Creating Cleaner, Safer Community Spaces

Montana's Approach to Wildfire Smoke and Indoor Air Quality

DEPARTMENT OF PUBLIC HEALTH & HUMAN SERVICES

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Agency for Toxic Substances and Disease Registry (ATSDR)

Notice of Funding Opportunity

Application due April 19, 2024

Advancing Health Equity in Asthma Control through EXHALE Strategies

Opportunity number: CDC-RFA-EH-24-0016

CDC EXHALE STRATEGIES

E – EDUCATION on asthma self-management

X – X-TINGUISHING smoking and exposure to secondhand smoke

H – HOME visits for trigger reduction and asthma self-management education

A – ACHIEVEMENT of guidelines-based medical management

L – LINKAGES and coordination of care across settings

E – ENVIRONMENTAL policies or best practices to reduce asthma triggers from indoor, outdoor or occupational sources

Key Priority Areas

Public Health & Healthcare Infrastructure

Achievement of Guidelines-Based Medical Management

Patient & Caregiver Education

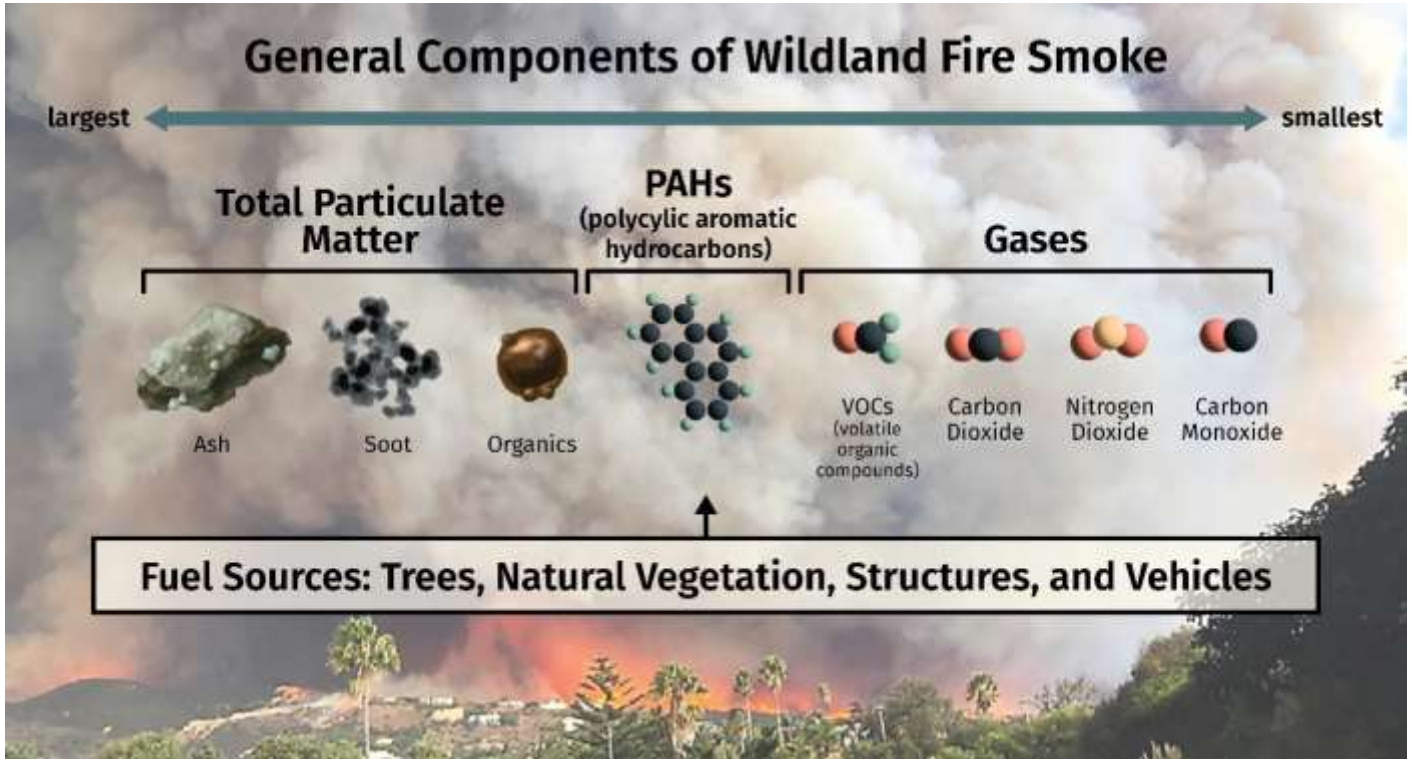
Tobacco Use Prevention & Cessation

Environmental Policies & Best Practices to Reduce Asthma Triggers

WHY ARE WE CONCERNED ABOUT WILDFIRE/WOOD SMOKE?

- Negatively affects the quality of ambient air (outdoor air, ventilation air)
- We consider outdoor air, (ambient air, ventilation air) to be generally cleaner than indoor air
- We use outdoor air to dilute indoor air pollutants
  - Smoke is not just from burning vegetation, it is also from human sources (think burning buildings and Human Made Stuff)

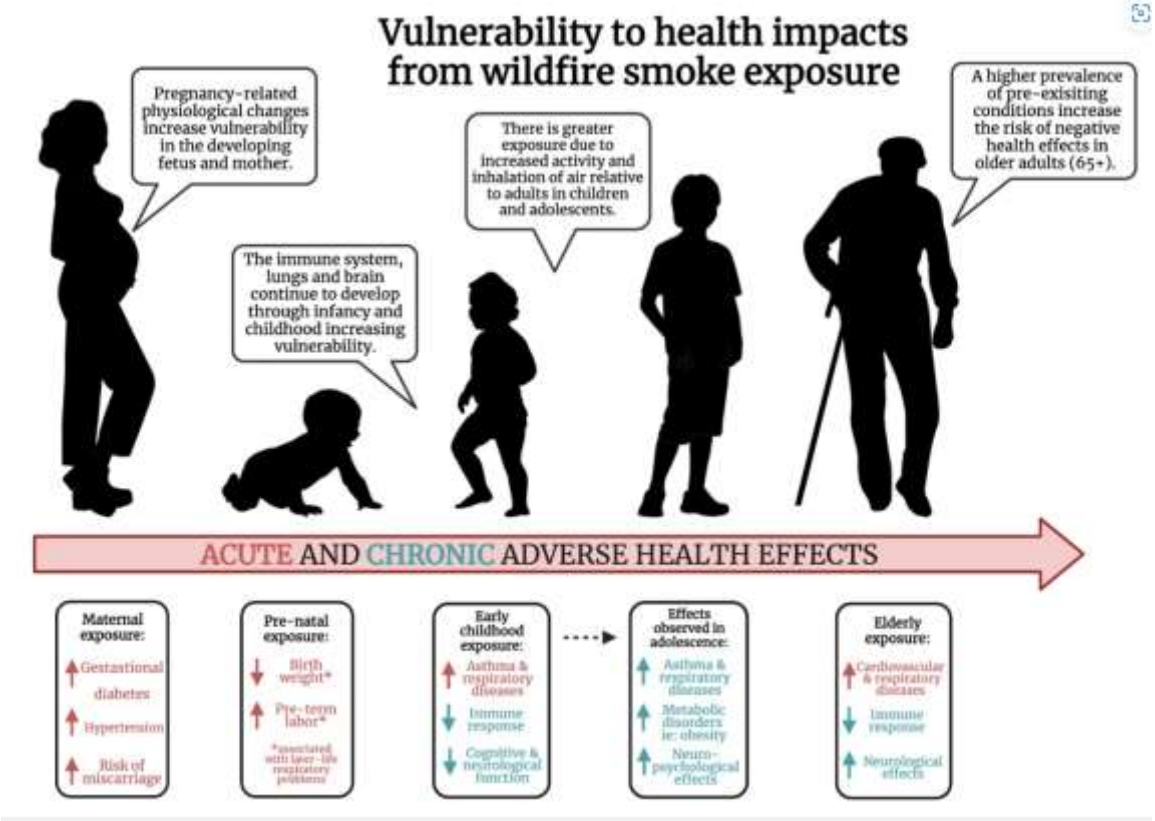
Wildfire Smoke Pollutants



- $PM_{2.5}$ is of concern because these particles penetrate deep into lungs
- $PM_{2.5}$ particles pick up other pollutants (VOCs, PAHs) by adsorption
- Systemic inflammation can affect other organs including immune system, heart, brain, kidneys, and increase in cancer rates
- Increase in hospital visits and higher healthcare costs

Wildfire Smoke Linked to…

- **Lower birthweight/preterm labor**
- **Lifetime risk** of respiratory issues, heart disease, cancer and dementia
- **Reduced Lung Function:** Recent UM study with younger adults in Missoula
- **Mortality:** MT had the highest fraction of mortality due to wildfire smoke from 2006-2018.

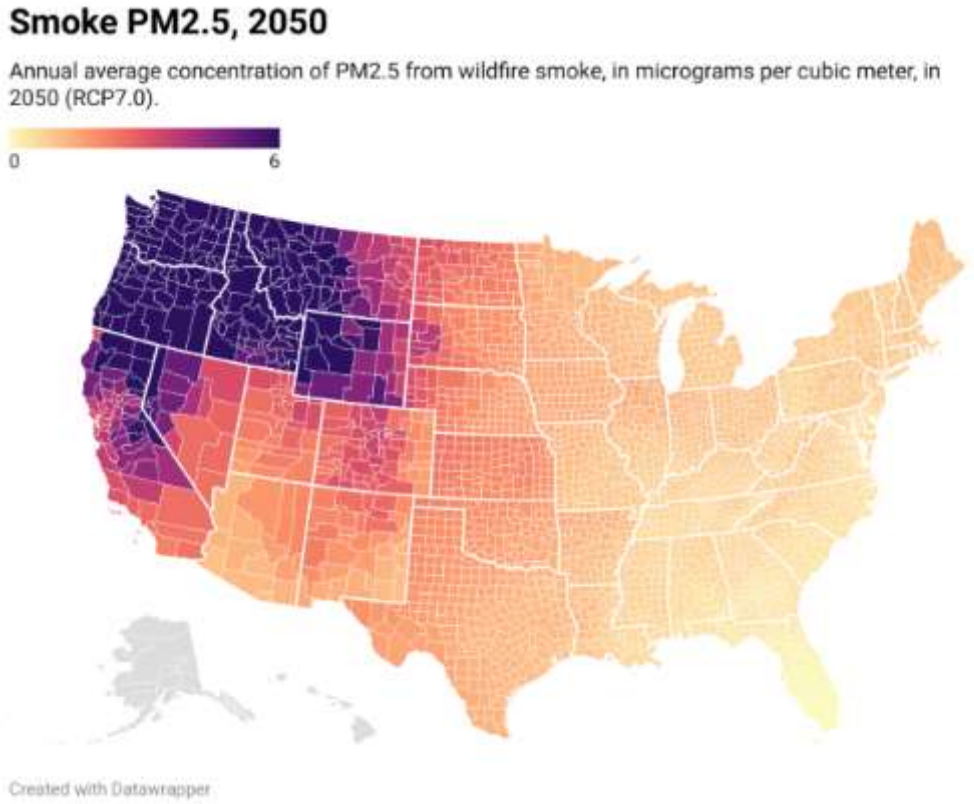


EPA AQI

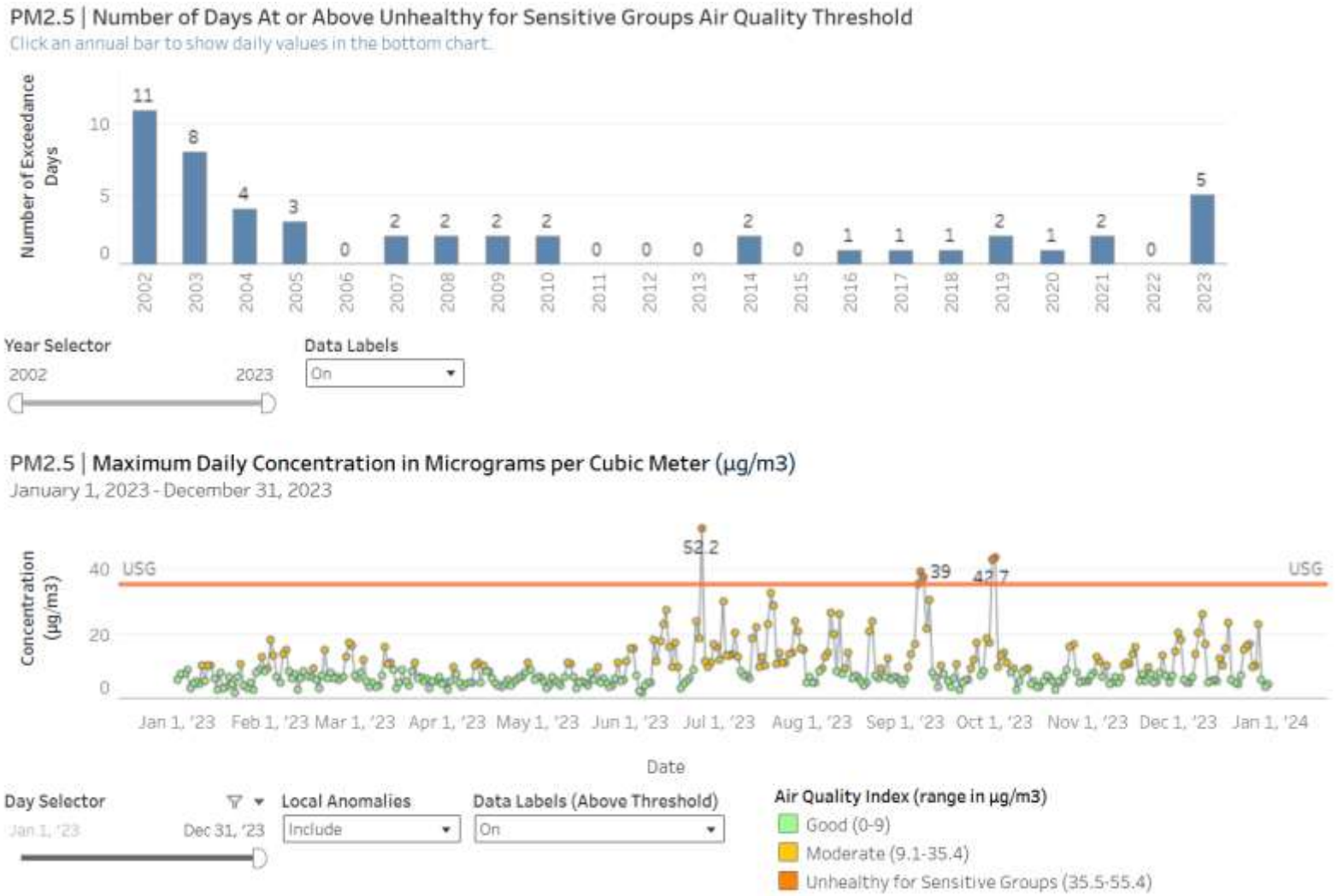
Air Quality Levels of Concern (values of index)	Recommended Actions
Good (0-50)	**Everyone:** Don't see or smell smoke? It's a good time to open windows or go outdoors.
Moderate (51-100)	**Everyone:** Don't see or smell smoke? It's OK to open windows or go outdoors. **Unusually Sensitive People:** Consider making outdoor activities light and short. Go inside to cleaner air if you have symptoms.
Unhealthy for Sensitive Groups (101-150)	**Everyone:** Consider lighter and shorter outdoor activities. **Sensitive Groups:** Go inside to cleaner air if you have symptoms.
Unhealthy (151-200)	**Everyone:** Keep outdoor activities light and short. Go inside to cleaner air if you have symptoms. **Sensitive Groups:** Consider moving all activities inside. Go inside to cleaner air if you have symptoms.
Very Unhealthy (201-300)	**Everyone:** Limit outdoor physical activity. Go inside to cleaner air if you have symptoms. **Sensitive Groups:** Avoid all outdoor physical activity.
Hazardous (301-500)	**Everyone:** Avoid all outdoor physical activity. **Sensitive Groups:** Stay indoors and keep activity levels light. Stay indoors and consider creating a cleaner air room.

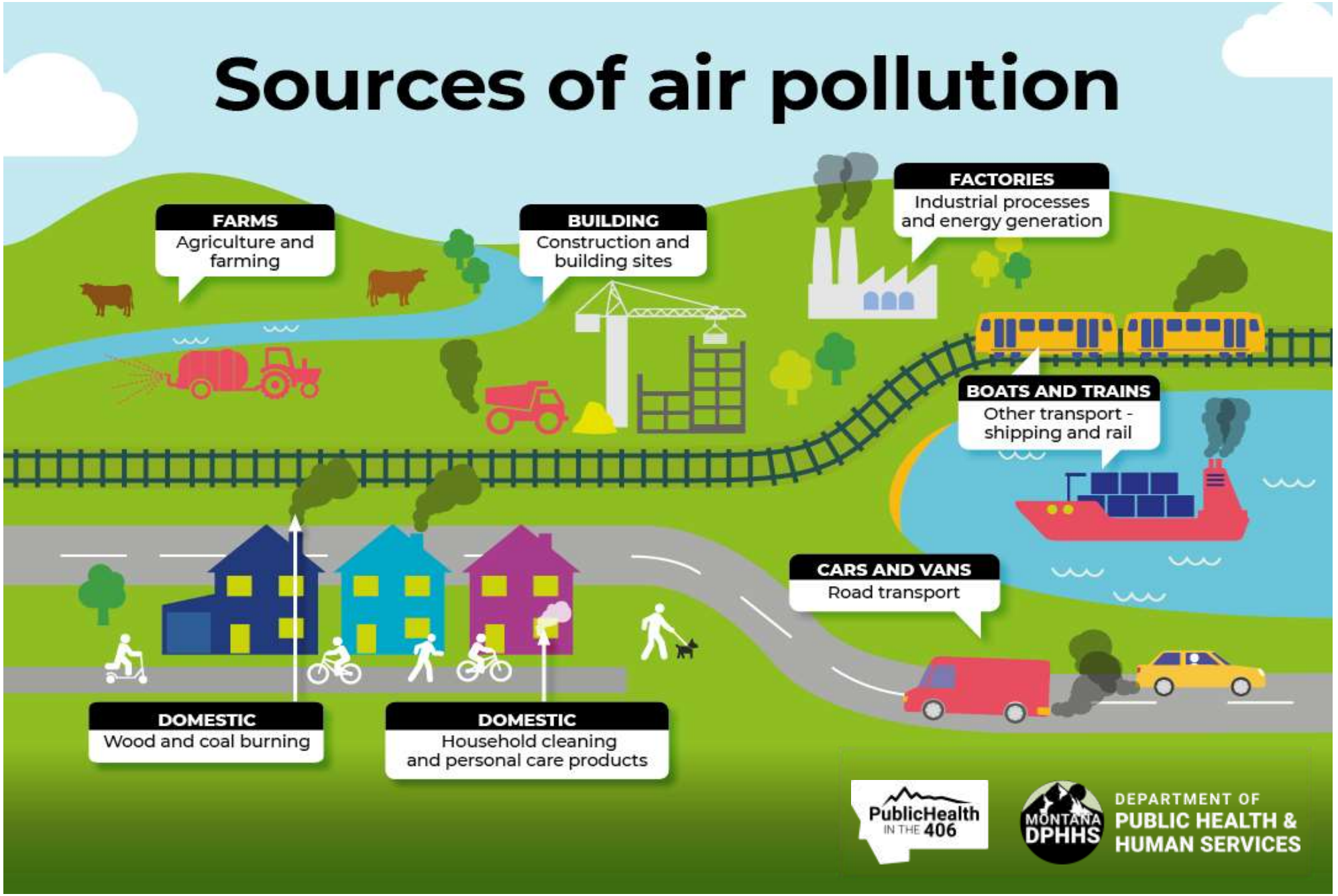
A Case for A Health Populations Approach to Wildfire

- Stanford researchers estimate wildfire smoke emissions caused 41,380 excess deaths/year from 2011 to 2020 in US
- That number is projected to increase to 70,000 deaths by 2050



Maine Historical Air Quality Data




Sources of air pollution
FARMS
Agriculture and farming
BUILDING
Construction and building sites
FACTORIES
Industrial processes and energy generation
BOATS AND TRAINS
Other transport - shipping and rail
CARS AND VANS
Road transport
DOMESTIC
Wood and coal burning
DOMESTIC
Household cleaning and personal care products
PublicHealth IN THE 406
MONTANA DPHHS
DEPARTMENT OF PUBLIC HEALTH & HUMAN SERVICES

Wood Burning and Lung Health in Maine

- 9.4% of Maine homes use wood as their primary heating source, ranking the state second in the U.S. for primary wood heating after Vermont.
- Half of Maine households heat with at least some wood.
- Around 1 in 3 wood stove owners in Maine have a stove that is over 20 years old.

Supporting clean air among priority populations in Western Montana

Strategy 1: Develop communication to outreach to the public, including smoke readiness planning

- Develop and disseminate communication tools tailored to different populations
- Educate public on home air filter options
- Encourage and support coordination and participation in a smoke readiness awareness week

Strategy 2: Technical training

- Provide training opportunities to building and HVAC managers in ASHRAE guidance and other indoor air quality topics
- Create and provide educational materials for building managers on ventilation and air quality

Strategy 3: Clean air recognition program including the deployment of portable air cleaners, indoor and outdoor air quality monitoring and preparation of community cleaner air spaces

- Develop a cleaner air center recognition program that is replicable and scalable
- Identify six buildings per year to participate and commit to being a public space with cleaner air
- Deploy air quality monitors and air cleaners at these buildings

Strategy 1

Public Communication & Smoke Readiness Planning

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What is a smoke ready community?

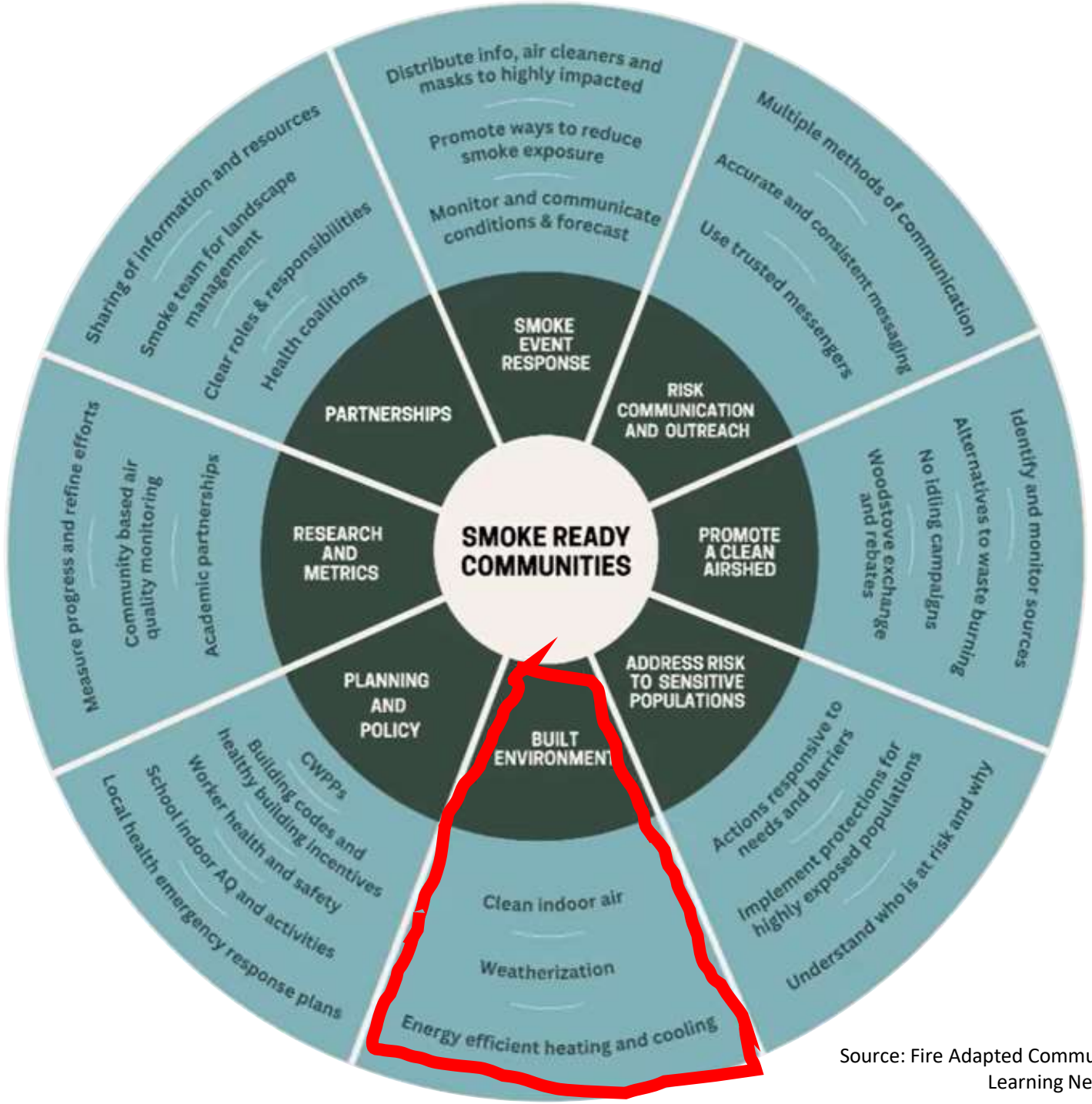
SMOKE READY

A community that knows its sources of smoke and is actively working to reduce them.

A community whose residents understand the health risks associated with smoke exposure and have access to tools to protect themselves.

A community with the resources on hand to help vulnerable and underserved residents.

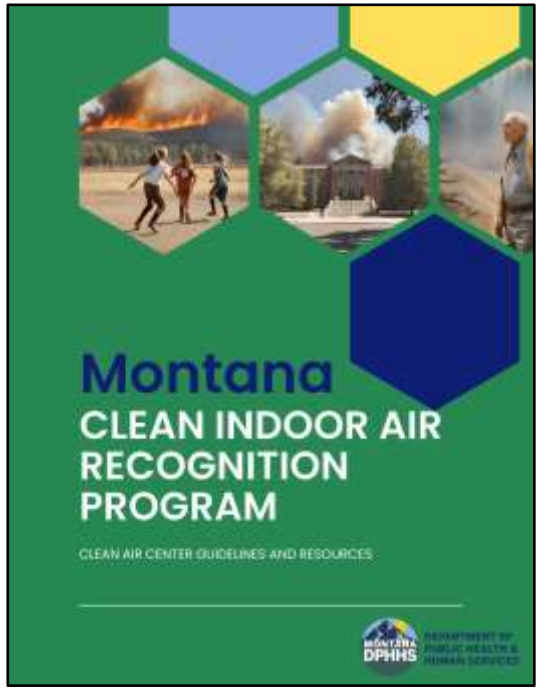
Resource Creation

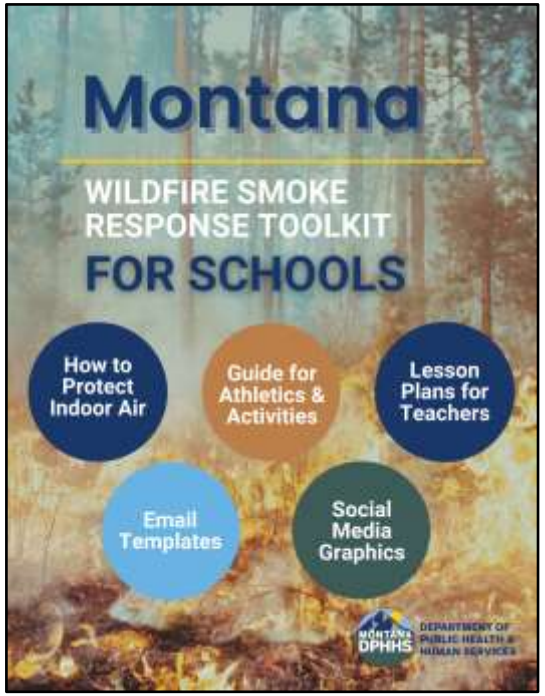


Source: Fire Adapted Communities Learning Network

Communication Tools & Education

Toolkits Developed





In the toolkits

Community Education & Resources

DYI Box fan filter demonstrations

Wildfire Smoke Preparedness Week

Outdoor/Migrant Worker Education


AGING HORIZONS
MONTANA DPHHS
DEPARTMENT OF
PUBLIC HEALTH &
HUMAN SERVICES

Track Air Quality: Fire.AirNow.gov

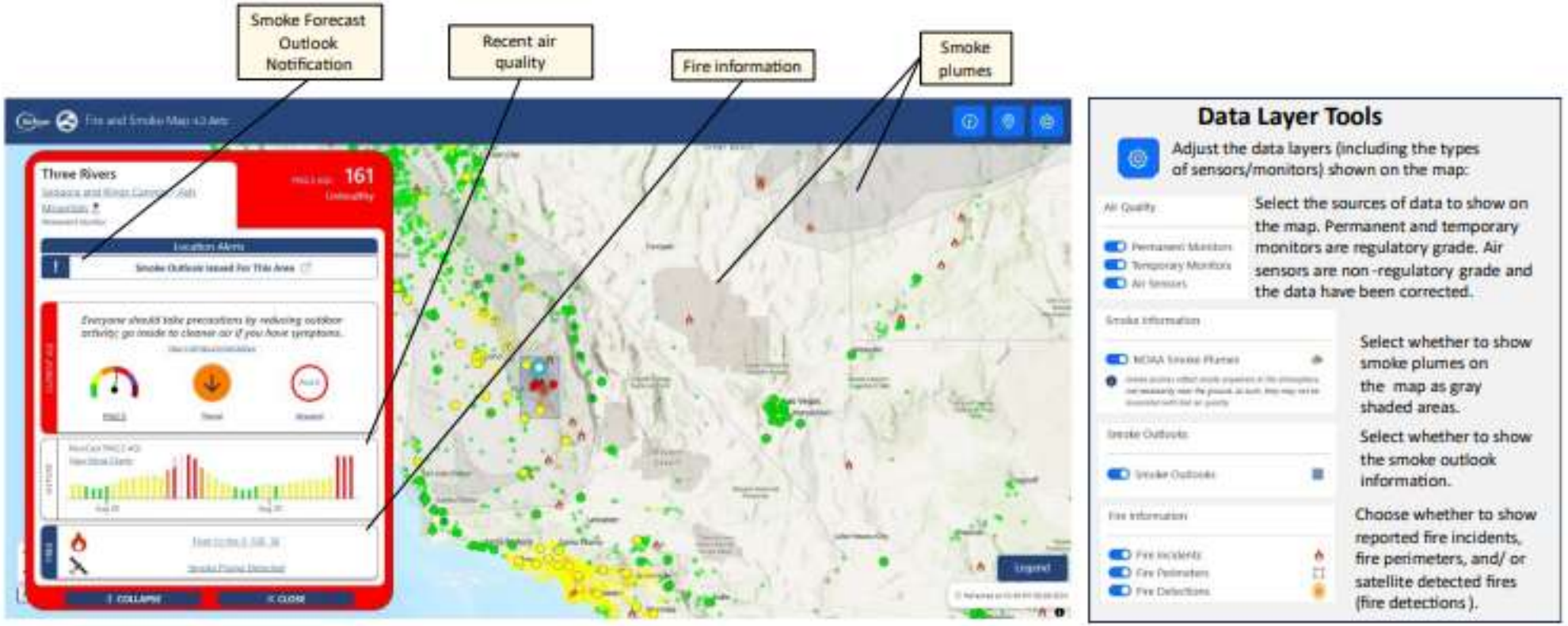


Figure 2. A screenshot from the AirNow Fire and Smoke Map.

Strategy 2

Technical Training on IAQ & Wildfire Smoke

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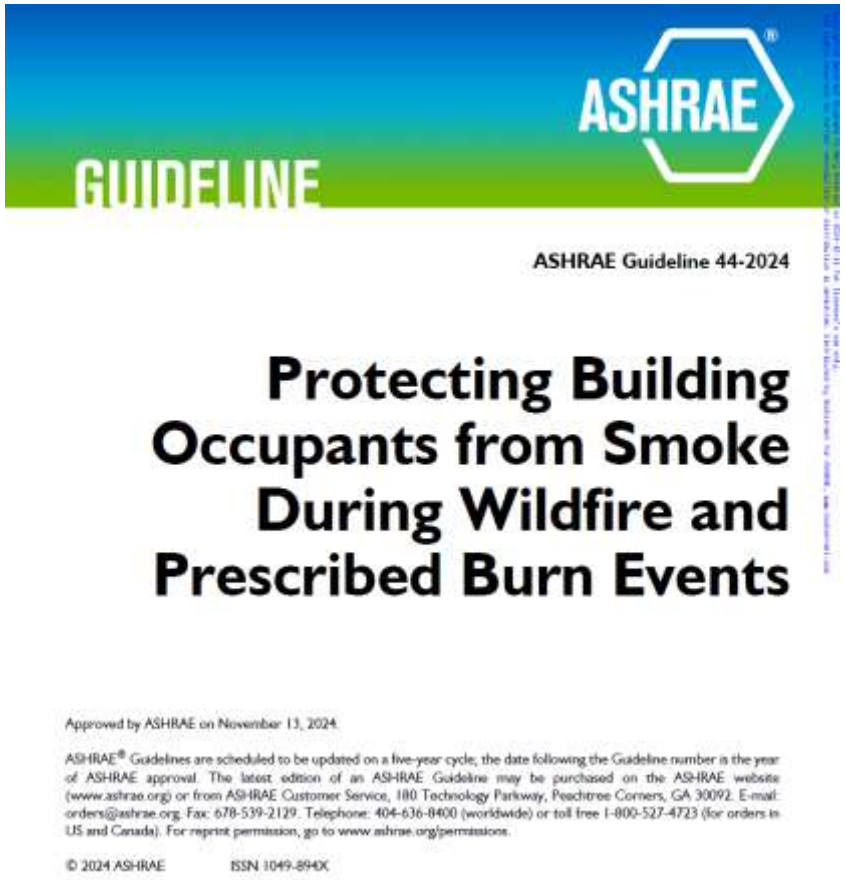
ASHRAE Guideline 44-2024



GUIDELINE

ASHRAE

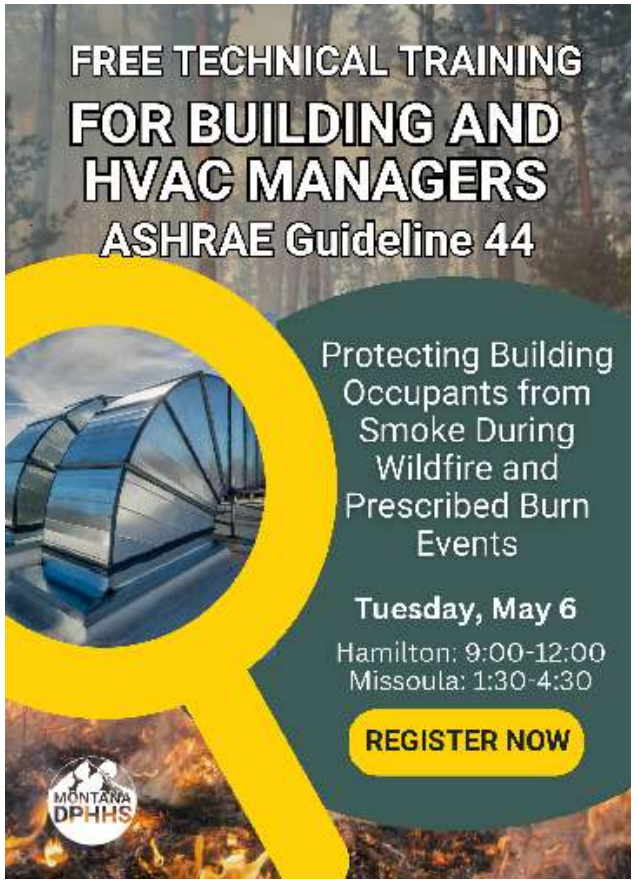
ASHRAE Guideline 44-2024

Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events

Approved by ASHRAE on November 13, 2024.

ASHRAE® Guidelines are scheduled to be updated on a five-year cycle; the date following the Guideline number is the year of ASHRAE approval. The latest edition of an ASHRAE Guideline may be purchased on the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 180 Technology Parkway, Peachtree Corners, GA 30092. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

 ISSN 1049-894X



HOW TO BETTER CONTROL SMOKE IN BUILDINGS & KEEP THE SMOKE OUT

Filter outdoor air entering the ventilation system to reduce the introduction of new pollutants, and filter indoor air to remove accumulated pollutants. Recirculate filtered air throughout the building.

Maintain positive pressure or cascading positive pressure, meaning the air pressure inside the building is higher than the air pressure outside to prevent outdoor air from being pushed or drawn into the building via infiltration.

Improve building air tightness to reduce infiltration of outdoor smoke and reduce sources of indoor air pollutants.

Continuously monitor indoor and outdoor $PM_{2.5}$ to assess the performance of the SRP and risks to building occupants.

Smoke Readiness Plan

Planning and Documentation

1. Establish baseline $PM_{2.5}$ levels and anticipate likely smoke exposure scenarios.
2. Review building design factors
3. Review engineering factors
4. Review administrative and occupant factors

During a Smoke Event

1. Monitor indoor and outdoor PM2.5
2. Make sure doors and windows stay closed
3. Do not vacuum
4. Turn OA to minimum
5. Check filters - add supplemental air filters
    - Check pressure drop across filters, no more than 2X clean pressure drop
6. Maintain a slight positive pressure in the building
7. Use Portable Air Cleaners made to filter out particles (HEPA)

HEPA Air Cleaner Considerations

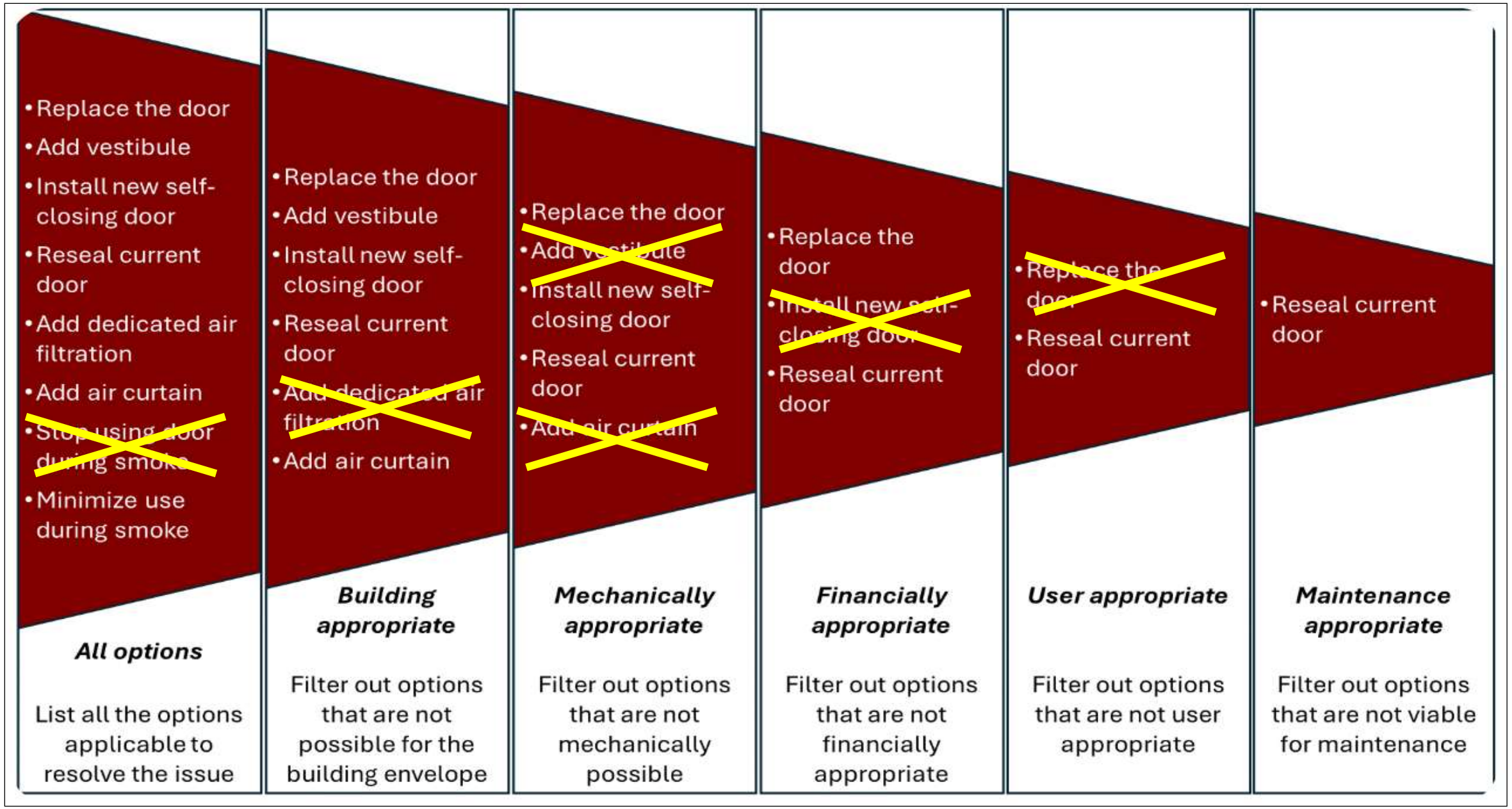
- TRUE HEPA-not HEPA-like
- Consider Room Size
- Noise Level (And Your Tolerance)
- Energy Star Rating
- Cost

List of CARB-Certified Air Cleaning Devices (California Air Resources Board)

Common HVAC Maintenance Issues

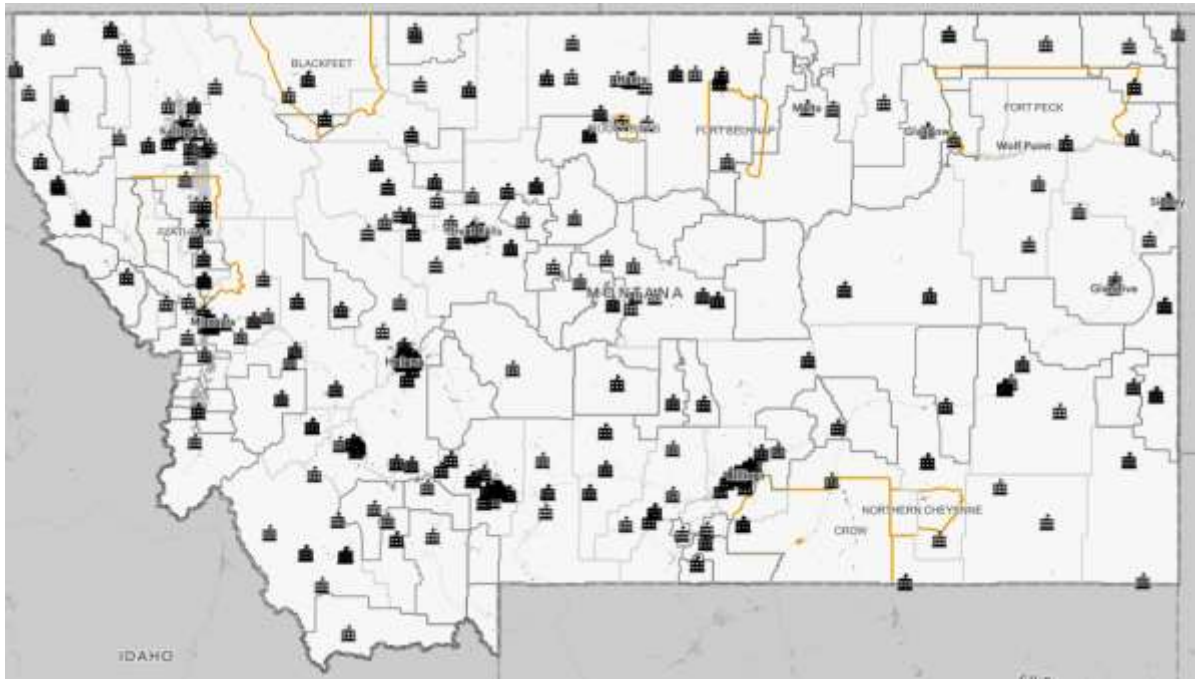
- **Filter bypass** (i.e. when smoky air gets around the filter) can be caused by poorly fitting filters, damaged filters, damaged gaskets, or damaged filter rack doors.
- **Broken Dampers** in the open position can let in large amounts of smoky air, while those broken in the closed position can impact the pressure balance of the HVAC system and not provide adequate ventilation.
- **Leaky Seals** on dampers can let smoky air leak through a closed damper.
- **Leaky Ducts** can let smoky air into the HVAC system potentially bypassing filtration sections.
- **Broken or uncalibrated sensors** can prevent the HVAC from operating as designed.

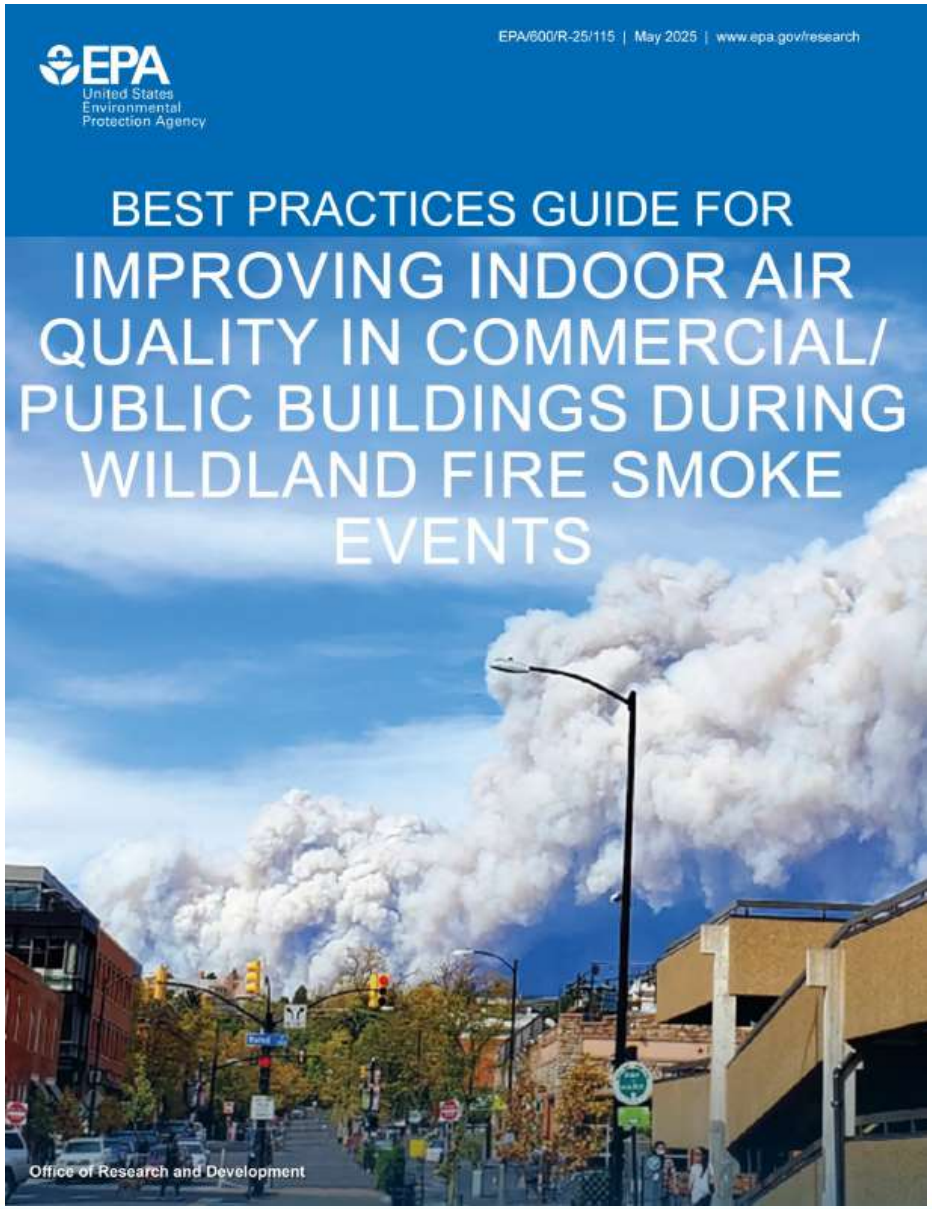
Hypothetical Scenario: Main door is causing air leakage into the building



Air Cleaners in Schools

MACP coordinated the distribution of over 10,000 HEPA Air Cleaners to schools with support from federal COVID-19 School Reopening Funds.




EPA
United States
Environmental
Protection Agency
EPA/600/R-25/115 | May 2025 | www.epa.gov/research
BEST PRACTICES GUIDE FOR
IMPROVING INDOOR AIR QUALITY IN COMMERCIAL/ PUBLIC BUILDINGS DURING WILDLAND FIRE SMOKE EVENTS
Office of Research and Development

Strategy 3
Clean Air Recognition Program

What kind of facility do we need to use for a Clean Air Center?

- Ability to operate building differently during smoke event
- Good building envelope integrity
  - Sealing and weatherstripping to decrease infiltration
- Mechanical ventilation and air conditioning systems
  - OA Filtration
  - RA Filtration
- Vestibules
- Qualified HVAC staff or contractors
  - Readiness to make quick, temporary changes to OA

Clean Air Recognition Program

Our Objective: Empower public buildings in target communities to serve as clean air centers for citizens during wildfire smoke events.

What DPHHS Provides:

- Smoke readiness planning guidance and resources
- HEPA air cleaner(s)/other support tools
- Indoor air quality monitor
- $1,500 stipend for incurred expenses
- HVAC system training for building manager/HVAC contractors

Partner Commitment:

- Adopt policies and protocols for protecting the building from wildfire smoke and improving indoor air quality conditions during smoke events
- Develop/adopt a building smoke readiness plan
- Meet regularly with DPHHS and other air quality partners to review actions taken and identify opportunities for improvement
- Share IAQ monitoring data with DPHHS
- Publicize Clean Indoor Air Center role in the community
  (A 24-hour center is not necessary to be eligible for this opportunity.)

Clean Air Centers

Bitterroot Library

Darby Library

Seeley Lake Library

North Valley Library

Lolo Library

Missoula County Library

Clean Air Recognition Program

Indoor and Outdoor Air Quality
Darby Library

This "Purple Air" sensor measures **indoor Air Quality**, specifically fine particular matter: PM 2.5. It's connected to the internet!

Click this QR code to view the **Purple Air map** and air quality level inside this library (it's the circle with a border!).

Current Indoor Air:

Wildfires and wood smoke contain many pollutants. We're most concerned with fine particulate matter PM2.5. These tiny particles can burrow deep into our lungs and even pass into our bloodstream, and they impact our health in multiple ways. Please see our brochure or montanawildfiresmoke.org for more information about health risks and what you can do in your home to prepare and stay healthy.

Current Outdoor Air

Darby also has an **outdoor Air Quality** sensor, and you can see the current air quality at **AirNow.gov**. Click this QR code.

Air Quality Activity Guidelines (AQI) provide the level of air quality and recommended actions

AQI	What should I do?
0-50	Good: You can breathe safe
51-100	Moderate: Some risk for those who are sensitive to air pollution
101-150	Unhealthy for Sensitive Groups. These folks should limit time outside and avoid strenuous outdoor activity
151-200	Unhealthy: Everyone should reduce exposure. Limit time and activity outside and take steps for clean indoor air.
201-500	Hazardous: Stay inside and filter indoor air. Go elsewhere for cleaner air if needed.

Climate Smart Missoula

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WILDFIRE SMOKE SEASON CHECKLIST

Task	Assigned To	Completed	Notes
BEFORE SMOKE EVENT			
Check supplies • HEPA Air Cleaner is operable • Extra HEPA filters available			
Confirm Air Monitor is operating			
Confirm staff is familiar with Clean Air Center protocols, monitor & materials			
Publicize shelter availability incl. hours of operation			
Clean HVAC system			
Determine clean air shelter/room capacity			
Solicit resources from community partners, if applicable			
DURING SMOKE EVENT			
Switch HVAC System from "normal" mode to "smoke mode"			
Display Shelter Availability Sign on main & community room doors			
Display & update Current Air Quality sheet			
Display Keep Door Closed signs on all doors			
Make Daily Monitoring Checklist available to staff & complete daily			
Monitor IAQ with PurpleAir indoor sensor			
Check HVAC & HEPA filters every 3-7 days, depending on severity and length of smoke event			
Maintain indoor temp below 80 °			
AFTER SMOKE EVENT			
Wet mop/dust surfaces			
Monitor IAQ & continue to use HEPA if needed			
Change filters in HEPA and/or HVAC if needed			
Thank community partners for resources, if applicable			
Record lessons learned if applicable			

Clean Indoor Air Center

Capacity:
Hours:

Entity Logo Here

North Valley Library

AQI MONITORING SPREADSHEET ~ SMOKE EVENT

AQI 151+ for 24+ hours

Date				
Time (AM)	Outdoor AQ	Indoor AQ	Staff Initials	Notes (if applicable)
Time (PM)	Outdoor AQ	Indoor AQ	Staff Initials	
Date				
Time (AM)	Outdoor AQ	Indoor AQ	Staff Initials	Notes (if applicable)
Time (PM)	Outdoor AQ	Indoor AQ	Staff Initials	
Date				
Time (AM)	Outdoor AQ	Indoor AQ	Staff Initials	Notes (if applicable)
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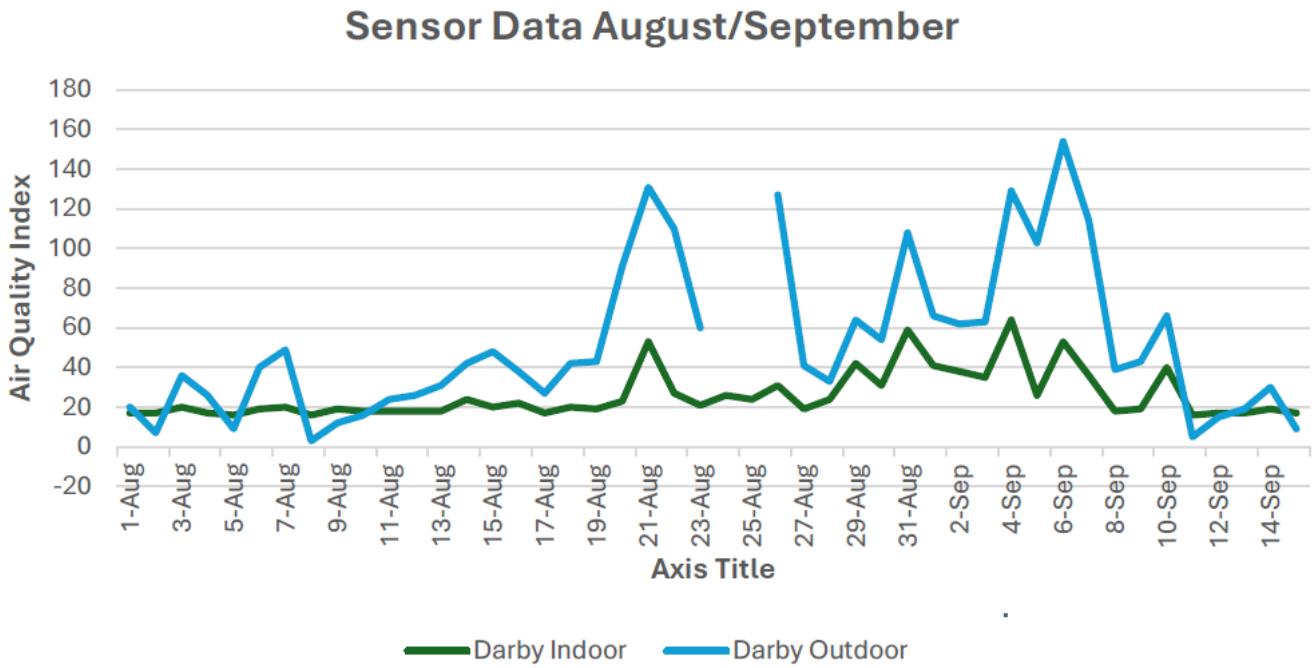
Time (PM)	Outdoor AQ	Indoor AQ	Staff Initials	
Date				
Time (AM)	Outdoor AQ	Indoor AQ	Staff Initials	Notes (if applicable)
Time (PM)	Outdoor AQ	Indoor AQ	Staff Initials	

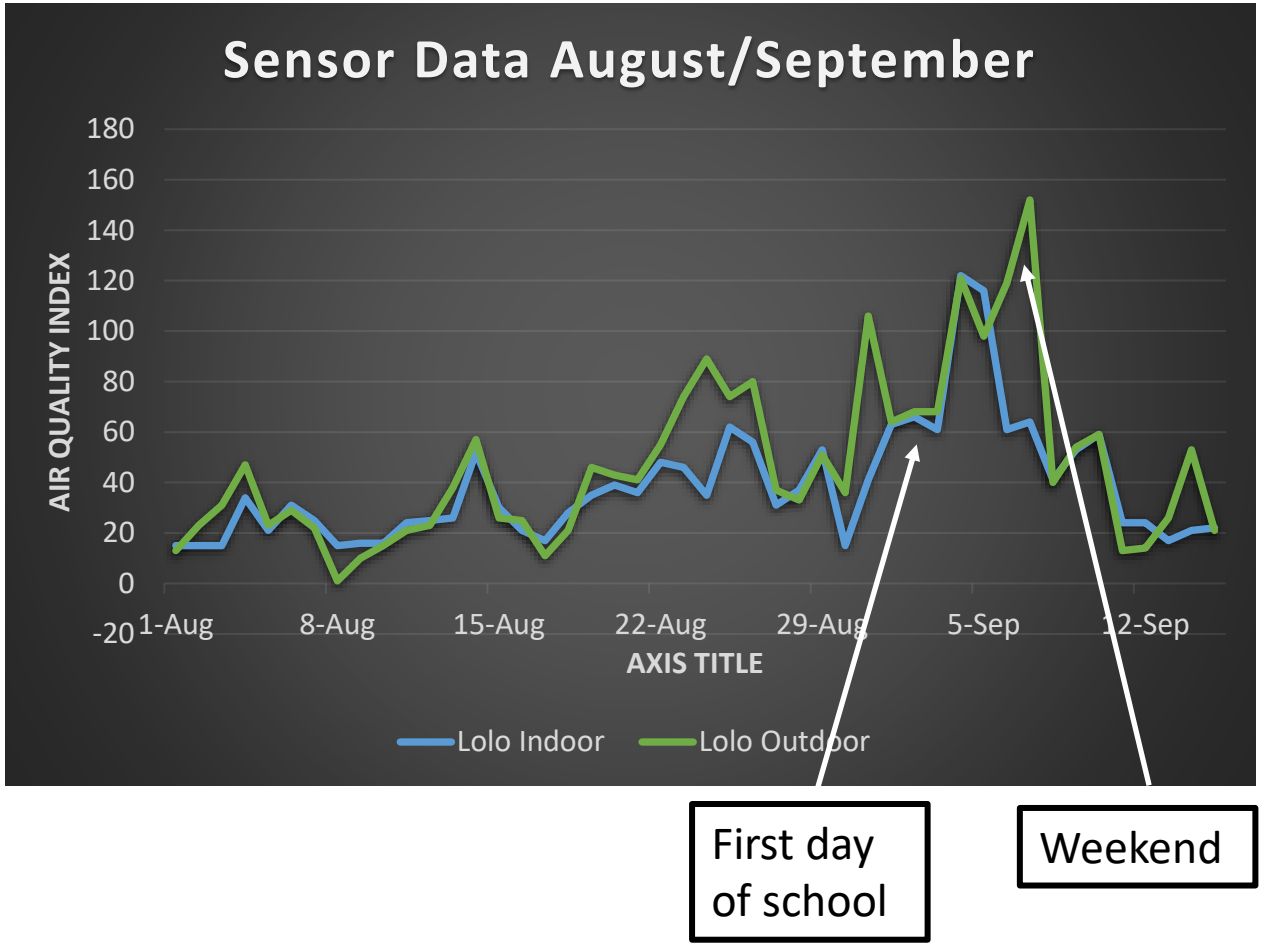
Sept. 30 - Give to Kayli to submit or submit all completed spreadsheets to mary.anderson2@mt.gov

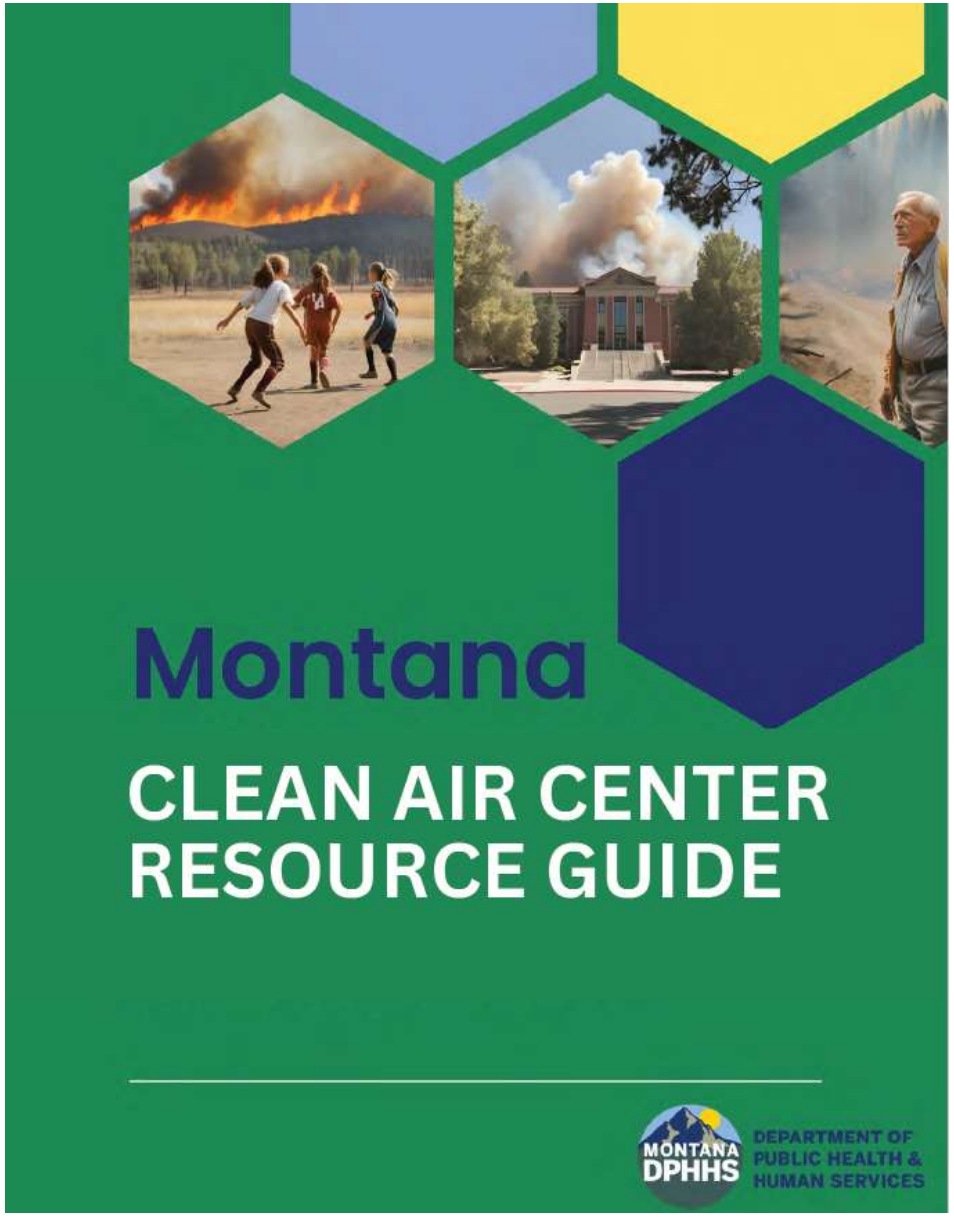
Darby Library



Lolo School and Library

Building opened for students: 2023




Montana
CLEAN AIR CENTER
RESOURCE GUIDE
MONTANA DPHHS
DEPARTMENT OF
PUBLIC HEALTH &
HUMAN SERVICES

Lessons Learned

People need something to do

Every building/community is different

Don’t box yourself in when looking for partners

Thank You

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406-444-0995

Websites
Asthma.mt.gov
Airquality.mt.gov

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