

Solving for the Indoor Environmental Determinants of Health (IEDOH) in Asthma:

IEDOH Solutions for Asthma During Wildfires

Hosted by

U.S. Environmental Protection Agency (EPA)

August 14, 2024

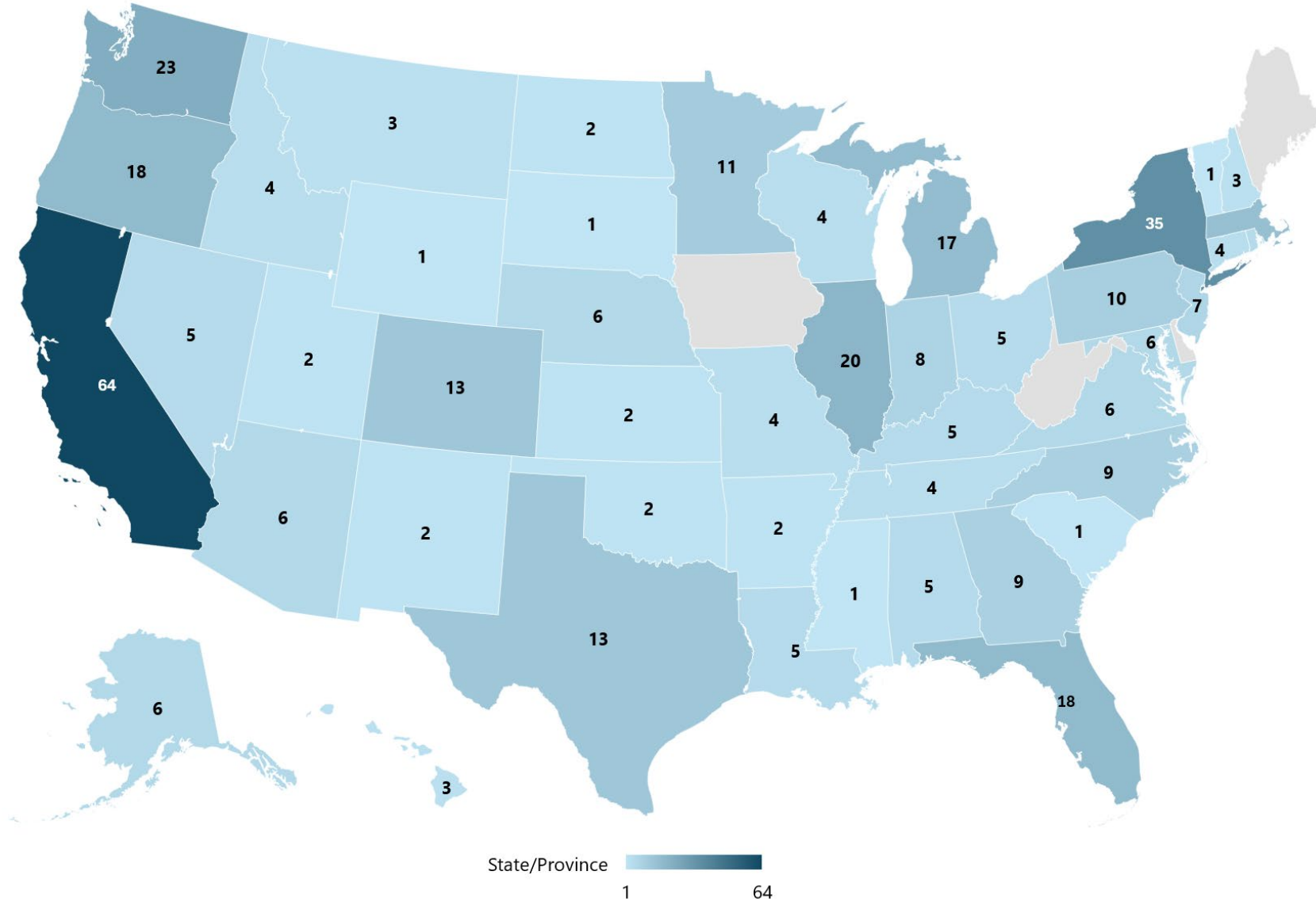
2:00–3:30 p.m. EST

IEDOH Solutions for Asthma in Wildfires

Today, we hope you will learn about—

- Significant and growing nationwide asthma risk from wildfire pollution exposure and associated spikes in urgent health care use.
- Preparedness with data, equipment, and community networks ready to deliver IEDOH interventions for people at greatest risk from wildfires.
- Examples of how to finance and deliver indoor air cleaners, replacement air filters, environmental education, and care to people with asthma during wildfire events.

Who Is Here Today?



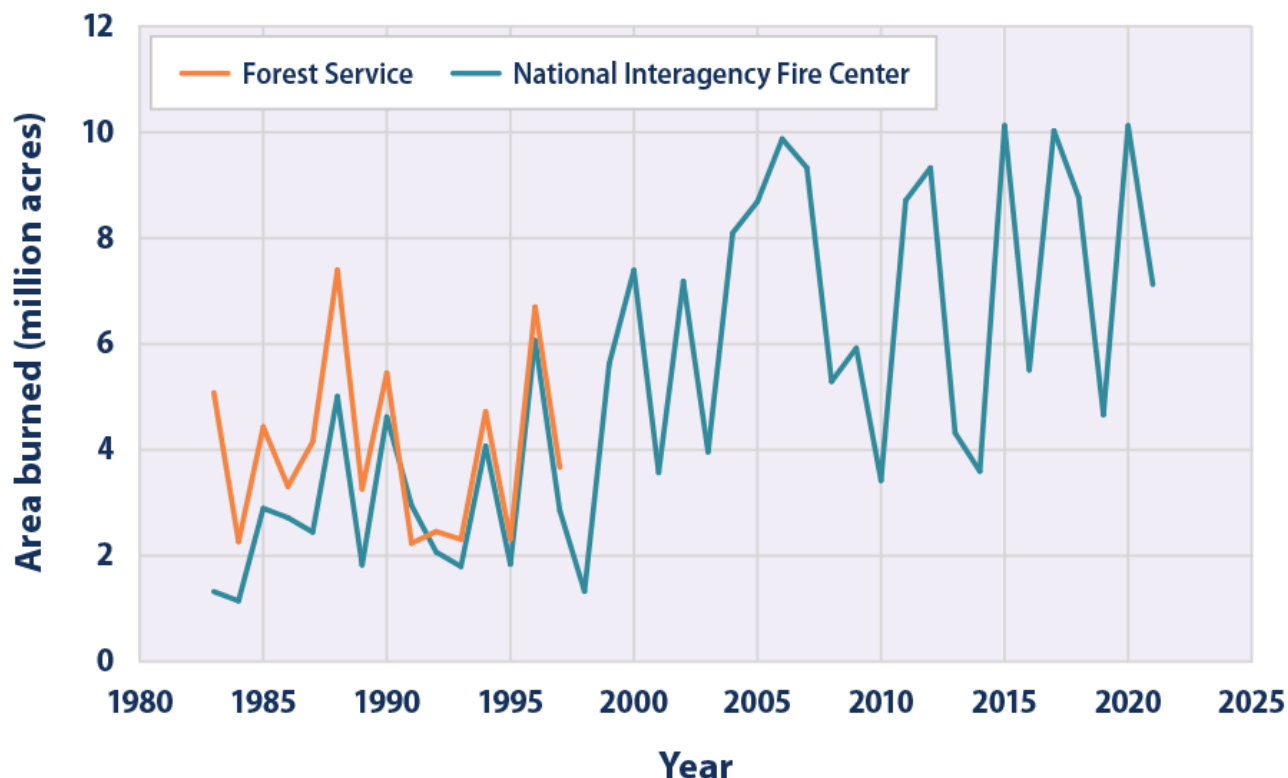
Polling Question 1

How familiar are you with wildfires and asthma and indoor interventions during wildfires for asthma?

1. Very familiar. I participate in wildfire and asthma efforts.
2. Somewhat familiar. I know wildfires are an asthma risk but do not know about IEDOH interventions for wildfires.
3. A little. I imagine people with asthma struggle with wildfire exposures.
4. Not familiar with wildfire pollution and IEDOH.

Solving for IEDOH in Asthma

Wildfire Extent in the United States, 1983–2021



Data sources:

- NIFC (National Interagency Fire Center). 2022. Total wildland fires and acres (1983–2022). Accessed June 2022. www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html.
- Short, K.C. 2015. Sources and implications of bias and uncertainty in a century of U.S. wildfire activity data. *Int. J. Wildland Fire* 24(7):883–891.

For more information, visit U.S. EPA’s “Climate Change Indicators in the United States” at www.epa.gov/climate-indicators.

Increasing wildfire risks bring a focus to the **critical role of in-home environmental interventions** in asthma care.

Children with asthma are at greatest risk from wildfire smoke exposure; **the worse the asthma, the greater the risk.**

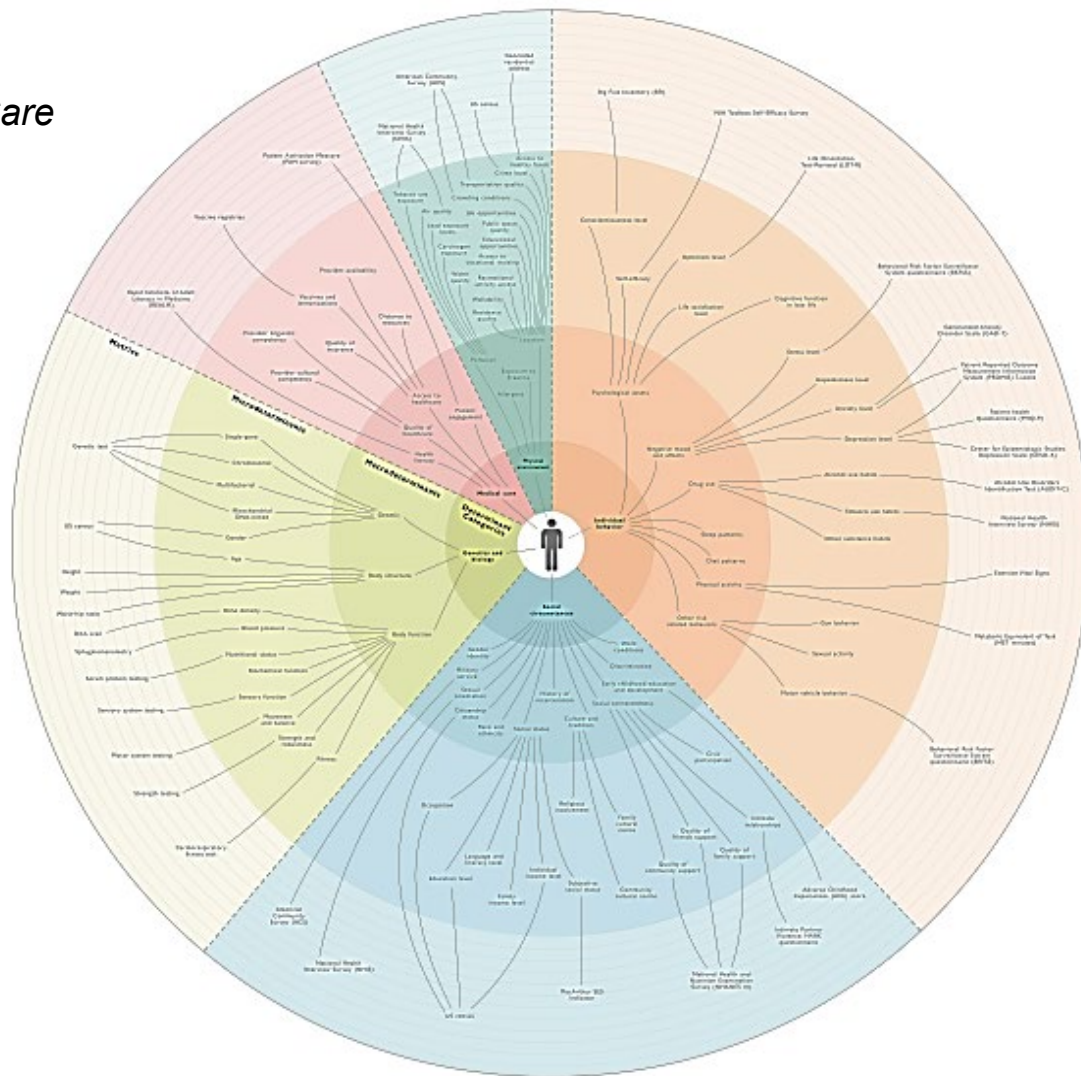
When outdoor air is full of wildfire smoke, **indoor environmental interventions become critical care.**

Physical Environment

Medical Care

Individual Behavior

Genetics & Biology

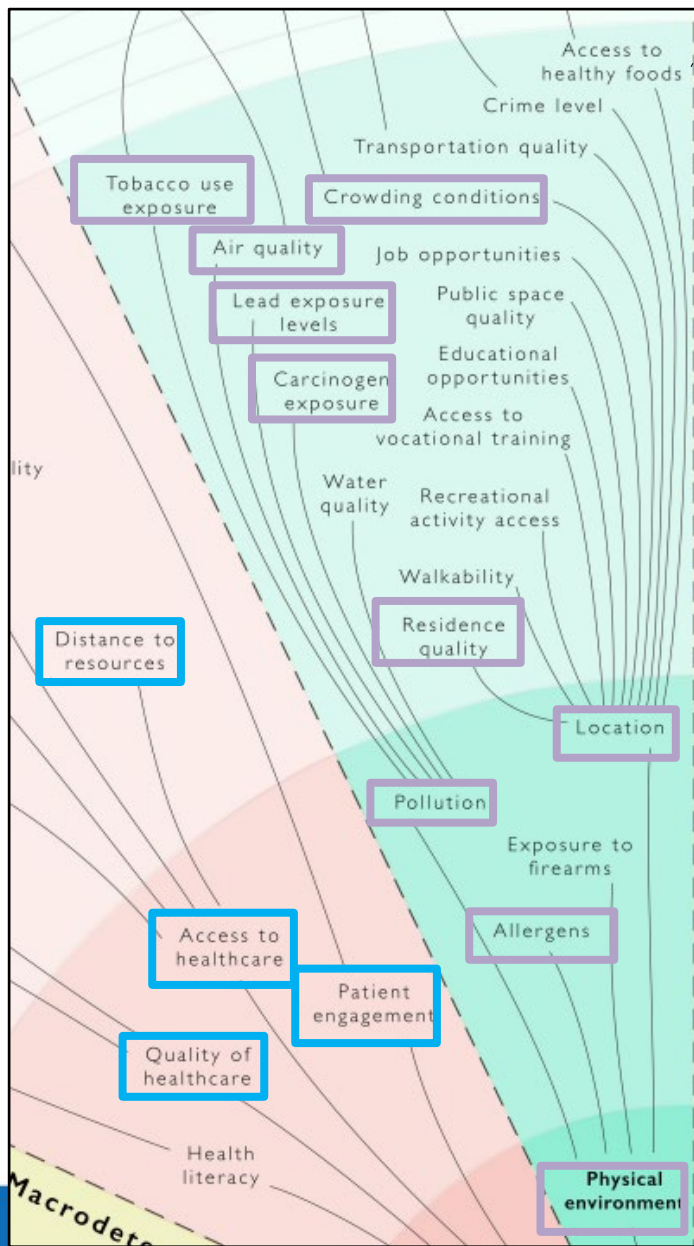


Social Circumstances

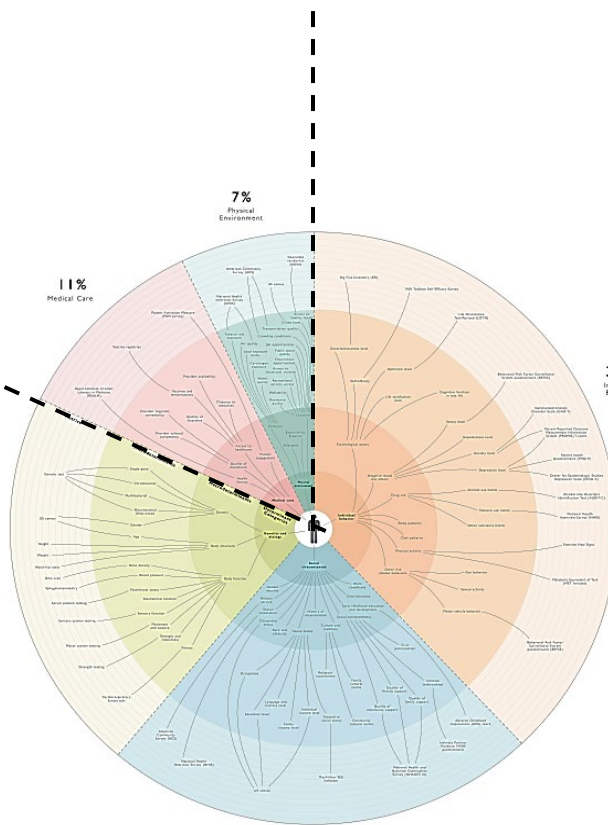
The **social determinants of health (SDOH)** are conditions in environments where people are born, live, work, play, and age that affect health, functioning, and quality-of-life outcomes and risks.

GoInvo infographic:
www.goinvo.com/vision/determinants-of-health/?utm_source=determinant

Solving for IEDOH in Asthma



IEDOH are a subset of SDOH clustered in the physical environment that **covary with housing quality and access to quality medical care.**



IEDOH are **modifiable environmental factors indoors**—such as household air pollution levels, thermal comfort, presence of pests, mold and moisture, chemicals, irritants, and **infiltration of outdoor wildfire smoke**—that influence risk and experience of disease.

IEDOH Solutions for Asthma in Wildfires

- Who needs IEDOH solutions? Everyone is at risk from wildfire smoke, but smoke poses particular risk for:
 - People with asthma and other respiratory and cardiovascular disease
 - Children younger than 18
 - Pregnant people
 - Older adults
 - Low-income people
 - Outdoor workers

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

IEDOH Solutions for Asthma in Wildfires

Emergency department (ED) visits for asthma increased during wildfire smoke exposure in New York
Asthma-associated ED visits increased over 80% on the day with the highest exposure to wildfire smoke*



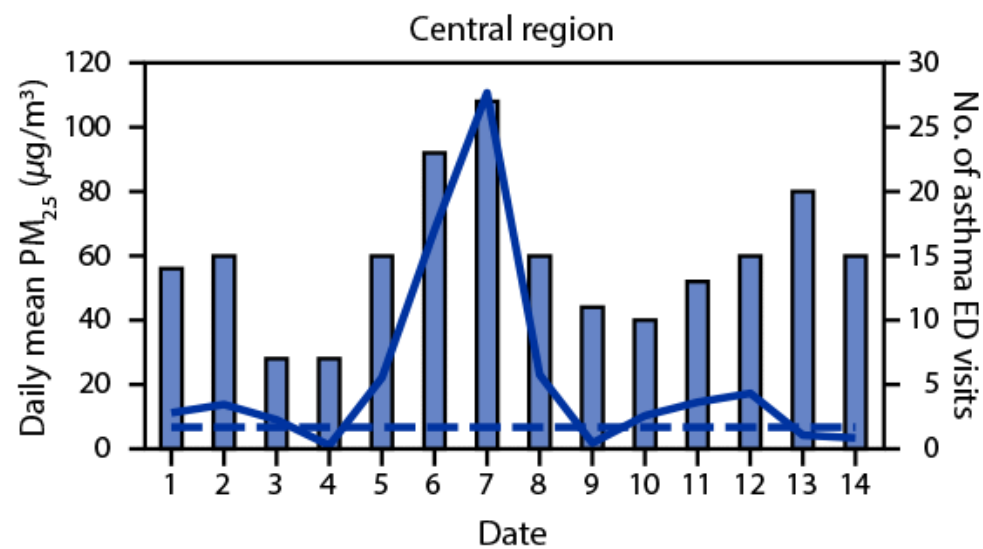
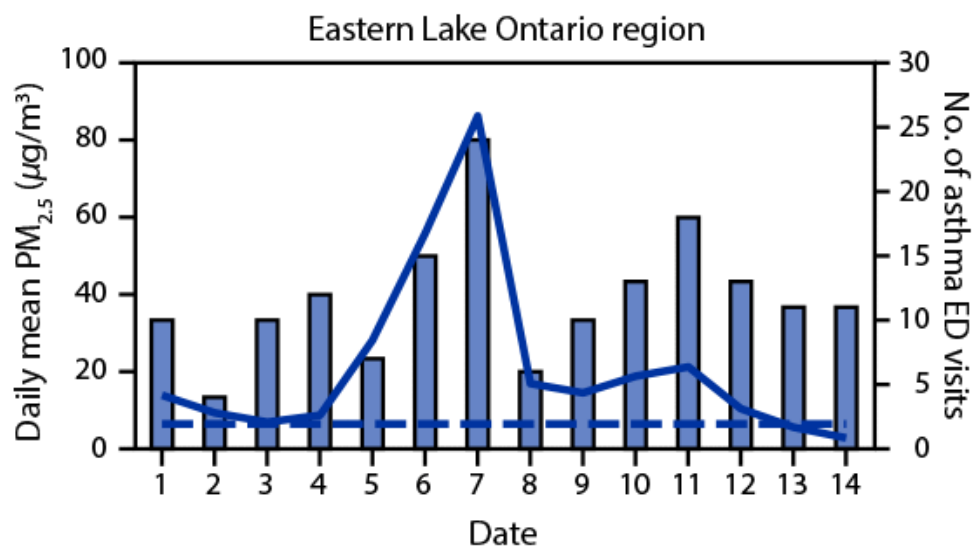
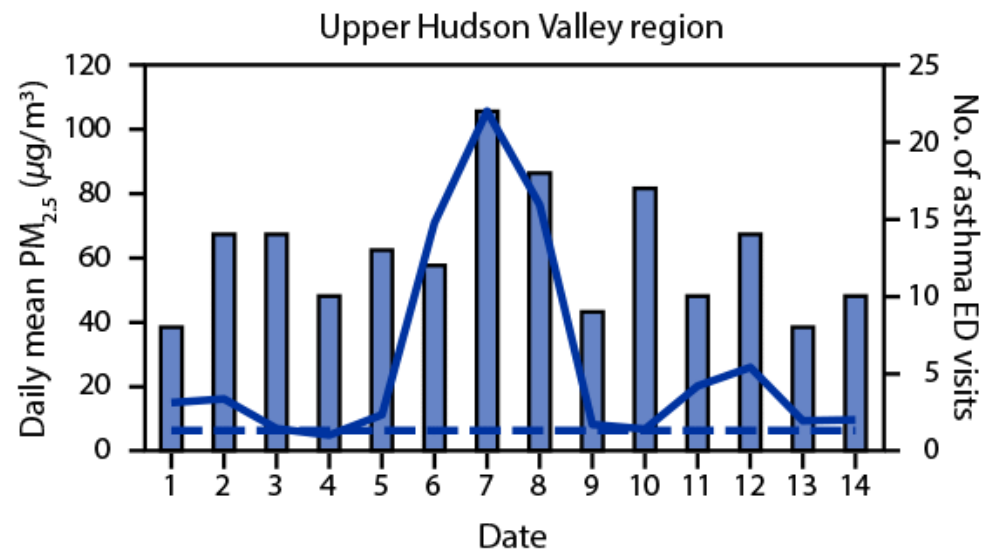
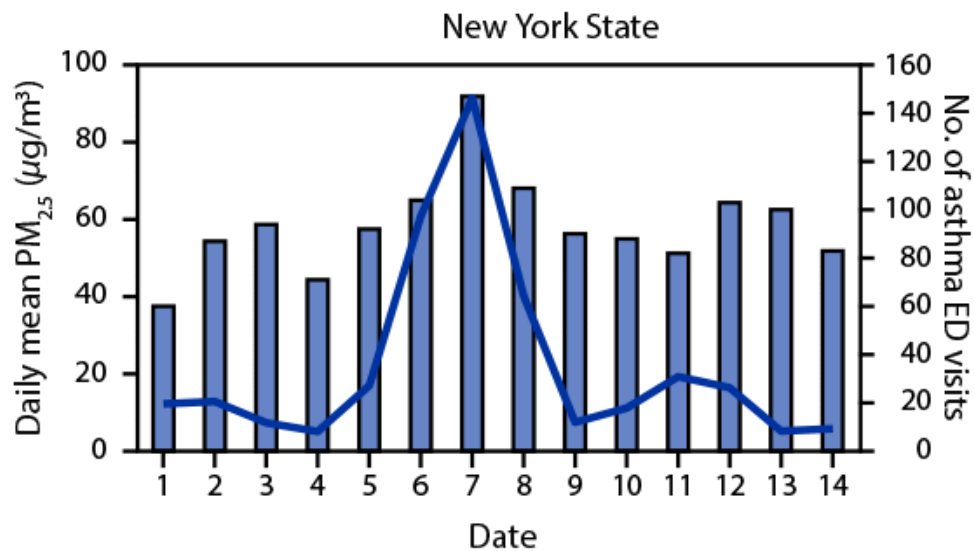
Have asthma? Talk to your clinician about strategies to prevent asthma attacks[†]

*During June 1-14, 2023, peak wildfire smoke exposure occurred on June 7
†Use a NIOSH-approved N95 mask for the best protection

bit.ly/mm7234a6

AUGUST 25, 2023





ED visits
 Daily mean PM_{2.5}
 10-year baseline PM_{2.5}

IEDOH Solutions for Asthma in Wildfires

- Especially in wildfires, 90–100% of time is spent indoors.
- IEDOH interventions, like air cleaning and enhanced filtration, can reduce PM_{2.5}.
- Addressing wildfire smoke in asthma means reaching people at risk, who may have limited clinical access, to deliver IEDOH intervention supplies and education.
- Portable air cleaners can be used alone or with enhanced filters in central air.
- Securing air cleaners, having networks to reach people at risk, and being ready to pay for equipment and staff before events is particularly important for those at-risk.

Solving for IEDOH in Asthma:

Providing Free Air Cleaners & Asthma Education to Address Health Disparities



ANNE KELSEY LAMB, M.P.H.
DIRECTOR, REGIONAL ASTHMA MANAGEMENT & PREVENTION (RAMP),
PUBLIC HEALTH INSTITUTE, OAKLAND, CA



IEDOH Solutions for Asthma During Wildfire Events

August 14, 2024

RAMP's mission is to reduce the burden of asthma with a focus on health equity. Emphasizing both prevention and management, we build capacity, create linkages, and mobilize networks to advocate for policy and systems changes targeting the root causes of asthma disparities.



Today's presentation

- Describe RAMP's guidance for selecting air cleaners for people with asthma
- Share tools for asthma programs, government agencies, and consumers
- Discuss best practices for distributing air cleaners to people with asthma

“The air is breathable in my house.”

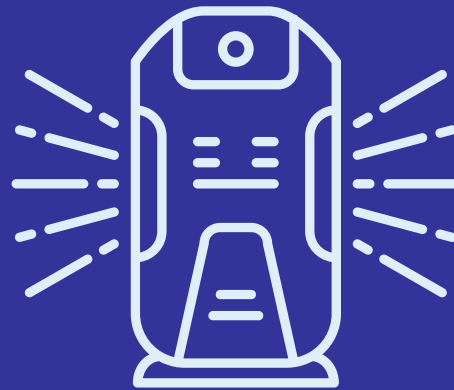
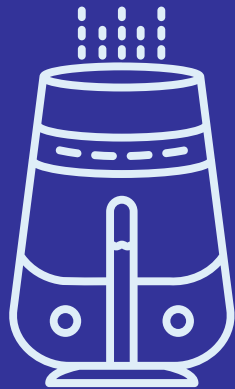
- Air cleaner recipient



Type

Cost

Room Size



Noise

Weight

Energy Use

Make sure the air cleaner is certified as a Mechanical Air Cleaner by the California Air Resources Board (CARB).

- Mechanical air cleaners are safe and effectively filter out particles using High-Efficiency Particulate Air (HEPA) or similar filters.
- Electronic air cleaners using ionizers, electrostatic precipitators, photocatalytic oxidizers, hydroxyl generators, and UV lights rely on technologies that can produce ozone or other byproducts harmful to health.

Choose an air cleaner that is the right size for the space where it will be used.

- Air cleaners are made to clean different-sized rooms.
- The clean air delivery rate (CADR) tells you how much air the air cleaner cleans hourly.
- This is measured in cubic feet per minute (cfm).

Show entries

Search

Brand	Model Name	Model Number	Type	Date Notified	EO Number
05+	Air Purifier	HM30P	Electronic	2022-12-21	G-22-478
05+	Air Purifier	HM20P	Electronic	2022-12-21	G-22-477
05+	Air Purifier	HM10P	Electronic	2022-12-21	G-22-476
1 by one BEAUTURAL	Air Purifier	741NA-0005	Mechanical	2019-11-18	G-19-184
3M	Office Air Cleaner with Filtrete™ Filter	OAC150	Electronic	2020-08-20	G-10-066
3M	Office Air Cleaner with Filtrete™ Filter	OAC250	Electronic	2020-08-20	G-10-066
3Q	Electrostatic Air Purifier	3Q-AP-04A	Electronic	2020-09-09	G-10-081
3Q	Electrostatic Air Purifier	3Q-AP-04	Electronic	2020-09-09	G-10-081
3Q	Electrostatic Air	3Q-AP-04S	Electronic	2020-09-09	G-10-081



ww2.arb.ca.gov/list-carb-certified-air-cleaning-devices

Other considerations

- Cost
- Noise level
- Size and weight
- Energy efficiency
- Independent testing
- Other features




Examples of air cleaners for asthma programs

ramp REGIONAL ASTHMA MANAGEMENT & PREVENTION		Examples of Air Cleaners							PUBLIC HEALTH INSTITUTE®
The air cleaners listed in this table are all: 1) CARB certified; 2) Mechanical air cleaners without ionizers; 3) under \$250.									
Air cleaners are made to clean different sized rooms. It is important to select each air cleaner for the room size where it will be used.									
Model	Room size	Unit cost*	Replacem ent Filter cost (1 yr)**	Noise (decibels)	Unit size (inches)	Weight (lbs)	Energy Star	Special features	
ISINLIVE vortex V2	Small	\$40	\$80	55	9*9*14.8	8.09	No	Air quality monitor	
Airthereal APH230C	Small	\$90	\$40	49	20*13*7.5	10	No	Child lock, optional timer, filter reset indicator, silent mode	
Renpho RP-AP088	Small	\$90	\$56	52	8.5*8.5*14.25	N/A	No	Timer, filter replacement indicator, night light, sleep mode, child lock	
Levoit Core 300	Small	\$100	\$60	50	8.7*8.7*14.2	7.5	Yes	Timer, filter replacement indicator, sleep mode, quiet mode	
3M Filtrete FAP-C03BA-G2	Small	\$108	\$43	55	21.3*15*11	14	No	Fan speeds, set a run timer, dim the control panel lights, and reset the filter change indicator, handle to carry	
Levoit Vital 100	Small	\$120	\$64	50	12.8*6.4*16.1	9.3	No	Sleep mode	
Okaysou Air Max 10L Pro	Small	\$130	\$100	51	13.2*7.2*19	12.78	No	Air quality monitor, auto mode, filter replacement indicator, timer, child lock	
Honeywell HPA100	Small	\$134	\$68	65	13.5*8.9*13.94	7.74	Yes	Filter replacement indicator, timer, panel dimmer	
Storebary C350	Small	\$136	\$27	50	8*68.6*13.5	7.7	No	Filter replacement indicator, PM 2.5 monitor, child lock, auto mode, timer, sleep mode, display off	
Medify Air MA-25	Small	\$160	\$100	52	13.5*8*8	7.3	Yes	Filter replacement indicator, child lock, sleep mode, timer	
IKEA STARKVIND	Small	\$180	\$30	53	7*20*21	13	No	Filter replacement indicator, auto mode detects the particles (PM2.5) in the air and then adjusts the fan speed	

rampasthma.org/wp-content/uploads/2023/09/Examples-of-Air-Cleaners-for-Asthma-Programs.pdf

Tools for organizations, schools, and consumers

How to Choose a Safe & Effective Air Cleaner



Air cleaners, sometimes called air purifiers, can help clear out wildfire smoke particles and improve indoor air quality.

What type of air cleaner is best?
Mechanical air cleaners with High-Efficiency Particulate Air (HEPA) filters or filters rated MERV-13 and higher are best. Electronic air cleaners may produce ozone or other byproducts in the air that can be harmful to health. You can avoid electronic air cleaners by avoiding products that use terms like: ionizer, electrostatic precipitator, plasma, photocatalytic oxidation, hydroxyl generator, or UV light. Some air cleaners have both a HEPA filter and an electronic component, such as an ionizer. If your air cleaner has both, we recommend turning the ionizer function off.

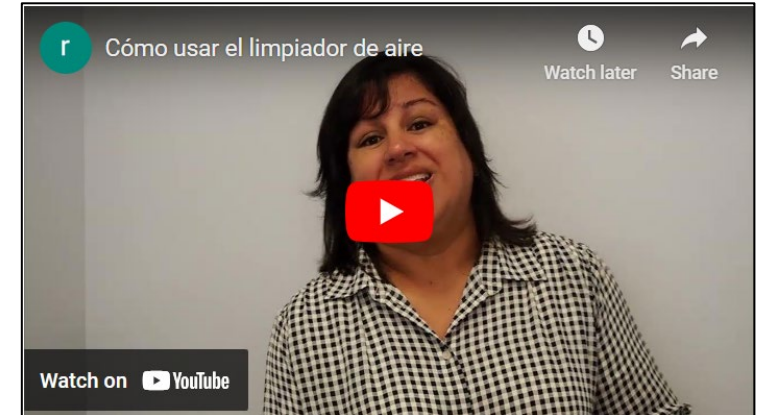
Why is room size important?
Air cleaners are made to clean different sized rooms. It is important to use one that is powerful enough to clean the amount of air in the room where it will be used. The clean air delivery rate (CADR) tells you how much air the air cleaner cleans hourly. This is measured in cubic feet per minute (cfm). Use an air cleaner with a CADR up to 200 cfm for a small room, 200-300 cfm for a medium-sized room, and more than 300 cfm for a large room.

Is it CARB certified?
All air cleaners sold in California must be certified by the California Air Resources Board (CARB) and you can check their list [here](#). Even if you don't live in California, your healthiest choice will likely be a CARB-certified air cleaner. CARB certifies both mechanical and electronic air cleaners. We recommend choosing mechanical air cleaners.

When choosing an air cleaner, make sure :

- ✓ It is a mechanical air cleaner with a HEPA filter
- ✓ It is the right size for the room where it will be used
- ✓ It is CARB certified





rampasthma.org/air-cleaners-for-asthma-programs/

Tips to Help People with Asthma Stay Safe During Wildfires

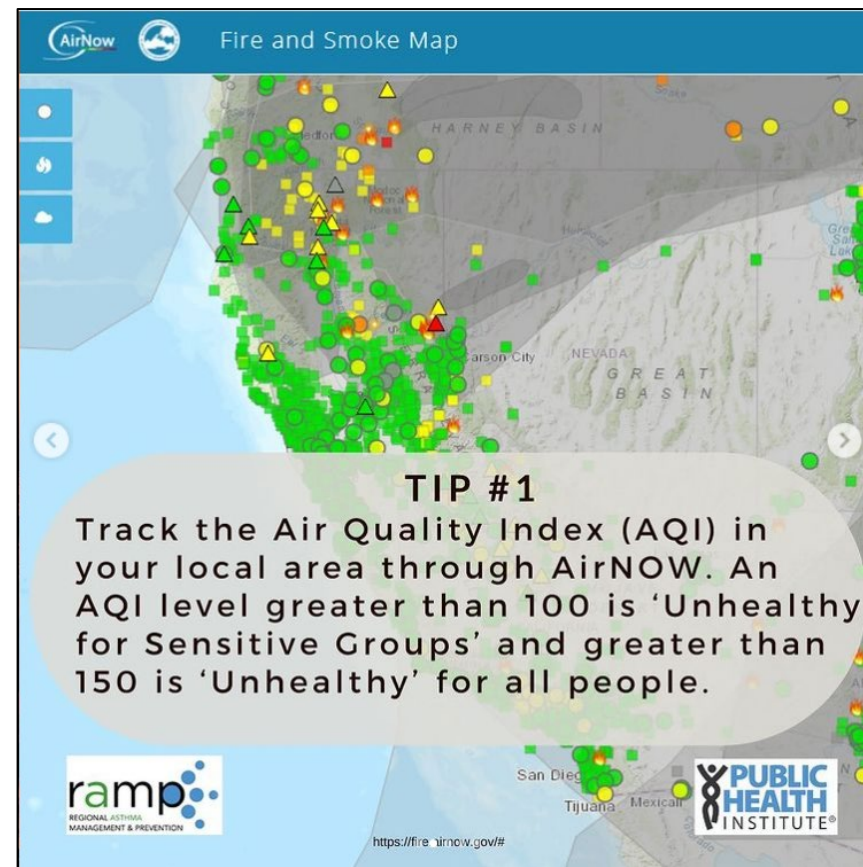
SWIPE TO SEE TIPS



ramp
REGIONAL ASTHMA
MANAGEMENT & PREVENTION

PUBLIC HEALTH INSTITUTE

Fire and Smoke Map



TIP #1
Track the Air Quality Index (AQI) in your local area through AirNOW. An AQI level greater than 100 is 'Unhealthy for Sensitive Groups' and greater than 150 is 'Unhealthy' for all people.

ramp
REGIONAL ASTHMA
MANAGEMENT & PREVENTION

PUBLIC HEALTH INSTITUTE

<https://fire.airnow.gov/#>

Tools in multiple languages

ramp REGIONAL ASTHMA MANAGEMENT & PREVENTION

ASTHMA SMOKE & AIR PURIFIERS

ASTHMA
Asthma is a long-term lung condition that makes it hard to breathe. People with asthma often have wheezing, coughing, shortness of breath and chest tightness.

Asthma triggers can cause attacks. Common asthma triggers are cigarette smoke, wildfire smoke, outdoor air pollution, and mold.

WILDFIRE SMOKE
In California, wildfires are common. The smoke from wildfires makes the air **not safe** to breathe. Breathing in the smoke can make asthma worse.

The best way to avoid wildfire smoke is to **stay indoors with doors and windows closed**.




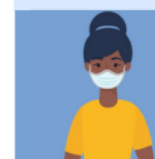
What can help you during a wildfire

AIR PURIFIERS
An air purifier, or air cleaner, is a machine that has a fan and filter. The fan pulls in dirty air and traps most of it in the filter. It then pushes out cleaner air for you to breathe. **Keep the air cleaner turned on for healthy indoor air.**

- **Mechanical air cleaners** are best because they are efficient at cleaning the air and don't create any harmful chemicals.
- Choose the right size air cleaner for the size of the rooms you will use it in most.

MASKS

- If you go outside, wearing a mask helps you breathe in less smoke.
- Use **N95 masks marked NIOSH**. These masks are also useful for preventing the spread of COVID.
- Children should only wear masks if they are over age 2 and are able to tell you if they are uncomfortable.

ramp REGIONAL ASTHMA MANAGEMENT & PREVENTION

مرض الربو الدخان وأجهزة تنقية الهواء


مرض الربو
الربو مرض طويل الأمد يصيب الرئة ويجعل التنفس صعبًا. غالبًا ما يعاني المرضى الحساسون بالربو من أزيز في التنفس، والسعال، وضيق التنفس، وضيق الصدر.



ramp REGIONAL ASTHMA MANAGEMENT & PREVENTION

HIKA MGA USOK AT AIR PURIFIER

HIKA
Ang hika ay isang pangmatagalang kundisyon sa baga na nagpapahirap sa mga tao na huminga. Ang mga taong may hika ay madalas na nakakaranas ng paghinga, ng dibdib.

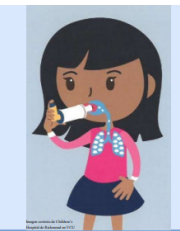


ramp REGIONAL ASTHMA MANAGEMENT & PREVENTION

ASMA EL HUMO Y LOS PURIFICADORES DE AIRE

ASMA
El asma es una afección pulmonar a largo plazo que dificulta la respiración. Las personas con asma tienen frecuentemente sibilancia, tos, dificultad para respirar y opresión en el pecho.

Algunos desencadenantes pueden causar ataques de asma. Los desencadenantes comunes del asma son el humo del cigarrillo, el humo de incendios forestales, la contaminación del aire exterior y el moho.




ramp REGIONAL ASTHMA MANAGEMENT & PREVENTION

哮喘 煙霧和空氣淨化器

哮喘
哮喘是一種長期的肺部疾病，會導致患者呼吸困難。哮喘患者通常伴隨有喘鳴、咳嗽、呼吸急促和胸悶的症狀。

哮喘的誘發因素會導致哮喘發作。常見的哮喘誘發因素有香煙煙霧、野火煙霧、室外空氣汙染，以及黴菌。




ramp REGIONAL ASTHMA MANAGEMENT & PREVENTION

HEN SUYỄN MÁY LỌC KHÔNG KHÍ HÚT KHÓI

HEN SUYỄN
Hen suyễn là tình trạng bệnh phổi lâu dài gây ra khó thở. Người mắc bệnh hen suyễn thường thở khó khè, ho, khó thở và tức ngực.

Các tác nhân gây hen suyễn có thể gây ra các cơn suyễn. Các tác nhân gây hen suyễn phổ biến là khói thuốc lá, khói cháy rừng, ô nhiễm không khí ngoài trời và nấm mốc.



Providing air cleaners to the people with asthma

- Asthma home-visiting programs
- Government agencies
 - Air district pilot project
 - Medicaid policies
- Recommendations and lessons learned



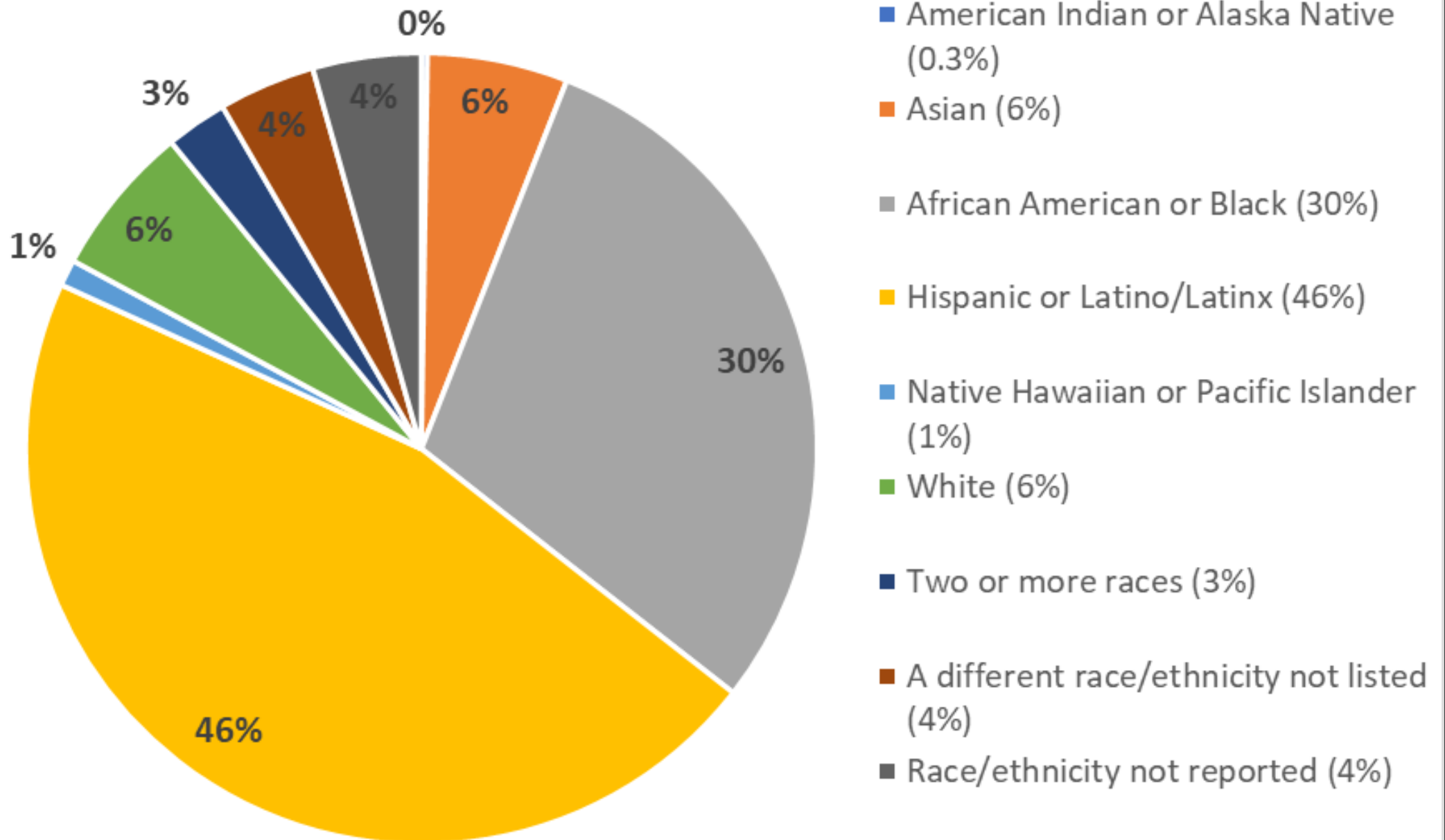
“The ability to provide this resource to patients (that have limited financial means) has had a significant impact on improving patient health outcomes surrounding asthma.”

– Asthma home visitor

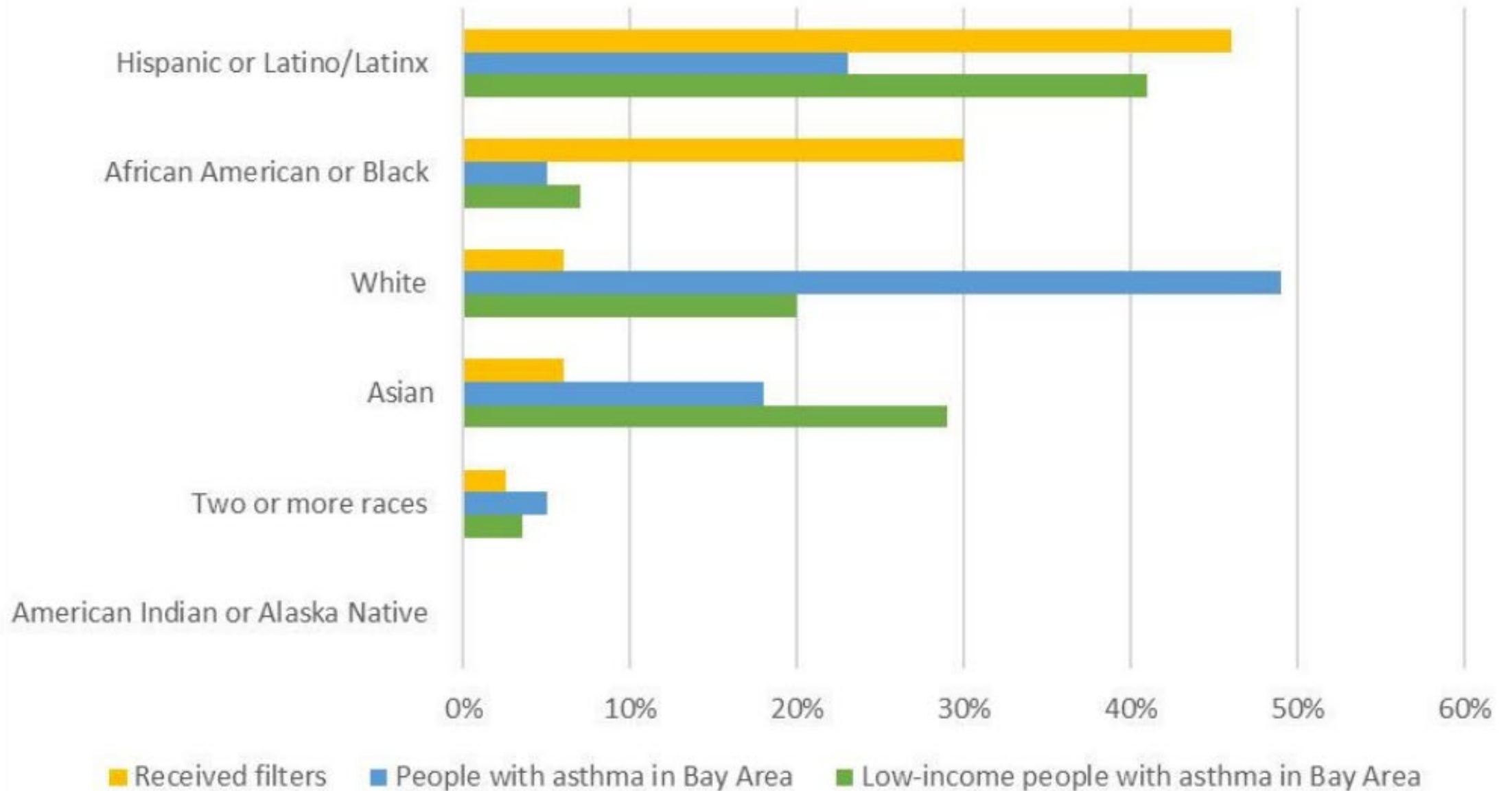
Recipient eligibility requirements

- **Poorly controlled asthma**
 - Asthma-related ED visit or hospitalization, or two urgent care asthma-related visits in the past 12 months, or
 - A score of 19 or lower on the Asthma Control Test, or
 - The recommendation from a licensed physician, nurse practitioner, or physician assistant, and
- **Medi-Cal recipients**

Self-reported race/ethnicity



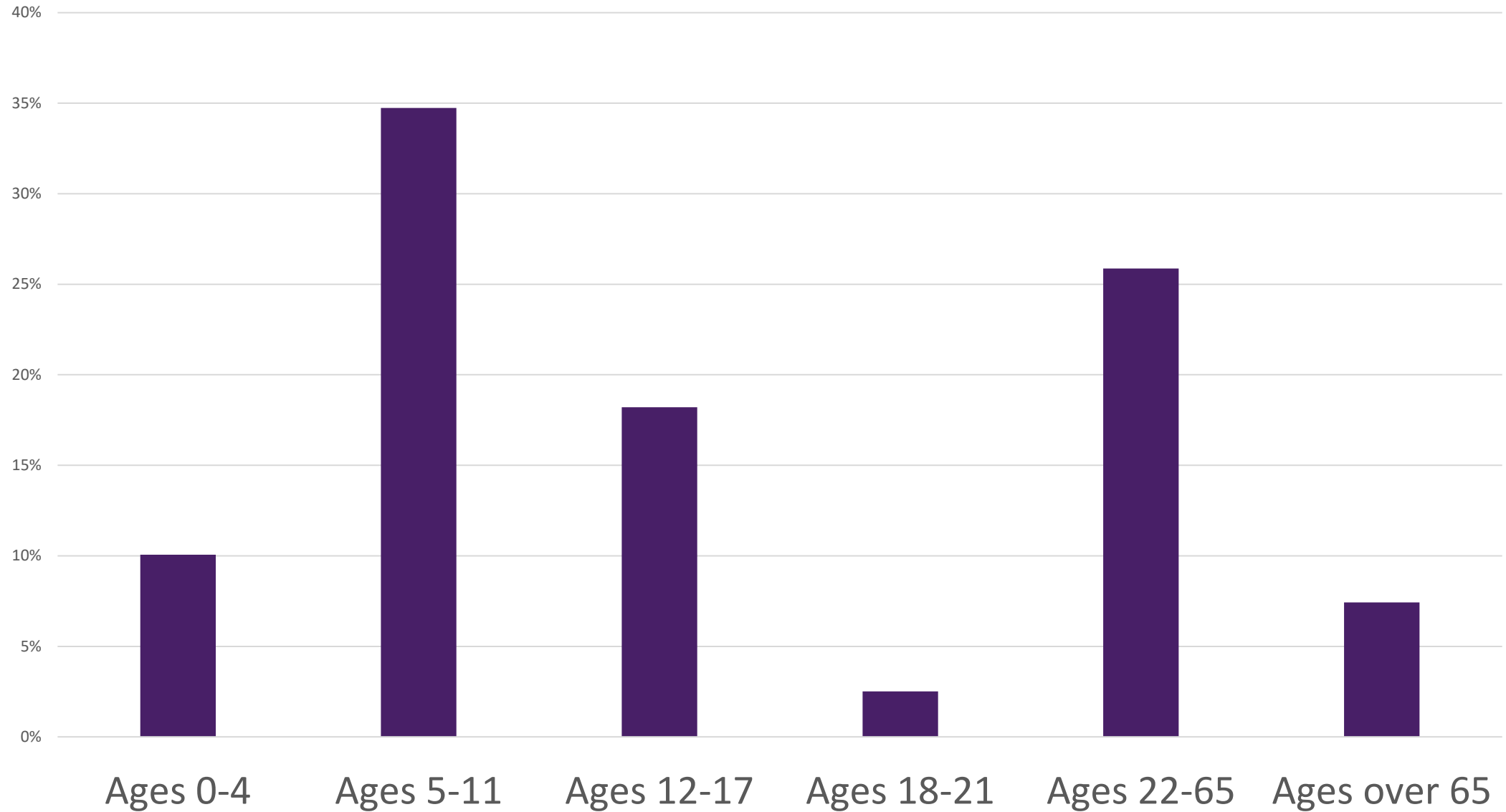
Race/ethnicity comparison



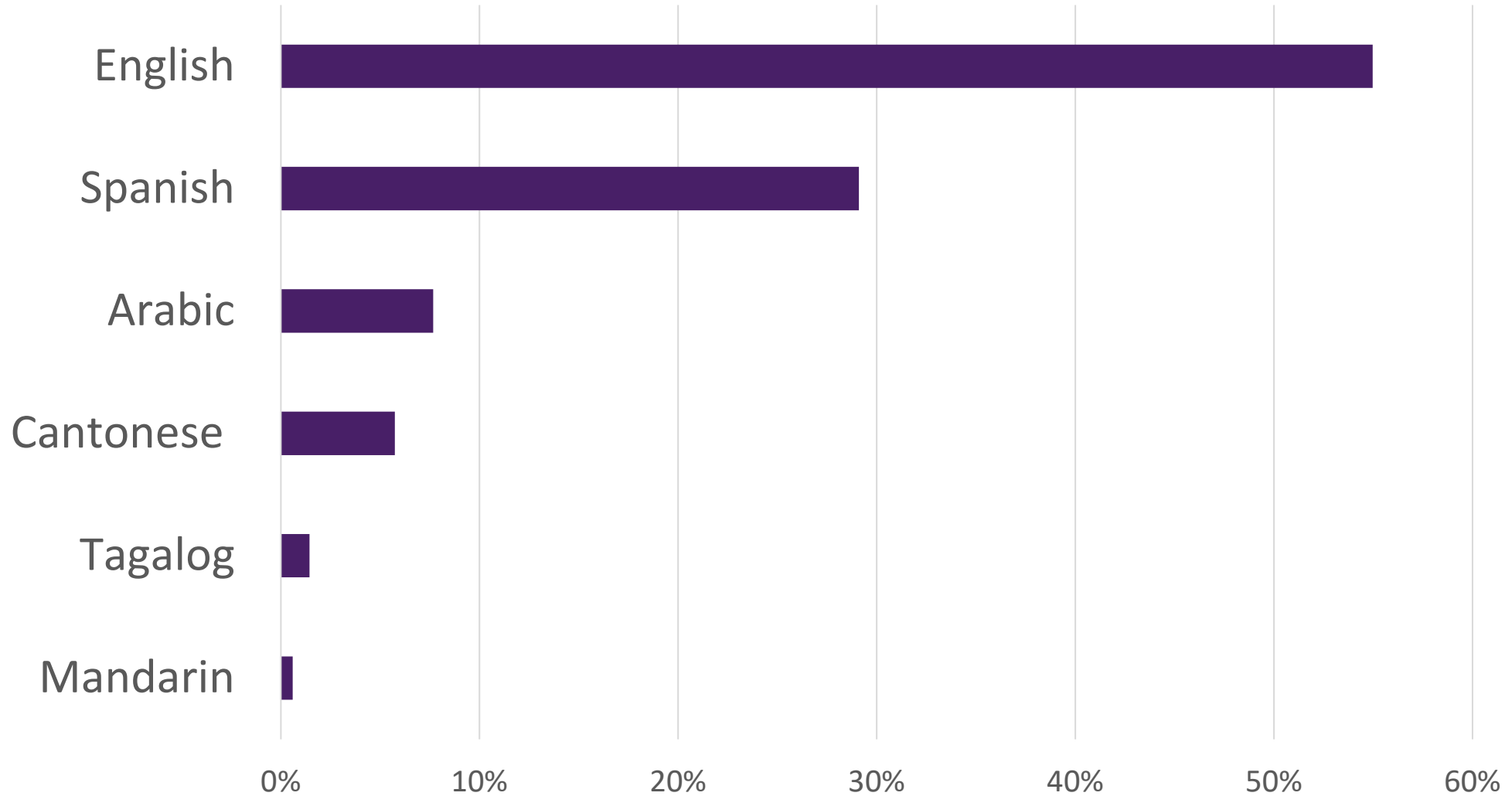
Geographic Reach



Age of Recipients



Primary language of recipients



Lessons and tips

PARTNERSHIPS

Establish Memoranda of Understanding (MOUs) with all participating partners before launching the project and involve partners in project planning and rollout

Consider an intermediary organization to streamline communication, ordering and data collection

AIR CLEANER SELECTION

Select vendors and air cleaners through a competitive process with clear, health protective criteria and scoring rubrics

Involve partners in the process of establishing criteria and selecting vendors

Provide multiple air cleaners from which partners can select to meet the needs of their organizations and clients

ORDERS AND DELIVERIES

Work with programs that will be distributing the air cleaners to establish processes for orders and deliveries

DATA COLLECTION

Establish data collection expectations and protocols upfront in partnership with distribution partners

EDUCATION

Provide educational materials in different formats and languages

When feasible, provide the air cleaners as part of a comprehensive asthma management intervention

Case Study highlights, lessons, and tips

[rampasthma.org/wp-](https://rampasthma.org/wp-content/uploads/2023/09/Case-Study-Air-Cleaner-Distribution.pdf)

[content/uploads/2023/09/Case-Study-Air-Cleaner-](https://rampasthma.org/wp-content/uploads/2023/09/Case-Study-Air-Cleaner-Distribution.pdf)

[Distribution.pdf](https://rampasthma.org/wp-content/uploads/2023/09/Case-Study-Air-Cleaner-Distribution.pdf)



Air cleaners for Medi-Cal's Asthma Remediation clients

- Asthma Remediation covers minor to moderate environmental remediation
 - Lifetime cap of \$7,500 per beneficiary

Supplies

- Mattress and pillow dustcovers
- HEPA filtered vacuums
- De-humidifiers
- Air cleaners and replacement filters

Services

- Minor mold removal and remediation services
- Ventilation improvements
- Integrated Pest Management (IPM)

*Other interventions identified to be medically appropriate and cost effective.

Oregon: Air Conditioner and Air Filter Deployment Program

HEALTH SYSTEMS DIVISION
Medicaid Programs



Air Conditioner and Air Filter Deployment Program

Protecting the health of at-risk Oregonians during extreme heat and wildfires

Section 7 of [Senate Bill 1536](#) (2022 Regular Session) directed the Oregon Health Authority (OHA) to create Oregon's Air Conditioner and Air Filter Deployment Program. This program:

- Provides portable air conditioner (AC) units and air filtration devices to protect Oregonians from extreme heat and wildfire smoke.
- Is only for people who qualify for medical assistance through OHA, Oregon Department of Human Services (ODHS) or Medicare, or people who have received medical assistance services in the past 12 months.

This year OHA will be able to provide around 3,000 AC units and 4,700 air filtration devices. OHA also works with partner organizations around the state to help install AC units for members who need help.

Lessons learned and recommendations

- Air cleaners are important and effective tools for reducing exposure to wildfire smoke.
- The asthma field should pilot and, ultimately, systematize and scale air cleaner distribution.
- Asthma programs should learn from one another to identify best practices.

Thank you.

Anne Kelsey Lamb, M.P.H., Director
anne@rampasthma.org

Panel Discussion and Question-and-Answer Session



Queen Eze, Project Manager,
Esperanza Community Housing



BJ Biskupiak, Health Education Specialist,
Montana Asthma Control Program, Montana Department
of Public Health & Human Services



Mary Anderson, Wildfire Smoke Coordinator
Chronic Disease Prevention & Health Promotion Bureau,
Montana Department of Public Health & Human Services

Polling Question 2

How familiar are you with wildfires and asthma and indoor interventions during wildfires for asthma?

1. Very familiar. I participate in wildfire and asthma efforts.
2. Somewhat familiar. I know wildfires are an asthma risk but do not know about IEDOH interventions for wildfires.
3. A little. I imagine people with asthma struggle with wildfire exposures.
4. Not familiar with wildfire pollution and IEDOH.

Where Can I Learn More?

- Preparing for Fire Season: www.epa.gov/wildfire-smoke-course/preparing-fire-season#aircleaner
- Wildfires and Indoor Air Quality (IAQ) (available in nine languages): www.epa.gov/indoor-air-quality-iaq/wildfires-and-indoor-air-quality-iaq
- Indoor Air Quality: www.epa.gov/indoor-air-quality-iaq
- How Outdoor Air Enters a Home: www.youtube.com/watch?v=na3RR848m-c
- Protect Yourself From Smoke and Extreme Heat: document.airnow.gov/protect-yourself-from-smoke-and-extreme-heat.pdf

Where Can I Learn More?

Join the Asthma Community Network at www.asthmacommunitynetwork.org.

Three-Part Webinar Series: *Technical Solutions for Addressing the Indoor Environmental Determinants of Health*

Innovations in Financing Environmental Asthma Home Visits Within Medicaid

Population Health Situational Awareness: Getting the Data You Need to Build Equity in Child Asthma Outcomes

Reimagining Asthma Care, Climate Resilience and Equity in Contra Costa, California: Partnering Health Care With Weatherization to Address the Indoor Environmental Determinants of Health

Three-Part Webinar Series: *Solving for the Indoor Environmental Determinants of Health (IEDOH) in Asthma*

Solving for Indoor Environmental Determinants of Health (IEDOH) in Asthma: Using Data to Prioritize In-Home IEDOH Interventions

Weatherization's Effects on Pediatric Asthma: Evidence From a Natural Experiment

Indoor Environmental Determinants of Health (IEDOH) Solutions for Asthma During Wildfire Events