to work.[18]

Additional health risks from wildfires

Fires pose additional health risks even after they are extinguished. Individuals returning home after wildfire should be aware of these potentially harmful exposures:

- Hot spots can occur when a small area of material remains hot after a fire. Even after fires stop burning, hot spots can flare up without warning. Shoes should have thick soles that are resistant to melting.
- Downed power lines can lead to electrocution.
- Burned trees and utility poles can become unstable and fall on people and property.
- Individuals experiencing power outages may try to heat homes or cook food by burning fuels (e.g., wood or propane) indoors resulting in carbon monoxide exposure.
- Ash and debris may contain hazardous materials and can cover surfaces and reduce air quality leading to irritation to skin and cause respiratory disease.

Patient case

A 74-year-old male with a history of osteoarthritis, obesity, hypertension, coronary artery disease, and limited mobility, who relies on an electric wheelchair to get around, visits your clinic asking for help refilling his medications. He recently lost his insurance and is staying with family in a house on the outskirts of town for the time being due to financial problems. He expresses concern about wildfires that have occurred in the area, and his fragile medical condition, dependence on his electric wheelchair, and concerns about being able to evacuate if wildfire were to break out near his current place of residence.

How would you suggest this patient go about preparing for wildfires in his area? What specific actions do suggest he take to help address this risk?

Wildfire action plans for patients

We recommend that you familiarize yourself with the **Wildfire Action Plan and Tip Sheet** provided in the toolkit and review it with any patient at risk of experiencing a wildfire. The document can be provided during care visits for adolescents and adults and can be the basis for a discussion around a wildfire action and evacuation plan, especially for patients particularly vulnerable to wildfire smoke (see Table above). Wildfire planning should be done before fire season in your locale. You can sign up for the Office of Climate Change and Health Equity's Climate and Health Outlook to anticipate climate risks like wildfires by emailing ocche@hhs.gov. Check with your local community about plans as well to align with local guidance and resources.

Anticipatory guidance for patients

Anticipatory guidance for wildfires may contribute to improved health outcomes. These strategies and resources are also covered in the accompanying patient-facing handout titled **Wildfire Action Plan and Tip Sheet** which we encourage you to share with at-risk patients. The information below provides additional detail on the strategies to prepare you for patient conversations.

To reduce risks from fire exposure:

1. **Create "defensible space" and "harden" the home**
   Defensible space is a buffer between a building and the grass, trees, shrubs, or any wildland area that surround it. This space is needed to slow or stop the spread of wildfire and helps protect buildings and homes from catching fire—either from embers, direct flame contact, or radiant heat. Proper defensible space also provides firefighters a safe area to work to defend the building.
   Defensible space can be created by removing flammable material, including shrubs and trees, next to the building to lessen the potential of flames reaching it. Other steps to create defensible space can be found at CAL FIRE.
   Hardening your home, are changes you can make to the materials or structure to make it more resistant to fires. Tips are available from CAL FIRE here: https://readyforwildfire.org/prepare-for-wildfire/hardening-your-home/

2. **Sign up for emergency alerts, such as at NIXLE**
   For general information on alerts: Emergency Alerts | Ready.gov.

3. Be prepared and evacuate when ordered to do so

Have an emergency "grab and go" kit to take with you and a "stay at home" kit ready to stay in place. See **Building an Emergency Kit** for more information on what to include.

Evacuation may be the best choice when wildfires or wildfire smoke are expected near a patient's home. Patients can be encouraged to pay attention to local media outlets for evacuation orders (e.g., through newscasts, social media, or automated alerts on a smart phone).

Responsiveness to evacuation alerts has been found to vary by age, gender, and other factors. Men and full-time residents may be more likely to want to stay and protect their property, whereas homes with children, older adults, pregnant people, individuals with health concerns, or part-time residents are more likely to evacuate early.

Providers can ask whether a patient would be willing to evacuate when asked to do so. For those individuals who are unwilling to evacuate, especially for individuals with chronic medical conditions or who rely on electronic devices such as ventilators, reviewing the risks from hurricanes and floods may be helpful to enabling evacuation to safety when necessary.

Providers should identify if their local jurisdiction has an emergency management program or other resources available for persons that would need assistance in evacuating. Connect high-risk patients who need assistance evacuating with available local resources, or see if they have a friend, family, or neighbor to call to assist.

Extensive, multilingual guidance on evacuation planning is available from FEMA.

Wildfires can spread quickly, and seemingly manageable conditions can deteriorate. See the evacuation planning section of **Wildfire Action Plan and Tip Sheet** for patient resources.

To reduce risks from smoke exposure:

1. Track air quality

AirNow provides both current fire-related air quality reports and forecasts for future air quality conditions. Most phone weather apps also include air quality information iv,v. For rural communities, leveraging smoke forecast data such as NOAA-HRRR (click the eye icon next to near surface smoke, then click the play button at the bottom of the screen) can provide more accurate information.

These sites and apps report the air quality index (AQI). The AQI is an integrated assessment of air quality based upon five pollutants (particulate matter (PM), ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide). The higher the number, the worse the air quality.

See the table below for more information on understanding AQI thresholds and alerts. You can learn more about how AQI is computed from AirNow.

Understanding wildfire smoke air quality index (AQI)					
AQI Levels	**Good** AQI: 0-50	**Moderate** AQI: 51-100	**Unhealthy for Sensitive Groups** AQI: 101-150	**Unhealthy** AQI: 151-200	**Very Unhealthy - Hazardous** AQI: 201+
AQI Level Descriptions:	Air quality is good	Air quality is acceptable. However, there may be a risk for some people, particularly those who are particularly sensitive to air pollution.	Members of sensitive groups may experience health effects. The general public is less likely to be affected.	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.	Health alert: The risk of health effects is increased for everyone. Health warning of emergency conditions: everyone is more likely to be affected.
Sensitive Groups: People with heart or lung diseases, 65+ years old, children and teenagers, pregnant people, minority populations, and outdoor workers.					

Adapted from:
Air quality Guide for Particle Pollution, August 2015, EPA-456/F-15-005 (airnow.gov)
AQMD - AB 661 AQI Chart (General Public Rebrand) - SMAQMD-0122-12 - V10 - PROOF (airquality.org)
NM-Tracking - Fires, Smoke and Health

2. Manage indoor air quality

To reduce exposure to air pollution indoors, several measures can be taken, including reducing introduction of outdoor air to the inside of the building, reducing indoor air pollution sources, and using air filters.

Ways to reduce wildfire smoke exposure

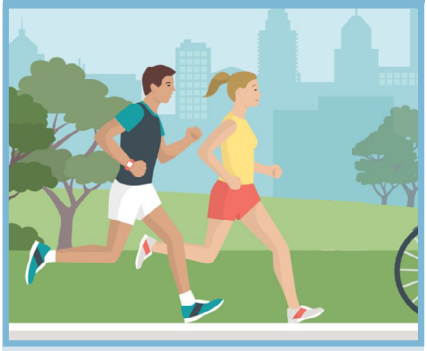
Avoid exposure

Seal home / air filtration / stay home

Reduce exposure

Wear N95 or go somewhere with cleaner air

Limit time outdoors



Do not exercise outdoors or open windows

These are actions that can reduce exposure to polluted air, including wildfire smoke. Providers should look for local resources for clean air shelters if they advise patients to leave their home for patients to go to.

Additional actions include:

a. Seal the home.
Minimizing polluted air from entering a home can reduce indoor exposure. Closing windows and doors to keep out wildfire smoke should only occur when the AQI is elevated (over 50), as typical indoor air can be more polluted than outdoor air.

For an AQI 50 - 150, decisions to close windows and doors should be made based upon an individual's health status, ability to comply with closing windows, and availability and adequacy of indoor air filtration.

For an AQI > 150, windows and doors should be closed in all homes.

As the AQI can change quickly, especially with rapidly changing fires or wind directions, decisions about trying to seal a home from outdoor air should be regularly re-evaluated.

Sealing a room may also require taping duct tape around windows and door frames.

Be aware that closing windows and doors and sealing the home could also make the home dangerously hot, which can be a more deadly risk to health. Providers should discuss with patients staying aware of the heat as well as the smoke and prioritize keeping the home cool.

b. Reduce indoor air pollution sources.
Indoor sources of air pollution should be minimized, especially for sensitive groups. Common sources of indoor air pollution include smoking, wood fires, candles, incense, and cleaning products as well as vacuuming.

Cooking can also release air pollutants, especially cooking with a gas stovetop. Natural gas stove tops, especially older ones, have been found to release many air toxins, including carbon monoxide, and oxides of nitrogen (which can cause flares of asthma and COPD).

Exhaust hoods for gas stove tops should be used if available. If they are not present or not vented outdoors (many hoods recirculate air back indoors), cooking on a gas stove top should be avoided. Ovens can also generate smoke that is released into a home and should be avoided during times or poor air quality. You can also use indoor air sensors to monitor the quality of the air inside your home.

Reduce indoor air pollution sources

Close windows.

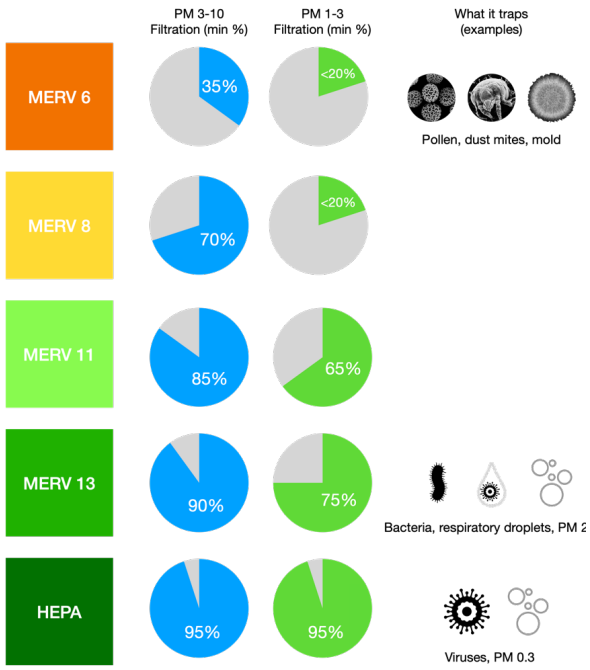
Reduce cooking indoors.

Do not smoke or burn firewood, candles or incense.

Avoid vacuuming.

c. Manage indoor air filtration

Homes with forced air heating and cooling typically have replaceable air filters in their air handlers. These filters are given a MERV (minimum efficiency reporting value) rating. The higher the rating, the better the filters work.



Only MERV 13 and higher, or a high efficiency particulate air (HEPA) filter, will substantially remove $PM_{2.5}$ (as well as bacteria and viruses attached to respiratory droplets). These are increasingly sold-out during wildfire smoke events, and it is not yet clear the health impacts of using a lesser rated filter. As you can see in the diagram, filters under MERV 13 are not as good for filtering particulate matter, particularly $PM_{2.5}$ associated with wildfire smoke.

Portable air cleaners, however, which are designed for use in individual rooms, may have HEPA filters. How well these filters reduce air particle concentrations depends on their size, the area to be cleaned, the filter efficiency (i.e., MERV rating), and the fan speed.

If medically necessary, providers may be able to prescribe air cleaners as durable medical equipment and check if it is reimbursable through Medicare Part B.

Low-cost portable air cleaners can be made with a box fan, a MERV filter (ideally MERV 13 or higher), and some bungee cords or tape (optional). A simple example of such a do-it-yourself filter can be found on the **All About Air Purifiers** sheet.

Patients can also create improvised air filters suitable for short-term use with materials available at most local hardware stores. Refer to the information sheet on air cleaners for more information.

d. Create clean rooms

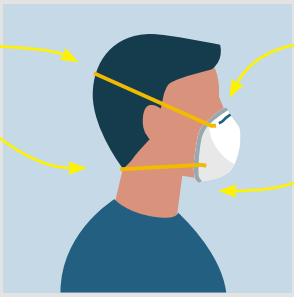
Creating a clean room in a home involves many of the steps above: 1) find a room that can fit all the people living in the home, 2) seal it by closing windows and doors, 3) filter the air using a built-in HVAC system or a portable air cleaner. Ideally clean rooms have air conditioning as well.

e. Wear respirators

- To filter wildfire smoke, respirators must be rated as N95 or P100, NOT cloth masks.
- Patients can be instructed on how to properly fit and wear respirators (see image below). Respirators come in small and regular sizes and, if properly fit, should collapse when a person breathes in.
- Children over ~7 years old can wear small or extra small N95//P100 masks. Adults typically wear “regular” or small sizes. Children <2 years old should not wear a mask.
- Respirators should be disposed of when dirty or when breathing through them becomes difficult.
- Respirators do not fully remove particulates and do not remove gaseous pollutants (e.g., oxides of nitrogen such as nitrogen dioxide or NO2). A clean room can provide better protection from wildfire smoke.

How to wear a respirator

One strap above and one strap below ears. Do not cross.



Fits over nose and under chin.

Pinch bar to shape of nose.

NIOSH with N95 or P100

Respirator should collapse as you breathe in and not let air in from the sides.

Notes:

Guidance and Checklist for Facility Repair and Re-Entry After Wildfires

For administrators

This sheet is an overview on wildfires and wildfire smoke providing background on how wildfires impact health and how providers can help patients prepare.

Wildfires pose serious hazards that can extensively damage healthcare facilities and make them unsafe to occupy without proper repairs and remediation. Even if flames do not directly burn clinic buildings, wildfire smoke and ash often contain toxic chemical residues that can permeate structures, coat surfaces, contaminate indoor air, and damage HVAC systems. The intense heat from nearby flames can also damage building materials and make structures unsound.

Fires frequently cause breakage of water pipes, fire sprinkler activations, and water valve malfunctions that can flood buildings. This promotes mold growth and can contaminate drinking water systems. Broken sewer lines may also create highly unsanitary conditions. The power outages that often occur during wildfires can spoil refrigerated medications and food and disrupt access to computer systems and electronic medical records.

Furthermore, the destruction of vegetation and topsoil in wildfire burn areas increases the risk of localized flooding around healthcare facilities and may increase the risk of landslides. Drinking water sources can also become polluted from the toxic runoff.

After a wildfire, do not enter your facility until a thorough professional safety inspection is completed. Even if no fire directly impacted the building, a careful assessment of structural integrity and testing for hazardous residues is essential before the clinic can be safely reoccupied. Expert inspections and remediation help identify any hidden structural damage as well as properly remove toxic wildfire ash and chemical traces deposited both inside and outside the building. Trying to reopen without these critical steps risks the health and safety of your staff and patients.

Key points of inspection for building structural integrity after fire damage:

- Roof
- Load bearing beams and walls
- Stucco, siding, and concrete
- Foundation cracks
- Structural metals
- Windows
- Interior walls and framing
- Damage to utilities (water, gas, electrical)

*Note: As of 2024, no best practice guidance exists for fire structural damage. FEMA recommends using the **post- earthquake safety evaluation of buildings** document in the interim (ATC-20-1).*

Awareness for smoke, ash, and chemical of buildings after fires

- Ash and other fire generated particulate matter can infiltrate a building during fires, even when windows and doors have been closed, through ventilation systems, gaps in window and door frames, or other openings in the building's exterior. Have the facility professionally assessed and cleaned as needed.
  - Fires may result in chemical exposure indoors from heated plastics, melted/damaged containers, (e.g., hazardous waste) that contain toxic substances (e.g., lead, mercury, cleaning products), and other sources. Building materials containing asbestos, fiberglass, and other irritants or toxins may be exposed by fire damage. Once the building has received structural safety clearance (if needed), use appropriate protection when entering the building.
  - Ash and other particulate matter can continue to settle after a fire has been extinguished. Take this into consideration when planning re-opening for clinical operations.

Awareness for water damage

- Fires can activate building sprinkler systems and damage water pipes and valves and result in flooding within buildings.
- Water release in buildings can contribute to mold growth, damage medical equipment, and mobilize chemical hazards (e.g., in waste containers, medications).
- Drywall and insulation that has been soaked by water from fire hoses may need to be replaced because of mold growth and wet insulation loses its effectiveness.

Post-wildfire checklists

General inspection checklist

Done	Task	Assigned to
✓	Await official guidance regarding reentry into evacuated areas, do not return until clearance is given.	
✓	Call the clinic's pre-identified assessment team(s) to inspect the building. The results of this inspection will determine what steps to take for building restoration.	
✓	Contact the clinic's pre-identified restoration team to prioritize and begin work.	
✓	Work with the assessment and restoration teams to identify if some sections of the clinic may be able to open before others. This will help with planning a staged re-opening.	
✓	Removal of hazardous material should be coordinated with local authorities.	
✓	Be mindful of potential flash flood risk which is dramatically increased post-wildfire, pay attention to emergency alerts and weather reports before attempting reentry.	
✓	Ensure staff are wearing N95 or higher-rated PPE, are appropriately hydrated while in the impacted area, and are aware of potential emotional impacts of returning.	

Exterior inspection checklist

Done	Task	Assigned to
✓	When evacuation zones are reopened, inspect the clinic from the outside to look for any residual smoke, embers, or fires. ☐ Contact a tree removal company for management of debris.	
✓	Look for heavily damaged trees that could fall and harm people or structures. ☐ Contact an arborist to assess trees or tree removal company for management of debris.	
✓	Look for downed or damaged power and communications lines. ☐ Contact your utility company immediately if any are observed.	
✓	Check for the smell of natural gas. If any is detected, then: ☐ Evacuate the area. ☐ Contact 911 or the gas company per local standards. ☐ Shut off the gas supply if safe to do so.	

Interior and systems inspection checklist

Done	Task	Assigned to
✓	Aside from direct physical impacts to water systems, wildfires can cause contamination of water supply locally and within geographic areas.	
✓	Assess both the functionality and safety of: ☐ Water system (this may require local water authority testing) ☐ Sewage system ☐ Exam room equipment ☐ Medical gas and suction systems ☐ Furniture ☐ Computer systems ☐ Refrigeration systems ☐ Pharmacy equipment	
✓	If the clinic has water damage, conduct mold inspection and remediation as needed. Minimize spore dispersion during cleaning and remediation using containment.	
✓	If the clinic uses paper documentation, check for damage to patient and pharmacy records.	
✓	Remove any porous materials, such as carpets, which have been wet for over 48 hours, or if they look or smell moldy.	
✓	Launder all linens.	
✓	Discard damaged or contaminated medications and medical supplies.	

Interior and systems inspection checklist (continued)

Done	Task	Assigned to
✓	Flush, clean, and disinfect ice machines and other equipment.	
✓	Have professionals test the facility for combustion by-products. This process is to determine what areas were impacted and to help guide remediation experts.	
✓	Inspect and clean HVAC ductwork. Replace filter as needed.	
✓	Obtain all necessary certifications for re-entry in accordance with local regulations.	
✓	Adapted from guidance from the CDC, FEMA and AIHA.	

Adapted from guidance from the CDC , FEMA, and AIHA.

Notes:

Wildfires and Planned Power Outages

For Administrators

Planned power outages may occur due to active wildfires or the prospect of a wildfire igniting. Power outages can severely impact care delivery in health centers.

Why are there planned power outages?

Planned power outages may be necessary to protect the power grid and to prevent the ignition of wildfires. Temporarily shutting power to an area can be a means to decrease load on the grid which can prevent widespread blackouts. Power may also be shut off in areas where the environmental conditions make wildfire ignition more likely.

What types of weather conditions make planned power outages more likely?

Extreme Heat

- Higher demand for electricity for air conditioning during extreme heat can strain the power grid, leading to loss of power for several hours or days.
- Power transformers can also exceed their capabilities during days of high demand and overheat due to extreme heat, leading to malfunctions and/or explosions which could ignite fires.
- Heat dries out grass, leaves, and trees making them easier to ignite if a power line falls.

High Winds

- High winds can knock down power lines and poles, which can create sparks and ignite grass, leaves, and trees nearby. Pre-emptive power outages can prevent downed power lines from sparking fires.
- High winds can rapidly spread fires.

Stay informed

- Planned power outages may be announced on media outlets, by alerts from utility providers, and/or via emergency notification systems. Pay attention to wind forecasts and heat advisories and alerts as these can increase the likelihood of a planned power outage.
- Contact your local utility company to see if there is a priority notification system for critical infrastructure such as health centers.
- Sign up for local emergency alerts.
- Monitor your power company's website where they may display real time power outage information.
- You can find fire weather outlooks on the National Weather Service's Alert page at https://www.weather.gov/alerts. See **Weather Hazard Monitoring** for more information.

Prepare for potential power outages

Have battery powered radios and flashlights handy. Ensure critical systems are supported with battery-powered backups to reduce the loss of critical information in the event of a sudden outage.

Ensure that you can keep patients and staff notified of any changes in operations through outgoing voicemail messages, mass notification systems, and social media.

For facilities that provide life-sustaining services, develop a referral or business continuity plan for critical patients in the event of an extended outrage.

For more information about power outage resiliency, see our **Health Center Power Outage Preparedness and Response** and consider distributing the patient information sheet **Plan for Power Outages**.

Notes:

Wildfire Preparedness Checklist

For Administrators

This document is a guide for clinics to prepare for the potential impacts of wildfires. It emphasizes the importance of advance planning and provides a checklist of tasks that should be reviewed annually.

The checklist covers various aspects of wildfire preparedness, including establishing communication plans, verifying insurance coverage, identifying potential risks, arranging for professional assessments and restoration teams, ensuring data backup, and briefing staff on the developed plans and resources. The document aims to help clinics mitigate the risks associated with wildfires and facilitate rapid recovery in the event of a wildfire-related closure.

Preparing your clinic in advance of wildfire is critical to rapid recovery. These actions should be reviewed on an annual basis.

Done	Task	Assigned to
✓	Register for emergency notifications and warnings from your local city/county emergency management.	
✓	Establish a communication plan to rapidly notify both employees and patients in the event of clinic closure due to wildfire risk.	
✓	Verify insurance coverage for wildfire protection and repairs. This coverage may be distinct from other sources of fires.	
✓	Identify the potential wildfire risk for your facilities and access routes by referencing local wildland urban interface mapping resources. Your local city/county emergency management office can likely assist with accessing these tools.	
✓	Identify potential referral sources for patients in the event of an extended closure of the clinic/facility (this becomes more critical the more essential/timely the service is, for example dialysis).	
✓	If the clinic owns the property where it operates, pre-identify at least 2 companies that could conduct a professional assessment for fire, smoke, and chemical damage. If a single company cannot cover the full range of assessment services, identify multiple companies that together could do a complete safety assessment. ☐ Sign a memorandum of understanding where appropriate. ☐ Put companies' contact information (and agreement where applicable) in the partner contact information section of the clinic's emergency preparedness plan.	
✓	If the clinic owns the property, also pre-identify a restoration team that can conduct necessary repairs. As above, multiple companies may be required to cover specialties such as structural safety, mold remediation, and HVAC systems.	
✓	If your clinic site is leased property, verify with the property manager who is responsible for hiring and paying assessment professionals and who is financially responsible for repair work.	

Done	Task	Assigned to
✓	Check the lease to understand whether the clinic will be required to pay rent during the restoration process.	
✓	Create remotely accessible backups of all emergency contact and response information to allow for access in the event the facility is inaccessible due to wildfire.	
✓	Ensure patient data has appropriate back up. Consider off-site and cloud storage. Data storage must meet HIPAA requirements.	
✓	Store pharmaceuticals in fire-proof or fire-resistant locations and containers, especially those that may be hazardous if released into the environment. Controlled substances must also be locked up.	
✓	Brief staff on identified risk, developed plans and resources, and expectations of staff as these components are developed and on an annual basis.	

Adapted from guidance from the CDC, FEMA, and AIHA.

Notes:

Wildfire Smoke Action Guidance

For Administrators

Wildfire smoke can have significant impacts on the health and well-being of both patients and staff at healthcare facilities. As the frequency and intensity of wildfires continue to increase, it is crucial for clinics to have a comprehensive plan in place to prepare for, respond to, and recover from wildfire smoke events.

This Wildfire Smoke Actions Guidance provides a step-by-step guide for facility administrators to ensure their clinics or health centers are ready to mitigate the health impacts of wildfire smoke. The plan is divided into four sections, each addressing a specific phase in a response: the start of wildfire season, when smoke impacts are anticipated, during smoke impacts, and after smoke impacts have subsided. By following the actions outlined in this plan, healthcare facilities can minimize the negative effects of wildfire smoke on their operations and the health of the communities they serve.

Start of wildfire season* (note: wildfires can occur throughout the year)

In addition to actions listed in the **Wildfire Preparedness Checklist**, the Weather Resilience Lead, with support from facility leadership, should lead the following activities:

☐ Test HVAC systems and check filters. If possible, utilize MERV 13 or higher HVAC filters.

☐ Review **Personal Emergency Preparedness** recommendations with clinic staff.

☐ Establish clear protocols for clinic closure and inform staff when the clinic is closed due to smoke.

☐ Take steps to seal any gaps (doors, windows, etc.) that may allow smoke in. Consider purchasing HEPA-grade portable air cleaners appropriately sized for each room. Ensure these purifiers do not produce ozone.

☐ Develop, train staff, and test **Wildfire Smoke Communications Templates**.

☐ Stay informed about wildfires and smoke forecasts in the area. See **Weather Hazard Monitoring**.

- ☐ Consider installing a particulate matter sensor (PM 2.5) to provide local air quality data to support staff and patient decision making. Rural areas often have few monitors and smoke forecasts such as Airnow.gov models make assumptions on air quality that are less accurate in areas without monitors. Satellite smoke data and forecasts can provide more accurate information for rural areas and can be accessed at NOAA-HRRR (click the eye icon next to near surface smoke, then click the play button at the bottom of the screen).

** It is important to recognize that wildfire season varies widely by location; while fire season in subarctic regions may be relatively short, in other locations, for example southern California, wildfire is increasingly a year-round risk.*

When wildfire significant smoke impacts are anticipated (near fire location or smoke is forecasted)

- Wildfire smoke is particularly difficult to forecast beyond a day: 24-hour forecasts can be found at AirNow.gov. More precise air surface/near surface smoke forecast maps can be found at NOAA-HRRR (click the eye icon next to near surface smoke, then click the play button at the bottom of the screen). Some jurisdictions may have air quality agencies which provide more precise forecasts.
- Close proximity to a wildfire increases the likelihood of significant smoke impacts.
- Discuss with patients if rescheduling is a possibility, in order to reduce patient smoke exposure. Prioritize discussing this with patients that are particularly high-risk, take public transportation, or walk/bike to appointments.
- When possible, consider using telemedicine to maintain essential visits with high-risk patients (asthma, COPD, etc.).
- Install HVAC systems with MERV13 filters or higher to ensure filtration of fine particles.
- Ensure staff are aware of personal preparedness actions they can take to reduce their exposure.
- Schools or after-school activities may be canceled. As a result, anticipate potential impacts on staff availability.
- If staff live in or near evacuation areas, anticipate impacts to staff availability.
- Ensure clinic admin are registered for local emergency alerts. Often these systems are opt-in, and individuals need to visit their local emergency management websites to register.
- Check with city/county emergency management or the local health department for locations of cleaner air shelters, if available. This information should be shared with staff and patients.
- Communicating health information to patients about smoke exposure is critical. See patient and provider information sheets.
- Distribute N95 respirators for staff working outdoors or for use in transit to and from work.

During wildfire smoke impacts (AQI above 100 - unhealthy for sensitive groups)

☐ Check HVAC systems and filters regularly. Wildfire smoke can clog filters and they need to be replaced often.

☐ Check-in with city/county emergency management or local health department for any updated information regarding cleaner air shelters.

☐ Ensure critical smoke information is being communicated to patients. See **Wildfire Communications Template**.

- Some important factors make patients more susceptible to the negative health effects of air pollution, including:
  - Age (particularly children under 5-years-old and people over 65)
  - Pregnancy
  - Chronic medical problems (e.g., diabetes, heart disease, chronic kidney disease, chronic obstructive pulmonary disease (COPD), etc.)
  - Working outdoors and / or in manual labor jobs

- Socioeconomic status (e.g., low-income status, living in informal settlements, low-income neighborhoods, or those living unhoused)

After wildfire smoke impacts (when AQI is below 50ppm - good)

- When the air quality index is below 50ppm, open windows to increase ventilation.
- Reschedule patient appointments which may have been canceled due to poor air quality.
- Replace HVAC filters.
- Replace portable air cleaner filters and continue to run them to ensure indoor air quality returns to normal. Clean sensors on portable air cleaners that have built in particulate sensors.
- If your facility was impacted by fire, please see the **Guidance and Checklist for Facility Repair and Re-Entry After Wildfire**.

Notes:

Wildfire Smoke Communications Templates

For Administrators

Effective communication is crucial for health centers and clinics to ensure the safety and well-being of their patients and staff during wildfire smoke. This document provides guidance and sample messages that can be used to disseminate important information and alerts before, during, and after wildfire smoke.

Before wildfire smoke

Recorded phone message or email – preparedness

Wildfires across [impacted region] are creating hazardous and smoky conditions. Smoke from the [impacted region] fires may drift into [your community's name] and rapidly reduce air quality.

If you suffer from asthma, COPD, heart failure, or any other chronic respiratory or heart conditions, plan for how you will protect yourself from harmful wildfire smoke.

Check air quality at [local official site] to know your level of danger and exposure. Ensure you have back up medications safely stored in a possible evacuation bag. Keep up to date on evacuation warnings here: [insert local resource for evacuations]

In the meantime, limit exertion and exercise, especially outdoors. If possible, stay inside in a designated clean room. Information on how to set up your own clean room at home can be found here: How to Set Up Your Own Clean Room at Home

Social media post or text message – staying informed

Air quality will likely get worse throughout the day and into tomorrow. Keep up to date with changes in air quality and evacuation orders through:

- [insert appropriate link for air quality monitoring for your community]
- [insert appropriate link for evacuation updates for your community]

Social media post or text message - health risks

Smoke, ash, and fire suppressant chemicals can be harmful to your health!

If you have: respiratory illnesses, heart disease, or cerebral vascular disease you are at higher risk from the effects of a wildfire.

Stay inside a clean room (How to Set Up Your Own Clean Room at Home).

Limit exertion and exercise, especially outdoors.

If your usual symptoms worsen, contact your doctor immediately.

Social media post or text message – prepare for evacuation

[Your clinic's name] anticipates that an evacuation order may be given in the next [anticipated time frame, 12, 24, 36 hours…]. Everyone should prepare to evacuate. Remember to bring:

- Face coverings (ideally N-95 to protect against ash, smoke, and chemicals)
- All medications plus a buffer stock for 7 days
- Medical paperwork, including a list of all conditions, medications and dosages taken
- Charged essential medical equipment and back up batteries.
- All assistive devices including eyeglasses, dentures, hearing aids, and communication devices
- Medical insurance information
- Photo ID

During wildfire smoke

Recorded phone message or email – general health

Smoke from wildfires is a mixture of gases and fine particles from burning trees and other plant materials. Smoke can hurt your eyes, irritate your respiratory system, and worsen chronic heart and lung diseases.

Smoke may be affecting you if you experience:

- Cough
- Scratchy throat
- Irritated sinuses
- Shortness of breath
- Chest pain
- Stinging eyes

Recorded phone message, email, or social media post – clinic status

[Clinic name] is open for [specify services] services from [opening time] to [closing time]. Due to damage at our normal location, we are currently providing services at [address / location].

Note: Only include the second sentence if your clinic has changed location.

Email, flyer, or long social media post – general health

[Clinic's name] recommends the following steps to avoid illness caused by breathing wildfire smoke.

Those with lung or heart disease, the elderly and children, should stay indoors when smoke outside is thick. Poor air quality is a health threat. All residents in smoky communities should avoid it. Local smoke levels can rise and fall rapidly as the wind and weather change.

Take steps to avoid breathing problems or other symptoms from smoke:

- Be aware of smoke levels, in your area. [Provide local resource for information].
- Avoid working or exercising outdoors when air quality is poor. Limit outdoor sports, work and recreation.
- Drink lots of water. Staying hydrated keeps airways moist. This will help reduce irritation of the nose, throat, and lungs.
- Try to avoid driving in smoky areas. If you need to drive in these areas, keep your windows rolled up and vents closed. Set the air conditioning on "re-circulate." This will avoid bringing smoke into your car.
- Avoid smoke by staying indoors and closing all windows and doors. Use a filter in your heating and cooling system that removes very fine particles.
- People with asthma or other on-going lung disease should follow their breathing management plans. Keep medications available. Contact your health care provider if you need medical care.

Social media or text message – carbon monoxide poisoning

Carbon monoxide (CO) is a significant threat to people living close to the site of the fire. Carbon monoxide makes it harder for your blood to carry oxygen to your brain and other vital organs. In high concentrations it can result in death.

Watch out for signs of CO poisoning:

- Headache
- Dizziness
- Weakness
- Nausea
- Vomiting
- Confusion

- Chest pain

If you become confused, you may not be aware of your symptoms, help your friends, family, and neighbors watch out for each other. Anyone with signs of CO poisoning should visit the emergency department immediately for evaluation.

Social media or text message – heat risk at home

Keeping doors and windows closed is important to reduce smoke exposure. If you don't have air conditioning, your home may get overheated. Consider visiting family members, neighbors or public buildings that have air conditioning and air filtration. Leaving the area of thick smoke may be best for those with health conditions that put them at higher risk for illness.

After wildfire smoke

Recorded phone message or email – clinic status

[Clinic name has / has not] experienced significant damage as a result of the [name] wildfire. We are working to get all services up and running as soon as possible.

[To the degree possible, provide a brief overview of the damage and steps taken so far towards restoration.]

Currently [X] services are available at [location]. If you urgently need [unavailable services], please seek treatment at [name and address of partner clinic or hospital.]

Social media or text message - safety

Like you, the clinic staff have just been allowed back into [impacted area] and we will begin inspecting the damage to our facility. Stay safe as you begin to assess the damage from fire, smoke, ash, and fire suppressant chemicals to your home.

Remember:

Do not enter until it is safe to do so. First observe from the outside, looking for embers and smoldering.

Look for obvious structural damage, downed power lines and the smell of gas. Alert utilities companies as necessary.

Ash and chemicals from fire suppressants can be irritating to the skin, eyes, and lungs. Wear gloves, goggles, an N-95 mask, long sleeves and pants, and thick soled shoes. If you are exposed, wash the area quickly with soap and clean water.

Social media or text message – water safety

Wildfires can cause contamination of ground water. Check [local resource] to know what water quality safety measures are in place for your protection.

Notes: