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WILDFIRE SMOKE INTERVENTIONS

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Wildfire Smoke Action Plan: Leveraging Community Interventions to Safeguard Patient Health

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Johnson&Johnson

Primary Authors: Rory Wilson, Nate Matthews-Trigg, Dr. Caleb Dresser, Chelsea Palmira Heberlein, and Elena Ateva.

Principal Collaborators: Caroline Ponticelli, Julie Winn, Tija Danzig, Saqi Maleque-Cho DrPH, Brandon Rogers PhD, Ted Miles PhD, and Sweta Waghela.

Other Contributors: Unarose Hogan, Hikma Elmi, Hope Suprenant, Tracy Sachs, Kim Nguyen, Anna Miller, and Marcy Franck.

We extend our deep gratitude to all who contributed their time, insights, and expertise to shaping these resources. From research and technical review to program implementation and partner engagement, their collective efforts have strengthened the usability and impact of these tools.

This Wildfire Smoke Action Plan was made possible through the dedication, expertise, and lived experience of frontline health care providers who serve communities most affected by extreme heat/wildfire smoke. We extend our deepest gratitude to the clinics and health centers that generously shared their insights, tested these tools in realworld settings, and provided invaluable feedback to strengthen their effectiveness. Their commitment to patient care and community resilience has shaped these resources in meaningful ways, ensuring they are practical, actionable, and centered on the needs of those most impacted. While we do not list individual contributors here, we recognize and appreciate the essential role they have played in co-developing and refining these tools. We also acknowledge the dedication of our partners and collaborators in the broader health and climate resilience community, whose ongoing efforts continue to drive innovation and preparedness in the face of a changing climate.

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Introduction

The continental United States is experiencing increasing frequency and intensity of wildfires, a trend caused by climate change. As a result, significantly more communities are being exposed to the hazardous health impacts of wildfire smoke. Wildfire smoke not only affects communities near fires but also travels long distances and can impact communities in distant states.

Primary care clinics have a critical role to play in community preparedness and response to wildfire smoke. Through their deep understanding of their patient population and connections with other community social services, clinics can implement interventions to protect their most vulnerable patients. As trusted providers of health information, they can offer guidance to the wider community on how to best protect themselves while also providing resources and connections to broader initiatives.

Purpose and Scope

This comprehensive **Wildfire Smoke Action Plan (WSAP)** expands upon the tailored plan you received after completing the wildfire smoke assessment tool. While your tailored plan presented a curated selection of 5 interventions based on the assessment tool data, this comprehensive document allows for a deeper exploration into the full array of potential interventions, including operational considerations and illustrative case studies.

The WSAP is intended to help clinics identify and develop potential interventions to protect their community against wildfire smoke. The interventions included in this resource were selected as there are research studies and/or case studies to support their implementation, but the amount of supporting material varies between interventions. Links to reference documents have been provided so that you can decide if a given intervention is right for your organization.

The intention here is to offer you a broader perspective, enabling you to discover additional and potentially more aligned strategies, opportunities for adapting interventions to the local context and ways to leverage your clinic's resources to better cater to specific patient populations. This approach encourages a holistic understanding of clinic-supported wildfire smoke preparedness, ensuring that your clinic is better prepared by integrating insights from the full spectrum of available interventions.

Interventions within the WSAP fall under the following categories:

1. Disseminate Wildfire Smoke Safety Information
2. Distribute Air Purifiers and N95 Masks
3. Provide Wildfire Smoke Education
4. Support Access to Cleaner Air Spaces
5. Utilize Air Quality Monitors
6. Conduct Remote Wellness Checks

Other sources of air pollution

While this action plan focuses on wildfire particulate pollution, much of the information will translate well to other sources of particulate pollution. However, it's important to recognize the distinctions between different types of air contaminants. Many protective measures, such as using air purifiers with HEPA filters or staying indoors with windows closed, are broadly effective against particulate matter, whether from wildfires, burning coal, oil and gas, or other sources such as wind-blown dust. However, some recommendations have limitations when applied to other pollutants. For instance, N95 masks, while highly effective against smoke particles, offer little protection against gaseous pollutants like ozone or volatile organic compounds. These gases can easily pass through the mask's filter, potentially causing respiratory irritation or other health effects. This illustrates the complexity of air pollution and the need for tailored approaches to different types of contaminants. While general air quality precautions are beneficial, it's crucial to understand the specific nature of local pollution threats and adjust protective strategies accordingly.

Definitions

Key Terms and Abbreviations

Air Purifiers – A portable device that removes particulate matter from the air; also called portable air cleaner or air sanitizers.

AQI – Air Quality Index is an indicator developed to communicate various types of pollution. This can include harmful particulates and gases such as ground-level ozone.

DIY – Do-it-yourself: building or modifying without the direct support of a professional or expert.

HEPA – Type of filter that can remove 99.97% of dust, pollen, bacteria and other airborne particles.

MERV – Filter efficiency measure. Higher MERV numbers are better at filtering small particles. Merv 13 is the lowest to adequately capture smoke particles.

N95 – A facemask that meets National Institute of Occupational Safety and Health standards to filter 95% of airborne particles.

WSAP – Wildfire Smoke Action Plan

PM 2.5 - Particulate matter 2.5 describes fine inhalable particles with diameters that are generally 2.5 micrometers and smaller.

Resources

Under Resourced [Intervention - Minimal to Moderate Resources Required]

Lacking sufficient funds or equipment to implement additional programmatic activities.

• Recommended interventions will identify partnerships that can support resource capacity

Adequately Resourced [Intervention - Moderate to Significant Resources Required]

Sufficient funds or equipment to implement additional programmatic activities.

• Recommended interventions will leverage clinic resources to lead intervention activities

Staffing

Understaffed [Intervention - Minimal to Moderate Staffing Required]

Lacking sufficient staff to lead additional programmatic activities

• Recommended interventions will identify partnerships that can support staffing capacity

Adequately Staffed [Intervention - Moderate to Significant Staffing Required]

Sufficient staff to lead additional programmatic activities

• Recommended interventions will leverage clinic staff to lead intervention activities

Patient Populations

Housing Insecure – People experiencing homelessness or unstable/uncertain housing (often accompanied by substance use, mental illness and lack of support systems)

Smoke Sensitivity – People who might be more sensitive to wildfire smoke, such as those with chronic respiratory diseases, certain cardiovascular diseases (such as pulmonary disease) or children with asthma

Outdoor Workers – People who work outdoors and have little agency to avoid work during poor AQI days. This could include people working in agriculture, construction, or resource extraction (mining, oil and gas), among others.

General – People who fall outside the high-risk patient population groups listed above

Vulnerability to wildfire smoke varies widely in the general population due to age, health status, social isolation and clean air access. Although interventions tailored for high-risk groups may not directly apply to everyone, strategies benefiting the general population can also support high-risk individuals, despite varying levels of vulnerability.

What We Know

- Wildfire smoke events are increasing in frequency across the United States, as wildfires are occurring more frequently and burning more acres.
- The length of wildfire season is extending beyond the historical summers, with the peak occurring earlier than usual.
- Wildfire smoke has led to an increase in annual PM2.5 concentrations in nearly three-quarters of the states in the contiguous U.S., eroding what is equivalent to 4 years of air quality progress.
- Wildfire smoke is associated with significant morbidity in vulnerable groups.
- The following patients are particularly vulnerable to health impacts of wildfire smoke: older adults, people who work outdoors, people with respiratory and cardiovascular diseases, children and pregnant people.
- Providers and public health officials play an important role in communicating the risks of wildfire smoke to the general public and warning vulnerable patients.

Clinic operations can be impacted by wildfire smoke both directly and indirectly.

This includes:

 staff safety issues,

 ventilation problems in which smoke intrudes into the clinic and

 finally demand for patient health services resulting from smoke exposure.

Source: https://pubmed.ncbi.nlm.nih.gov/38622704/

Operationalizing the Wildfire Smoke Action Plan (WSAP)

Below is a list of items to consider as you implement any of the interventions described in this WSAP.

Establish Your Team

To ensure effective execution of the WSAP, you may find it helpful to assign specific staff to be responsible for different parts of its implementation. Integrating the plan into the work of an already established emergency preparedness team or establishing a dedicated wildfire smoke planning team at your clinic can ensure accountability, oversight and validation of your smoke plan.

Administrative staff responsible for implementing various aspects of the plan (facility management, procurement, etc.) will be essential. Successful implementation of the WSAP also requires a well-coordinated effort amongst other stakeholders, including health care providers, local authorities and community organizations. Identify and engage community stakeholders relevant to your planned interventions early in the process and work to engage them in discussion about what actions are right for your clinic, community and patients.

Clarify Roles and Responsibilities

For any collaborative initiative to be effective, it is crucial to establish clear roles and responsibilities for each party involved - internally amongst clinic staff and externally between the clinic and community partners.

Establishing clear roles ensures tasks are executed efficiently, minimizes overlap or gaps in responsibilities and establishes accountability. By clearly outlining who is responsible for what, this plan ensures effective coordination and collaboration between relevant stakeholders.

Consider the Timing

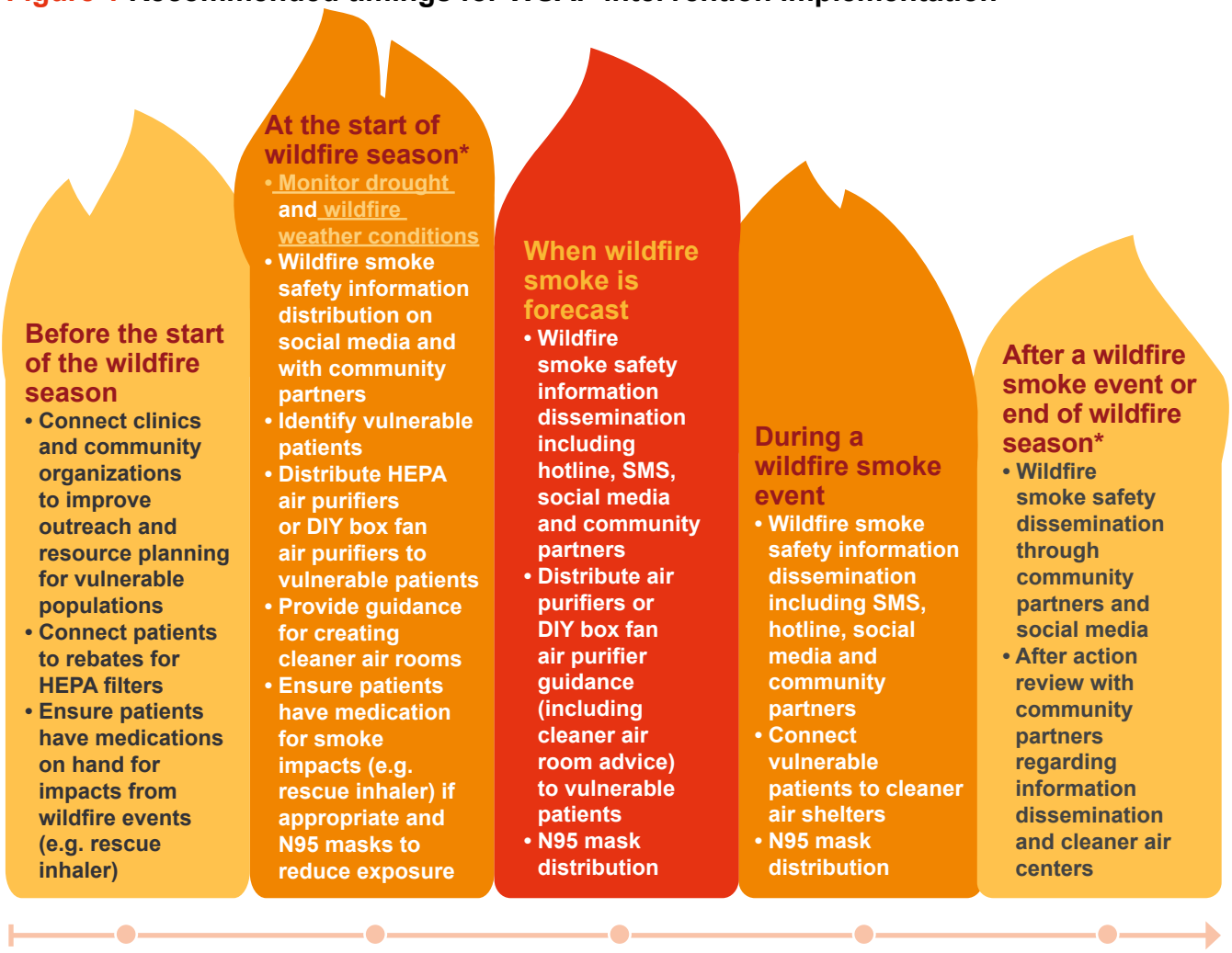
Timing is critical for the effective implementation of interventions outlined in this WSAP. Different actions are most appropriate at various times of the year, depending on local conditions, annual variability and climate-related changes. While it's crucial to organize these measures around your location's typical wildfire season, it's equally important to recognize that wildfires can ignite rapidly and occur at any time if conditions are conducive to fire spread, resulting in poor air quality. By implementing "year-round" and "before start of wildfire season" activities, facilities can be prepared to act when smoke occurs.

Recommended actions for each intervention will be designated under 1 of 5 timing categories:

1. Before the start of wildfire season
2. At the start of wildfire season
3. When wildfire smoke is forecast
4. During a wildfire smoke event
5. After a wildfire smoke event or end of wildfire season

Synchronizing actions with wildfire smoke forecasts and alerts supports timely interventions that can prevent health emergencies. Implementing a phased approach allows for the gradual rollout of interventions, ensuring that resources are optimally utilized and that the community is adequately prepared.

Figure 1 Recommended timings for WSAP intervention implementation



Wildfire smoke season dates are generalized. *Actual start of season will differ based on annual variability and location and will gradually shift with climate change. We encourage you to stay connected with local weather reports, fire-weather projections and drought reports to anticipate the start of heat season for your locale*

Understanding and Communicating Air Quality Index Information

The Air Quality Index (AQI) is an indicator used to inform the public about air quality. In the United States, AQI is a numerical scale ranging from 0 to 500 that considers particulates (PM10 and PM2.5), carbon monoxide, ground-level ozone, nitrogen dioxide and sulphur dioxide. Lower AQI values signify better air quality, while higher values indicate worse conditions (see figure on the next page). A value of 100 on the AQI scale typically aligns with the short-term national air quality standard for protecting public health. Numbers below 100 are generally considered acceptable, while those above 100 indicate increasingly unhealthy conditions.

To make the index more user-friendly, each category is assigned a specific color. This color-coding system allows people to quickly assess air quality conditions in their area without needing to remember exact numerical values.

As AQI values rise above 100, air quality becomes more hazardous. Initially, this may affect only sensitive groups, but as levels increase further, it can impact the general population. This system provides a standardized way to communicate air quality information, helping individuals and communities make informed decisions about outdoor activities and potential health precautions.

<table>
<tr><th colspan="6">Understanding wildfire smoke air quality index (AQI)</th></tr>
<tr><td>AQI Levels</td><td>Good

AQI: 0-50</td><td>Moderate

AQI: 51-100</td><td>Unhealthy for Sensitive Groups

AQI: 101-150</td><td>Unhealthy

AQI: 151-200</td><td>Very Unhealthy - Hazardous

AQI: 201+</td></tr>
<tr><td>AQI Level Descriptions</td><td>Air quality is good</td><td>The air quality is acceptable. However, there may be a risk for some people, particularly those sensitive to air pollution.</td><td>Members of sensitive groups may experience health effects. The general public is less likely to be affected.</td><td>Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.</td><td>Health alert: The risk of health effects is increased for everyone. Health warning of emergency conditions: everyone is more likely to be affected.</td></tr>
<tr><td>Visibility and Smell
For particulate pollution, such as smoke, if you do not have access to AQI information, you can estimate based on visibility to landmarks.</td><td>No smell or visible signs of pollution

Visibility: 11+ miles</td><td>Light haze, no smell

Visibility: 10- 5 miles</td><td>Visible haze, minimal smell

Visibility: 3 - 5 miles</td><td>Significant haze or change in sunlight and smell

Visibility: 1 - 2 miles</td><td>Major haze or change in sunlight and strong smell

Visibility: <1 mile</td></tr>
<tr><td>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.</td><td>No restrictions</td><td>Consider making outdoor activities shorter and less intense. Watch for health-related symptoms.</td><td rowspan="2">Limit time spent outdoors and reduce physical activity. Watch for health-related symptoms.</td><td>Avoid the outdoors and physical activity. Use an N95 mask if outdoors.</td><td rowspan="2">Avoid the outdoors and reduce physical activity. Use an N95 mask if outdoors.</td></tr>
<tr><td>Sensitive Groups
People with heart or lung diseases, 65+ years old, children and teenagers, pregnant people, minority populations and outdoor workers.</td><td colspan="2">No restrictions</td><td>Reduce long or intense activities. Take more breaks during outdoor activities.</td></tr>
</table>

Air quality information can be found in multiple locations; however, there are nuances about which are the most reliable. For clinics and health centers located in densely populated areas, Airnow.gov provides a reliable option for current and 24-hour smoke forecast data. For facilities located in more rural or dispersed areas, consumer-grade air quality monitor applications (e.g. PurpleAir or Breezometer) and plume models [link – *under RAP, select the eye icon and then press the play button at the bottom left hand of the screen*], when considered together can provide valuable air quality information. Some areas may have few local air quality monitors. For clinics and health centers located in these areas, we recommend setting up a low-cost consumer-grade air quality monitor (Intervention 6.1).

Particulate Pollution

It is important to note that this action plan only focuses on particulate pollution from wildfire smoke. Wildfires can produce a hazardous mix of pollutants. However, particulates are considered the most significant health threat from wildfire smoke, as tiny particulates can penetrate deep into the lungs and enter the bloodstream, causing harm throughout the body. Many of the interventions in this document will not protect individuals from non-particulate pollutants, such as ground-level ozone, carbon monoxide or others. For this reason, it is important that when communicating AQI to community organizations or patients, it is clear whether particulates are the main source of pollutants or not and appropriate recommendations are given.

There are many sources of particulate pollution besides wildfire smoke, and many of the interventions in this action plan can be used to protect patients from these sources. The following are major sources of particulate pollution in the United States:

- Wildfires
- Vehicle emissions (especially diesel engines)
- Industrial processes and power plants
- Agricultural activities (e.g., field burning, dust from tilling)
- Construction and demolition activities (this includes post-disaster debris)
- Residential wood burning (fireplaces, wood stoves)
- Dust from unpaved roads
- Cooking (electric and gas stoves both produce indoor particulate pollution; however, gas stoves also produce harmful gases which require adequate ventilation)
- Natural sources (e.g., pollen, dust storms, or Saharan dust traveling across the Atlantic Ocean)

Many types of consumer-grade air quality monitors (see Intervention Annex 6) focus solely on measuring particulate matter. This narrow focus offers a clear advantage: users can confidently apply interventions from this plan, knowing the monitor's readings specifically reflect particulate pollution levels.

However, this approach has limitations. Some air quality monitors, both consumer-grade and reference-grade, also measure gaseous pollutants (ground-level ozone, etc.). These pollutants can be particularly harmful to individuals with respiratory conditions, making detection and dissemination of findings valuable for patients and community-members to make informed decisions to protect themselves and their families.

Likely a balance must be found based on the local context (such as whether ground-level ozone is a common issue in your community) and the patient population your clinic or health center serves.

Adapt to Your Local Context

Case studies from a variety of communities are included in each intervention summary in this WSAP and provide valuable insights into the practical application of strategies, their effectiveness and contextual modifications. Lessons learned from case studies can help guide the adaptation and improvement of the plan to meet local needs effectively but cannot replace your knowledge of the community you serve.

The WSAP is meant to be adapted to the unique demographic, geographic and cultural aspects of each community. We encourage you to modify the content to reflect your community's context and needs.

Building Partnerships

Some of the strategies outlined below will be easier to implement if you enter into a partnership with other local organizations. Think about partner organizations that have similar goals and interests especially when it comes to protecting your community from the dangers of wildfire smoke. If you are not already in contact with them, reach out and schedule a conversation. Share with them your wildfire smoke action plan and tell them what support you may need from them – for example, if you are considering advocating for your municipality to distribute N95 masks during a wildfire smoke event, this could benefit the local community at large and may be of interest to other community organizations serving low income or housing insecure populations.

A partnership could have powerful results for your community and will make it easier to realize your goals. For more information on how to find, build and maintain community partnerships, please review the Health Professional and Community Collaboration Guide created by the Medical Society Consortium on Climate and Health.

Resource Mobilization

Mobilizing resources is an integral part of any plan, but it does not have to be intimidating. Consider who within your community might be able to help – for example local businesses can donate N95 masks, air purifiers or box fans and filters. More specialized organizations can donate medicines and supplies, including those critical during a wildfire smoke event, such as inhalers, albuterol and other critical resources. Community fundraising events are a powerful way to raise awareness of the dangers of wildfire smoke among community members while also collecting donations for realizing your clinic's wildfire smoke action plan.

Your local Chamber of Commerce can be a good place to start inquiring about potential funding opportunities. Other local foundations may also have grants available to cover your needs. At the federal level, the Department of Health and Human Services launched a catalytic program in early 2024 to support health care providers, especially safety net organizations, in taking advantage of the tax credits, grants and other supports made available by the Inflation

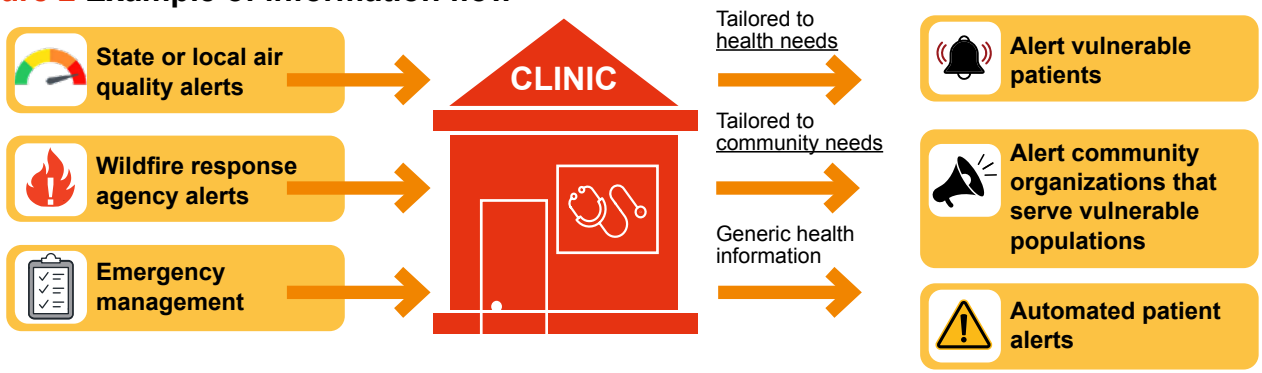
Develop a Communications Plan

An effective communications plan is a roadmap that ensures clear and timely information reaches all stakeholders during a wildfire smoke event. It outlines the messages you want to convey, who is responsible for sending the messages, who the target audiences are (staff, patients, general public), the most appropriate communication channels and a schedule for disseminating information. Additional strategies for disseminating wildfire smoke safety information can be found in Intervention Annex 1.

To allow for smooth execution of the WSAP and to safeguard patient well-being, it's recommended to have effective communication channels established before a wildfire smoke event. These communications are both within the clinic as well as with patients and community stakeholders.

Clinics are uniquely positioned to supply relevant information to vulnerable patients. Leveraging digital tools, such as automated electronic health record systems, SMS, social media and listserve emails to patients and community partners can play an important role in ensuring that vulnerable individuals are prepared and supported.

Figure 2 Example of information flow



Develop a Process for Gathering and Incorporating Feedback

Collaboration with local organizations and authorities is key to ensuring the plan is comprehensive and successful, and thus establishing robust feedback mechanisms is vital. Regular monitoring and assessment of the implementation process can help identify challenges and areas for improvement.

Regular community feedback should be actively sought out from a variety of stakeholders to ensure the plan remains relevant and effective for the local population. Ongoing analysis of feedback data and sharing with community partners can help everyone understand the impact of the plan and identify gaps or unforeseen challenges.

Annual reassessment of clinic staffing, resources and vulnerable patient lists will allow the plan to adapt to evolving needs. When assessing vulnerable patients, consider underlying health conditions (CDC list of people at increased risk) and likely exposure based on activity or their home environment.

Encouraging a culture of open communication and continuous learning within the implementation team fosters a responsive and dynamic approach to wildfire smoke action planning.

Providing information, feedback, insights and data to the Americares and Harvard Chan C-CHANGE teams ensures new case studies are generated, lessons learned are captured and the WSAP is updated and improved. This will help it to best serve the need of frontline clinics by reflecting the experience of frontline clinic staff who have worked on wildfire smoke issues.

Figure 3 **Recommended cycle of WSAP planning, implementation, evaluation and improvement to be carried out annually by clinic-designed wildfire smoke or emergency preparedness team**

Understand Limitations and Use Good Judgment

The interventions described in the following sections are based on the best available information at the time of writing. In some cases, interventions have been the subject of scientific studies and published academic literature; in other cases, they have not been formally studied, but have been or are being implemented by public health agencies, nonprofit organizations or other entities, providing case-specific information about their use.

It is important to recognize that community and individual adaptation to wildfire smoke is a topic of active study, and that additional research is being conducted and will become available in future years. Even interventions that have been scientifically studied in some settings may not perform in an equivalent manner in other settings.

Use your best judgment and your understanding of your patients and community to inform your decisions about which interventions may be most appropriate in your specific context.

ANNEX 1

Disseminate Wildfire Smoke Safety Information

Local health care providers and primary care clinics play a crucial role in disseminating wildfire smoke information. They are viewed as trusted sources by communities (see this review or this one for details). Clinics and health centers are uniquely positioned to provide vital information and guidance to their patients regarding wildfire smoke risks and protective measures.

The interventions in this annex prioritize communication as a key tool to improve readiness for wildfire smoke events. They focus on establishing a robust network for knowledge sharing, ensuring the community has critical information needed to stay safe during periods of wildfire smoke. This proactive approach can help the clinic and the community respond to the health risks associated with wildfire smoke.

1.1 Operate a Wildfire Smoke Safety Telephone Hotline

Summary

A wildfire smoke safety telephone hotline can help patients seeking assistance, information and resources during a wildfire smoke event. It is a dedicated phone line, where callers can ask about personal measures to reduce exposure (N95s, HEPA or DIY box fan air purifiers, cleaner air rooms), location of nearby cleaner air centers and in some cases be triaged for medical symptoms requiring clinical assessment (if staffed by licensed medical / nursing staff).

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Moderate to Significant:
- Space
- Dedicated phoneline or call-forwarding system

Staff Requirements

Significant:
Need staff member to monitor the line. Staff must be able to:
- Answer smoke-related health questions
- Share general guidance on air filters, masks and cleaner air rooms
- Assist in identifying cleaner air centers
- Triage patients based on symptoms (if licensed RN, MD or similar)

Suggested Timing

Before Start of Wildfire Season:
- Establish phone line and staffing plan

At the Start of Wildfire Season:
- Distribute phone number to patients

When Wildfire Smoke is Forecast:
- Distribute phone number to vulnerable patients

During a Wildfire Smoke Event:
- Staff the hotline

Additional Considerations

1. Is the hotline just for vulnerable patients, for all patients or the wider public? There is likely a need for some prioritization so the line isn't overwhelmed.
2. There may already be city or state-wide smoke hotlines, which patients can be directed to if necessary.
3. How can at-risk patients without telephones be reached?
4. You may need to prepare for and overcome language barriers – Spanish of particular importance.

1.2 Share Wildfire Smoke Safety Information via Text Message

Summary

Disseminating wildfire smoke safety information and alerts directly to patients via automated or manual text messages is a cost-effective way to provide critical information to vulnerable patients. Particularly important for patients without internet access, text messages can provide information on AQI, when patients should utilize masks or air purifiers and where to access cleaner air centers. Larger systems should consider automating SMS messages.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Minimal to Moderate:

- Consider automated messaging system if feasible and not already in place

Staff Requirements

Minimal to Moderate.

- If using automated system: minimal. Have a staff member dedicated to drafting messages then overseeing the system for any issues
- If using manual system: moderate. Must have staff member to draft, schedule and send messages

Suggested Timing

Before Start of Wildfire Season

- Establish SMS service and staffing plan
- Ensure vulnerable patient phone numbers are updated
- Compose messages for use

When Wildfire Smoke is Forecast

- Plan timing (AQI linked) and frequency of messages
- Contact to allow opt in or out
- Messaging on preparedness actions (obtain filter, set up cleaner air room etc)

During a Wildfire Smoke Event

- Activate messaging system
- Messaging on response actions (N95, activate filters, etc.)

Additional Considerations

1. Consider HIPAA regulations if sending tailored messages that reference protected health information.
2. Consider if other similar automated messages are being used by other sources, such as the local school system. Align messages and timing to avoid overwhelming recipients.
3. Provide in languages your communities use, as well as English.
4. Be conscious of messaging fatigue.

1.3 Share Wildfire Smoke Safety Information via Social Media

Summary

Wildfire smoke information dissemination via social media can provide valuable information on how to reduce smoke exposure (some examples include: N95 masks/air filters/clean rooms), which can be provided throughout the season. During smoke events, this can be reiterated with real-time updates that include AQI forecasts and locations of cleaner air centers. Some messaging may focus on vulnerable patients' health impacts.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Minimal to Moderate:
- Setting up social media accounts on appropriate platforms, if not in place
- Developing communication protocols and templates

Staff Requirements

Minimal to Moderate:
Need staff member dedicated to:
- Managing social media accounts
- Sourcing information to be shared, per pre-determined communication plan depending on nature and frequency of posts

Suggested Timing

Before the Start of Wildfire Season:
- Establish social media accounts and presence
- Develop communication protocols and templates

At the Start of Wildfire Season:
- Spread information on reducing smoke exposure (masks/air filters/clean rooms)
- Increase patient online engagement

When Wildfire Smoke is Forecast:
- Increase intensity of posting on personal risk reduction and location of cleaner air centers

During Wildfire Smoke Event:
- Post updates regularly and links to AQI health resources

Additional Considerations

1. Encourage other community organizations/ members to re-share posts within their networks to enhance reach of information.
2. Post frequently enough to keep patients engaged but not too frequently; as you could cause alert fatigue and lead patients to ignore updates.

1.4 Partner with Community Health Workers to Share Wildfire Smoke Safety Information

Summary

Community Health Workers (CHWs) can serve as a vital link between health care systems and vulnerable communities. These trained individuals can disseminate wildfire smoke safety information and provide in-person advice tailored to people's unique language, health and cultural needs. CHWs can also identify health barriers, such as living conditions, and connect patients to supportive services.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Minimal to Moderate:
- Develop or compile wildfire smoke-related education materials for CHWs
- Develop or compile patient assessment materials for CHWs

Staff Requirements

Minimal:
- Recommend partnering with existing municipal/state CHW program(s), if possible
- Will need staff member assigned to manage that relationship and resource compilation described above

Suggested Timing

Before the Start of Wildfire Season:
- Work with CHW program staff to train CHWs

At the Start of Wildfire Season:
- Deploy CHWs to vulnerable patients for wildfire smoke education

When Wildfire Smoke is Forecast:
- Deploy CHWs to vulnerable patients for wildfire smoke education

During Wildfire Smoke Events:
- Deploy CHWs to vulnerable patients for wellness checks and wildfire smoke education

Additional Considerations

1. Are there adequate levels of community health workers to serve the population in need?
2. Is it beneficial to develop a community health worker training program to meet volunteer demand?
3. Could community health workers be leveraged to conduct wellness checks in tandem with information sharing?
4. Consider establishing guidelines for components of the wildfire smoke health risk assessment.

1.5 Partner with Community Organizations to Share Wildfire Smoke Safety Information

Summary

Wildfire smoke safety information can be shared directly with vulnerable patients through partnerships with community organizations that provide essential services. Clinics can collaborate with these organizations to disseminate crucial information in a culturally appropriate and accessible way, leveraging the reach and credibility of frontline community organizations.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Minimal to Moderate:

- Partnership with community organizations to provide wildfire smoke- safety information can range in complexity from simple information sharing to close collaboration and facilitation of shared wildfire smoke-safety community events

Staff Requirements

Minimal to Moderate:

- Dependent on level of collaboration

Suggested Timing

Before the Start of Wildfire Season:

- Develop information sharing plan with community partners – including roles and responsibilities for each organization

When Wildfire Smoke is Forecast:

- Increase frequency of messaging or distribution to ensure all vulnerable patients contacted

During Wildfire Smoke Events:

- Highest frequency of messaging

After Wildfire Smoke Event or the End of Wildfire Season:

- Review to assess whether all vulnerable people contacted received relevant information

Additional Considerations

1. Identify which community organizations have a strong presence and influence within vulnerable populations.

ANNEX 2

Distribute Air Purifiers and N95 Masks

The interventions in this section prioritize equipping vulnerable patients with the tools necessary to reduce their exposure to wildfire smoke, both indoors and outdoors. By distributing air purifiers to patients, clinics can empower them to reduce indoor particulates and clean the air they breathe within their homes. Additionally, the distribution of NIOSH-approved N95 masks offers patients a valuable means of protection during unavoidable outdoor exposures to wildfire smoke. These combined efforts aim to equip patients with the means to safeguard their health and mitigate the risks associated with wildfire smoke exposure.

2.1 Distribute HEPA Air Purifiers to Vulnerable Patients via Donation or Loan Programs

Summary

High-Efficiency Particulate Air (HEPA) air purifiers are very effective in reducing smoke in indoor environments. Distributing HEPA air purifiers to vulnerable patients can significantly reduce exposure to wildfire smoke and associated health impacts. This should be paired with guidance on how to use them properly (within a cleaner air room, if available) and maintain them (change filters).

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

General | Smoke Sensitivity

Resource Requirements

Significant:
- Funding for purchasing or securing donations of HEPA air purifiers
- Storage space for HEPA air purifiers before distribution
- Educational materials on the use and maintenance of HEPA air purifiers

Staff Requirements

Moderate to Significant:
- Staff to manage the logistics of acquisition, storage and distribution
- Staff to identify vulnerable patients who would benefit the most from a HEPA air purifier
- Staff to provide educational material on the proper use and maintenance of the HEPA air purifier

Suggested Timing

Before the Wildfire Season:
- Get HEPA air purifiers through donation or grant.
- Identify vulnerable patients and develop a distribution plan

At the Start of the Wildfire Season:
- Distribute to patients, with advice on maintenance and correct use in cleaner air room

When Wildfire Smoke is Forecast:
- Alert recipients to prepare cleaner air room and activate air purifiers

During Wildfire Smoke Events:
- Alert for activation and use throughout wildfire smoke event

After Wildfire Smoke Events:
- Review usage

Additional Considerations

1. How to handle maintenance and replacement filter costs? Replacements can be expensive; models could be discontinued. Is that cost up to the patient?
2. How to ensure the devices are used properly to maximize effectiveness? There needs to be robust educational material provided or available online on correct usage of HEPA air purifiers. This could be a pamphlet or in Missoula, Montana they provided QR codes which took users to a webpage giving guidance.
3. Could patients receive energy rebates for using HEPA air purifiers?

2.2 Distribute DIY Box Fan Air Purifiers to Vulnerable Patients

Summary

DIY box fan air purifiers, using filters (MERV 13 rating or higher) offer an affordable way to reduce indoor wildfire smoke exposure and associated health impacts. hey require some instructions and basic assembly skills, but cost a fraction of the price of store-bought air purifiers. Clinics can distribute pre-made air purifiers, give workshops on how to make them or provide directions for patients to build their own.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

General | Smoke Sensitivity

Resource Requirements

Moderate to Significant:
- Educational materials on how to assemble and use DIY box fan air purifiers
- Funding to purchase components
- Storage space for components (such as fans and filters)

Staff Requirements

Significant:
- Staff to develop and distribute guidance on DIY assembly and correct use
- Staff to purchase components
- Volunteers or staff to assemble DIY box fan purifiers if offered

Suggested Timing

Before the Wildfire Season:
- Acquire components and prepare educational content on correct usage

At the Start of Wildfire Season:
- Distribute DIY guidance or build and distribute to vulnerable patients

When Wildfire Smoke is Forecast or During a Wildfire Smoke Event:
- Build and distribute DIY box fan air purifiers or share DIY guidance online and in person

Additional Considerations

1. Similarly effective as HEPA air filters, but louder. Patients may prefer smaller more attractive HEPA air purifiers.
2. Associated costs will vary based on supplies. Materials may be sold out during wildfire smoke events. Bulk purchasing recommended.
3. There are several options. The basic is a fan and one MERV 13 filter, better is with 2 filters and best is with 5 (similar Cori Rosenthal box). The more filters the more effective however price increases.
4. A DIY box fan air purifier is ineffective when filter is very dirty, so frequent filter changes may be needed during smoke events.
5. Use box fans made after 2012 as older fans have known fire risks.

2.3 Distribute N95 Masks and Educate on Appropriate Use

Summary

N95 masks (N95s) are an effective way to reduce exposure to wildfire smoke, unlike surgical or cloth masks. Since the COVID-19 pandemic, access to N95s and their use has increased with large-scale distribution in place. Clinics and health centers can distribute N95 masks to vulnerable patients. Distribution, either directly or via community providers, should include education on proper fit and sealing.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

General

Resource Requirements

Moderate:
- Funds to purchase NIOSH-approved N95 masks
- Educational materials on the correct use, fit and disposal of N95 masks
- Storage space for masks before distribution
- Develop partnerships with community organizations serving vulnerable populations especially elderly adults

Staff Requirements

Moderate:
- Staff to manage the logistics of mask purchase, storage and distribution
- Staff to create or obtain educational material on correct mask usage
- Staff or community partners to distribute masks and educational materials

Suggested Timing

Before the Start of Wildfire Season:
- Procure N95 masks and prepare educational materials

At the Start of Wildfire Season:
- Begin distribution of masks to vulnerable patients at the clinic ad hoc

When Wildfire Smoke isForecast:
- Intensify distribution to vulnerable patients at clinic and with community partners

During a Wildfire Smoke Event:
- Continue distribution

Additional Considerations

1. Ensure masks are available in various sizes to fit different age groups and face shapes properly. Children under age 2 should not wear masks.
2. Emphasize that use of an N95 does not make it safe to spend time outside in heavy smoke: patients should still go inside and seek cleaner air. Masks are temporary solution when exposure to outdoor air or hazardous indoor air is unavoidable.
3. Ensure vulnerable patients are aware that when using a mask, if they have significant breathing difficulties or become too hot, they should take the mask off and seek a cleaner air room/center.
4. Emphasize that surgical and cloth masks are ineffective and cannot replace N95s.

ANNEX 3

Provide Wildfire Smoke Education

These interventions focus on empowering health care professionals to educate the community about wildfire smoke safety. Health care professionals are uniquely positioned to educate the community as trusted sources of information. Key strategies include conducting presentations at schools and community events, distributing educational materials and hosting workshops on DIY air purifiers. These efforts collectively enhance community preparedness and resilience against wildfire smoke hazards.

3.1 Engage in Wildfire Smoke Education Outreach

Summary

Clinic staff can educate community stakeholders, including employers, employees, medical providers, schools and community service organizations, about the dangers of wildfire smoke and strategies to reduce their impact. This could include one-on-one conversations, formal presentations or distributing educational materials.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Minimal to Moderate:
- Educational materials on health impacts of wildfire smoke and risk reduction strategies
- If applicable, a formal presentation that can be shared with community stakeholders

Staff Requirements

Moderate to Significant:
- Active outreach to community associations and organizations
- Identify/develop outreach materials
- Develop presentation
- Train others to support outreach

Suggested Timing

Before Start of Wildfire Season:
- Identify events for outreach, such as health fairs or back-to-school presentations
- Develop relationships with organizations that facilitate events and outreach

At the Start of Wildfire Season:
- Activate outreach to event organizers and community organizations offering to present on wildfire smoke safety

When Wildfire Smoke is Forecast:
- Outreach to community organizations offering brief presentations targeting at-risk communities

Additional Considerations

1. Tailor content to the specific needs and concerns of each stakeholder group.
2. Consider partnering with local public health departments or community organizations to expand reach.
3. Ideally, provide materials in multiple languages when needed, especially when engaging diverse populations.
4. Target outreach to at-risk communities. Partner with organizations that work with these communities.

3.2 Conduct Personal Air Purifier Workshops and Demonstrations

Summary

Clinic staff can host workshops that include demonstrations of using or making DIY box fan air purifiers. These workshops can be hosted at locations serving vulnerable individuals, such as community centers, senior living facilities, schools, etc. The workshops should provide a demonstration on making and using air purifiers, hands-on education about the importance of air filtration and answer any questions about how to best utilize air purifiers.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

General | Smoke Sensitivity

Resource Requirements

Moderate to Significant:

- Educational materials on personal air purifiers
- Demonstration materials: HEPA air purifiers, DIY box fan air purifier materials (MERV 13 filters, box fan, duct tape, scissors, cardboard)
- Space to host workshops
- Air purifiers or DIY materials to give away at the workshop

Staff Requirements

Moderate to Significant:

- Active outreach to appropriate community associations and organizations
- Tailoring workshop curriculum and educational materials to specific audience

Suggested Timing

Before the Wildfire Season:

- Establish relationships with organizations and community groups that may host a workshop

At the Start of Wildfire Season:

- Solidify date, times and venue for workshops. Work with co-hosting organizations to advertise the event
- Purchase materials for demonstration. Consider raffling away several DIY box fan air purifiers to attract participants
- Print guidance on making a DIY box fan air purifier

Additional Considerations

1. Provide printed instructions for participants to take home (see guide).
2. Consider raffling away several air purifiers to attract attendees.
3. If you cannot provide materials for participants, provide a list of materials, associated costs and where they can purchase them.
4. Consider partnering with local hardware stores for supplies or vouchers/discounts for purchasing air purifiers supplies.

ANNEX 4

Support Access to Cleaner Air Spaces

This intervention prioritizes community health during wildfire smoke events by enhancing existing cleaner air centers through clinic partnerships. The focus is on integrating medical support at these centers, ensuring that vulnerable individuals have access to immediate care and resources when air quality deteriorates due to wildfire smoke. This collaborative approach aims to provide vital on-site services and strengthen the community's resilience against the health impacts of smoke exposure.

4.1 Partner with Cleaner Air Centers

Summary

Cleaner air centers are public spaces with filtration systems for use during wildfire smoke events. They are often set up in facilities such as libraries or community spaces. Clinics and health centers can partner with community organizations and local authorities hosting cleaner air centers to ensure they are accessible to vulnerable community members, offer additional services such as mobile medical outreach and ensure their location is disseminated to patients.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

General | Housing Insecure

Resource Requirements

Minimal:

- Develop social media, text or physical pamphlets giving location of cleaner air centers and when to use them (if a person is unable to create an adequate cleaner air room at home)

Staff Requirements

Minimal:

- Coordination with authorities or NGOs setting up cleaner air centers based on capacity and location
- Distribute location information and advice on when vulnerable patients should use cleaner air centers

Suggested Timing

Before Start of Wildfire Season:
- Initiate partnership with cleaner air centers

At the Start of Wildfire Season:
- Send out information (text, email, pamphlet) on when to use cleaner air centers

When Wildfire Smoke is Forecast:
- Send out information (text, email, pamphlet) on when to use cleaner air centers and their locations

During a Wildfire Smoke Event:
- Send out information (text, email, pamphlet) on when to use cleaner air centers and their locations

After a Wildfire Smoke Event or End of Wildfire Season:
- Review how many vulnerable patients used these centers

Additional Considerations

1. This intervention is contingent on cleaner air centers being provided in your community.
2. Keep in mind that cleaner air centers may be set up or change location last minute.
3. Most cleaner air centers have limited hours and are rarely open 24/7, so patients cannot rely on them for constant access.
4. If patients are going to utilize cleaner air spaces, they should have an N95 to use while getting to the location. This avoids harmful exposure.

4.2 Distribute Information on Making Cleaner Air Rooms for Vulnerable Patients

Summary

A cleaner air room is a designated space in a home kept as smoke-free as possible through use of air filters and sealing methods to reduce smoke infiltration. Without a proper cleaner air room, filter effectiveness decreases significantly. This intervention educates vulnerable patients on creating and maintaining such rooms. Guidance is provided through documents or community workshops.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Minimal:
- Educational materials detailing how to select a room and set it up as a cleaner air space

Staff Requirements

Minimal to Moderate:
- Staff to develop and distribute educational materials to vulnerable patients
- Staff to join community organizations and offer workshops on setting up cleaner air rooms

Suggested Timing

Before the Start of Wildfire Season:
- Develop educational materials

At Start of Wildfire Season:
- Conduct workshops and distribute educational material on setting up a cleaner air room

When Wildfire Smoke is Forecast or During a Wildfire Smoke Event:
- Directly contact vulnerable patients with digital or physical pamphlets on setting up cleaner air rooms

Additional Considerations

1. Pair this intervention with DIY or HEPA air purifier distribution. Information on cleaner air rooms should be shared during filter distribution. It should also reach vulnerable patients who don't receive a filter.
2. When poor air quality coincides with heatwaves, expert consensus states heat is more immediately dangerous. Without access to air conditioning, it is better to open windows at night for indoor cooling. If patients are particularly sensitive to smoke, then they should try to leave and find somewhere cooler with cleaner air.
3. Consider partnering with community organizations on workshops about making cleaner air rooms. Collaborators could include low-income housing authorities, local public health and senior citizen service providers.

ANNEX 5

Utilize Air Quality Monitors

This intervention highlights the value of clinics purchasing and installing consumer-grade air quality monitors to provide site-specific information on wildfire smoke events. By deploying these devices, clinics can provide real-time, localized air quality data to staff and patients, enabling more informed decision-making during smoke episodes. This intervention empowers health care providers to offer timely advice on protective measures, helps identify when to activate cleaner air spaces within the clinic and contributes to a broader network of air quality information in the community.

5.1 Use Consumer-Grade Air Quality Monitors

Summary

Many parts of the United States do not have any air quality monitors. Purchasing low cost, consumer grade air quality monitor can provide valuable local information for patients and community organizations to make informed health decisions during wildfire smoke events. Clinics can set up and monitor air quality at their location, share the data publicly or loan out monitors to vulnerable patients to assess local or indoor air quality.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Moderate:

- Funds to purchase air quality monitor(s) – costs range from $150 to $1000 USD per monitor based on features, sampling method and durability

Staff Requirements

Minimal to Moderate:

- Staff to research and purchase appropriate monitor(s)
- Staff to set up and maintain monitor(s)
- Staff to educate providers and staff about accessing information and how their patients can access the information

Suggested Timing

Before the Start of Wildfire Season:

- Determine which air quality monitors are right for your clinic
- Purchase and install
- Disseminate information on how patients can access the air monitor data

At the Start of the Wildfire Season:

- Remind patients where they can find air quality data (include actions if the AQI is high)
- Test air quality monitor to ensure it works

When Wildfire Smoke is in the Forecast or When There is Smoke:

- Share local air quality data with patients
- Consider postponing appointments for vulnerable patients if the monitor is showing poor air quality

Additional Considerations

1. There are many choices of air quality monitor with varying nuance between brands and models.
2. Make sure the air quality readings from the consumer-grade monitor are publicly available and easily accessible to patients. Many monitors have an associated app that is free to download.
3. Monitors can help with non-wildfire smoke air pollution, providing additional benefit to patients with respiratory diseases. This will depend on what the monitor is built for. This may include ground-level ozone and other local pollutants.
4. In addition to stationary monitors, there are small portable monitors that may be distributed to particularly high-risk patients to understand their personal exposure.

ANNEX 6

Conduct Remote Wellness Checks

This intervention describes how to do remote wellness checks to support vulnerable patients. By proactively reaching out, clinic staff can assess the well-being of vulnerable community members, provide guidance on smoke protection measures and determine if additional assistance is needed. This strategy aims to maintain communication with those who may be more susceptible to the effects of wildfire smoke, offering a way to address concerns and provide information remotely.

6.1 Conduct Wellness Checks via Telephone

Summary

For vulnerable patients living alone, wellness checks during wildfire smoke events can be a critical intervention. Similar to extreme heat, clinic staff or volunteers are uniquely positioned to assess basic health needs, determine if additional care is needed and provide information on safe decision-making. Wellness checks are especially important for patients with pre-existing respiratory or cardiovascular conditions who may be at higher risk during smoke events.

Implementation Examples and Additional Resources

CLICK HERE

Patient Populations

Outdoor Workers | Smoke Sensitivity | General | Housing Insecure

Resource Requirements

Minimal to Moderate:
- Dedicated phone line
- Phone triage protocol for assessing patients

Staff Requirements

Moderate to Significant:
- Staff/volunteers to conduct the checks
- A clinical professional to be available for consultation when needed

Suggested Timing

Before the Start of Wildfire Season:
- Arrange space and phone line for wellness checks
- Develop staffing plan: number of staff/volunteers depending on the number of patients called, frequency of checks and patients' unique needs
- Develop method for prioritizing patients

At the Start of Wildfire Season:
- Train staff/volunteers
- Identify a clinical point of contact for volunteers

When Wildfire Smoke is Forecast:
- Alert staff/volunteers

During a Wildfire Smoke Event:
- Conduct telephone checks

Additional Considerations

1. Designate check-in staff and create a patient list.
2. Inform patients to expect calls.
3. Prioritize callers with existing patient relationships.
4. Establish protocols for:
   - Unresponsive calls
   - Patients needing care
   - Emergency service criteria.
5. Address special needs (e.g., language barriers).
6. Consider pairing calls with occasional in-person checks.

Key questions to ask:
- How are you feeling? Any breathing difficulties or chest tightness?
- Do you know how to check outdoor air safety?
- Do you have an N95 mask?

Consider reviewing this guide that outlines remote wellness check protocols for extreme heat. While the specific details may differ, the overall approach can be adapted for wildfire smoke events.

INTERVENTION ANNEX

Title:

Summary

Patient Populations

Might be challenging to reach:

Resource Requirements

Staff Requirements

Suggested Timing

Additional Considerations

NOTES:

NOTES:

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