



MKE
FreshAir
Collective

Wildfire Smoke and Outdoor Air Quality

City of Milwaukee Health Department - Emergency Preparedness
Environmental Health

&

MKE Fresh Air Collective

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Common Causes of Poor Air Quality



Pollen



VOCs

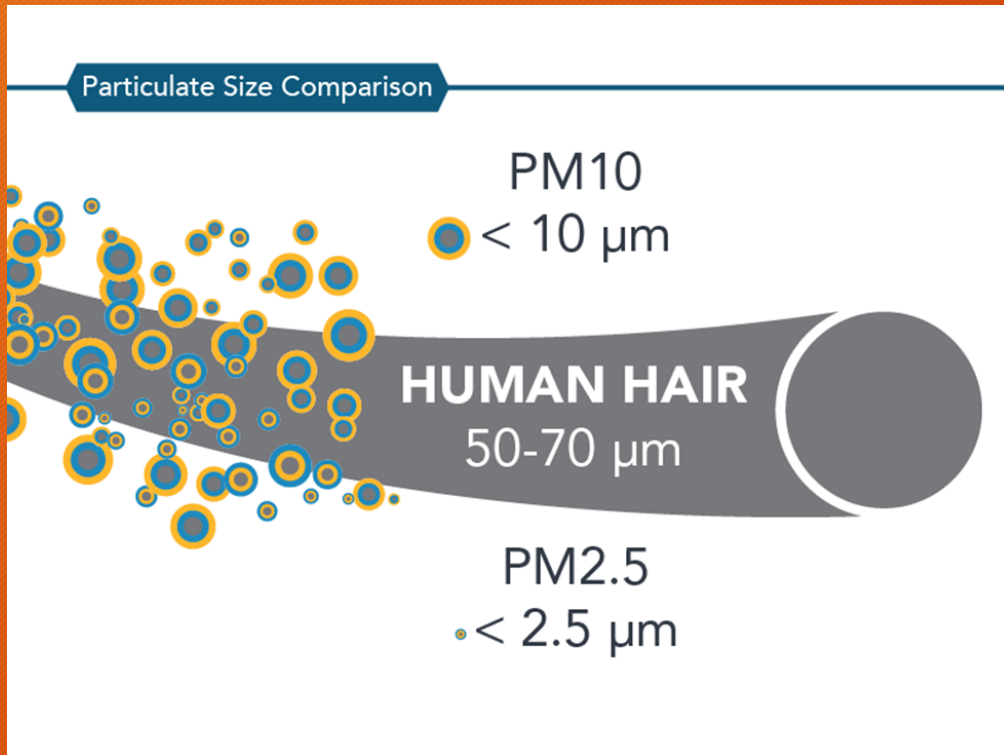


Smoke and
Exhaust



Dust

PM 2.5 Background



Particulate matter (PM) is a mix of solid particles and liquid droplets found in the air.

Why are we concerned: PM_{2.5} can cross into the lungs and bloodstream, causing breathing issues and other health concerns.

PM 2.5 and Health Impacts



HEART

- Heart attacks
- Irregular heartbeat



LUNGS

- Asthma
- ↓ lung function
- ↑ respiratory symptoms:
 - Irritation of the airways
 - Coughing
 - Difficulty breathing



BRAIN

Negative effects on:

- Brain development
- Memory
- Learning abilities

Health Effects of Wildfire Smoke

The following symptoms may be attributable to poor air quality:

Coughing

Tiredness

Trouble
breathing

Fast
heartbeat

Stinging eyes

Wheezing

Asthma
attacks

Headaches

Runny nose

Irritated
sinuses

Chest pain

Scratchy throat

Health Effects of Wildfire Smoke

Older adults, children, pregnant people, and people with pre-existing heart and lung conditions may be more susceptible to health effects from wildfire smoke and may experience symptoms at lower levels of air quality index (AQI) than others.



Understanding AQI

US AQI Level		Health Recommendation (for 24 hour exposure)
WHO & EPA Recommended Guidelines as of 2024		
	Good 0-50	Air quality is satisfactory and poses little or no risk.
	Moderate 51-100	Sensitive individuals should avoid outdoor activity as they may experience respiratory symptoms.
	Unhealthy for Sensitive Groups 101-150	General public and sensitive individuals in particular are at risk to experience irritation and respiratory problems.
	Unhealthy 151-200	Increased likelihood of adverse effects and aggravation to the heart and lungs among general public.
	Very Unhealthy 201-300	General public will be noticeably affected. Sensitive groups should restrict outdoor activities.
	Hazardous 301+	General public at high risk of experiencing strong irritations and adverse health effects. Should avoid outdoor activities.

Understanding AQI (Contd.)

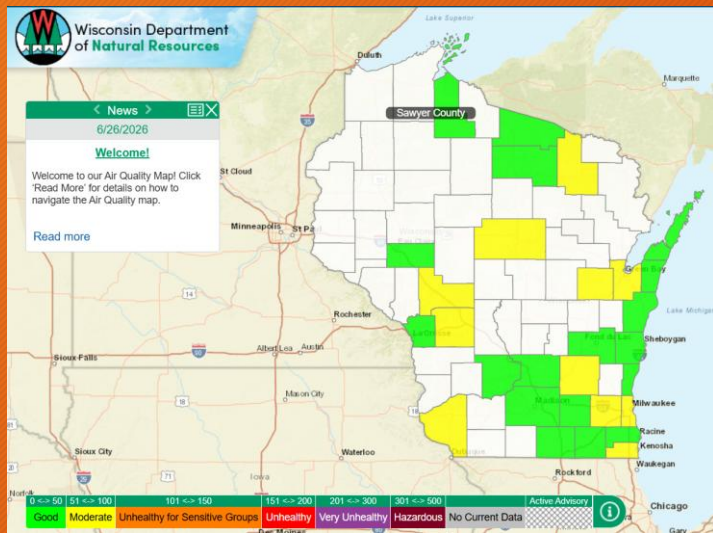
Level of Health Concern	AQI Range	Recommended Action
Good	0-50	None! Enjoy the outdoors!
Moderate	51-100	Watch for symptoms in sensitive groups
Unhealthy for Sensitive Groups	101-150	Limit prolonged outdoor exertion, consider moving activities to an indoor location with filtered air
Unhealthy	151-200	Avoid outdoor exertion, move activities to an indoor location with filtered air or reschedule
Very Unhealthy	201-300	Cancel, reschedule or relocate outdoor activities to spaces with filtered air as possible
Hazardous	301-500	Cancel, reschedule or relocate outdoor activities to spaces with filtered air

How to Protect Your Health

- When air quality is poor:
 - Stay inside
 - Keep windows closed
 - Run an air purifier with a HEPA air filter to maintain good indoor air quality
 - * Note that air conditioning units have air filters
- If you have symptoms attributed to poor air quality contact a medical provider or go to urgent care.



Air Quality Maps



<https://airquality.wi.gov>

Live Air Quality Map

Real-time air quality data from over 80,000 monitoring sensors worldwide.

Search: Your country, city or location...

Greendale air quality index (AQI)

62 Moderate

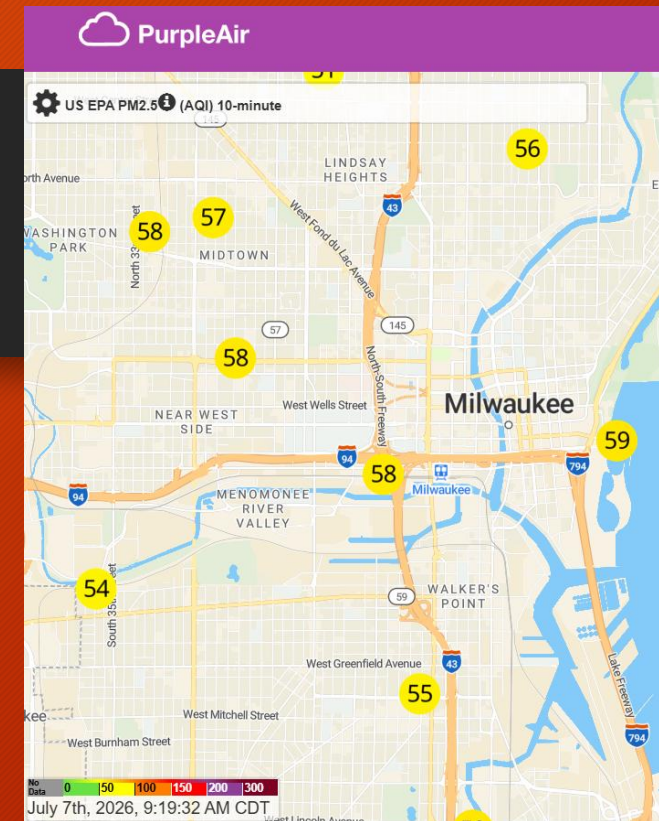
Main pollutant: PM2.5 15.3 $\mu\text{g}/\text{m}^3$

25° 8 km/h 47 %

7-DAY FORECAST



<https://www.iqair.com>



<https://map.purpleair.com>

MONDAY
JULY 13, 2026

WILDFIRE SMOKE & OUTDOOR AIR QUALITY

Danika Hill-Paulus
Co-Executive Director



MILWAUKEE HEALTH DEPARTMENT ENVIRONMENTAL HEALTH SERIES



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WWW.MKEFRESHAIR.COM



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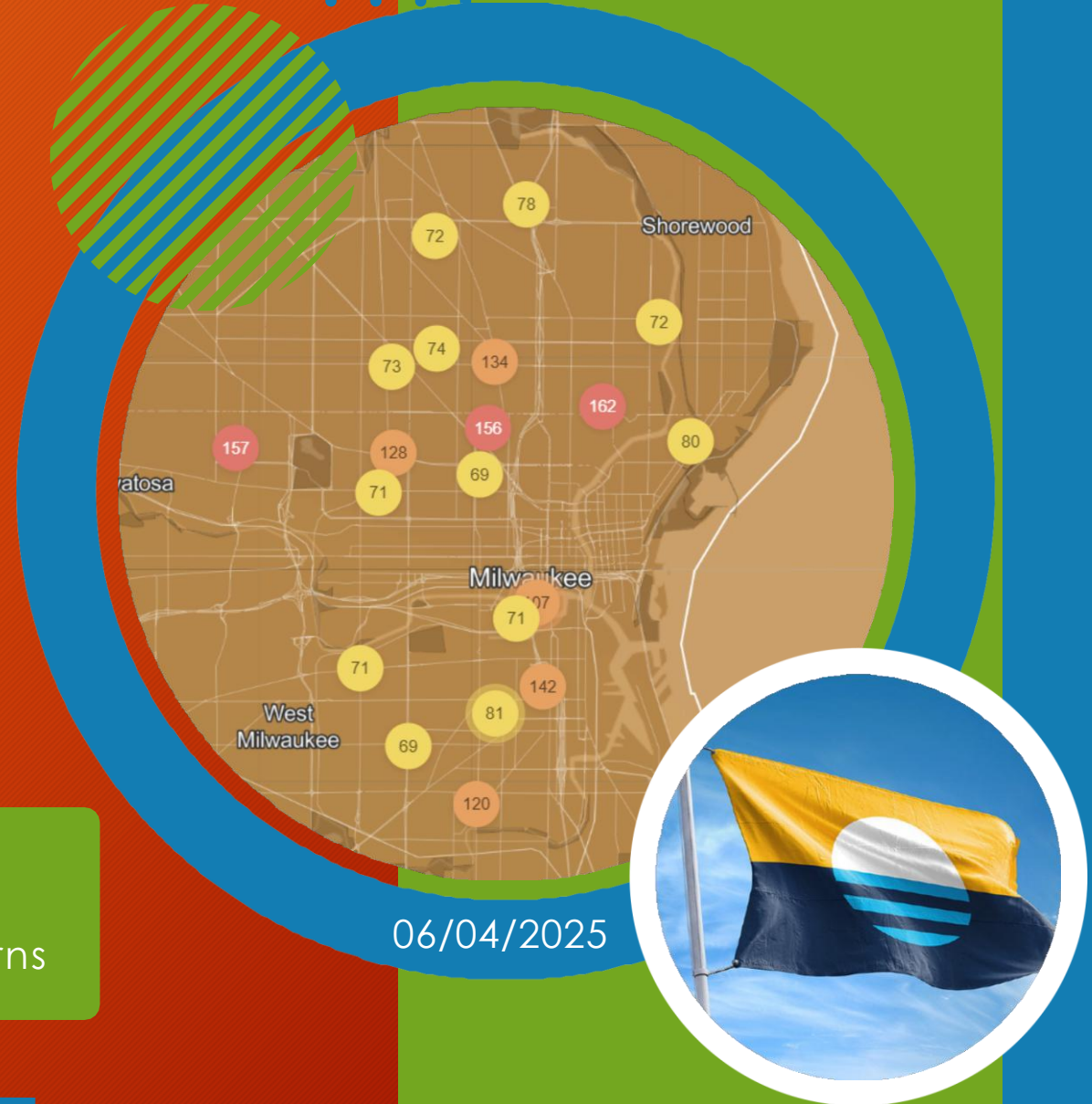
+21,500
Followers

6+

tons of

12

Paid Interns



Our Values

Racial Equity & Justice

We prioritize equity & justice in all our work.

Data-Driven Policy

Our commitment to data-driven insights guides our advocacy efforts.

Community Empowerment

We believe in the power of community voices and experiences.

Community-Centric Relief

We deliver interventions that minimize the demands placed on communities already impacted by systemic injustices.



OUR PROGRAMMING



Outdoor Air
Quality Monitoring



Community Education &
Workshops



Free In-Home Radon
Testing



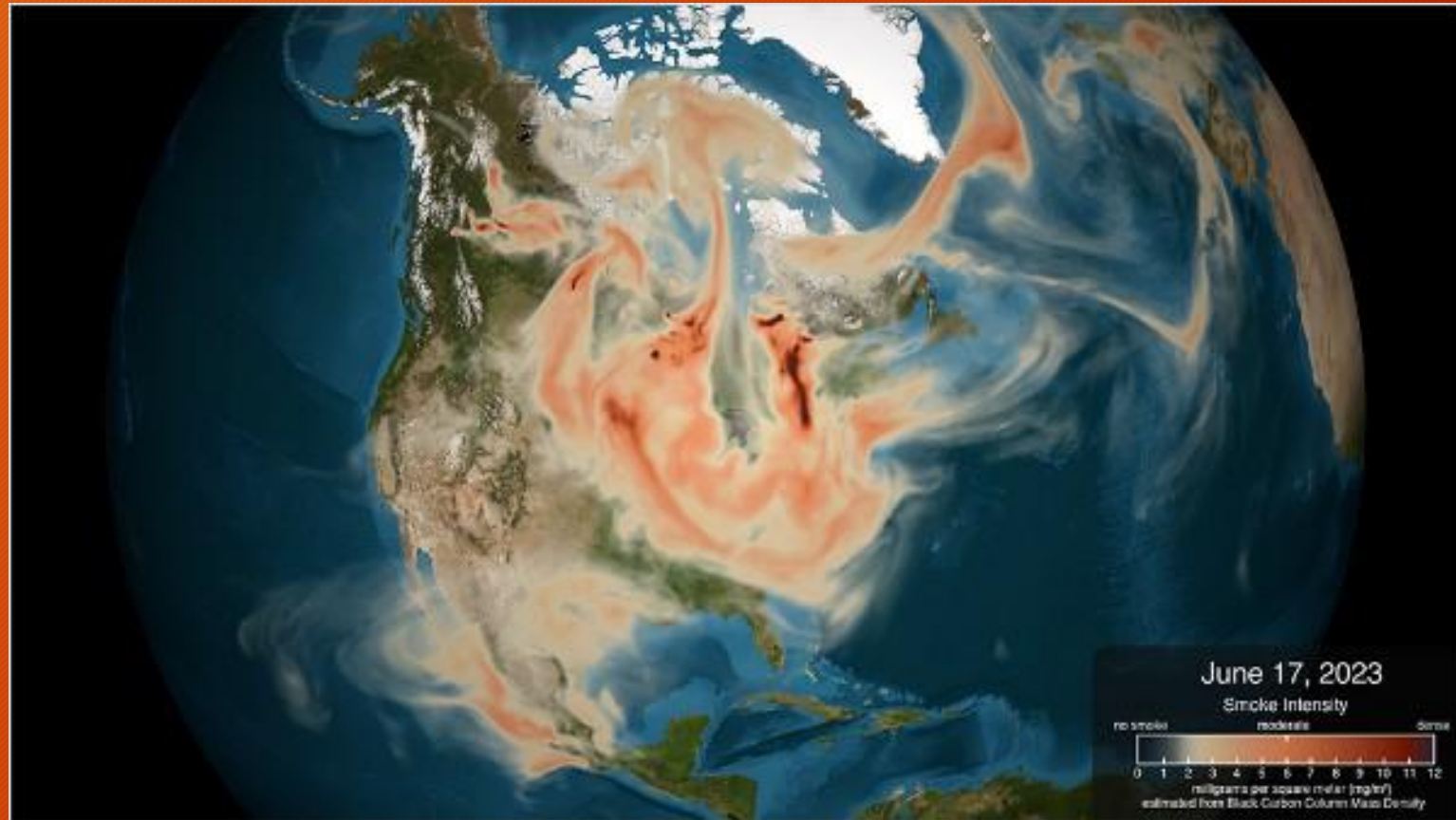
Advocacy &
Outreach

Wildfire Smoke Events in Wisconsin



CANADIAN WILDFIRE SMOKE

2023
&
2025



Long-range Transport of 2023 Canadian Wildfire Smoke into the Northeastern United States

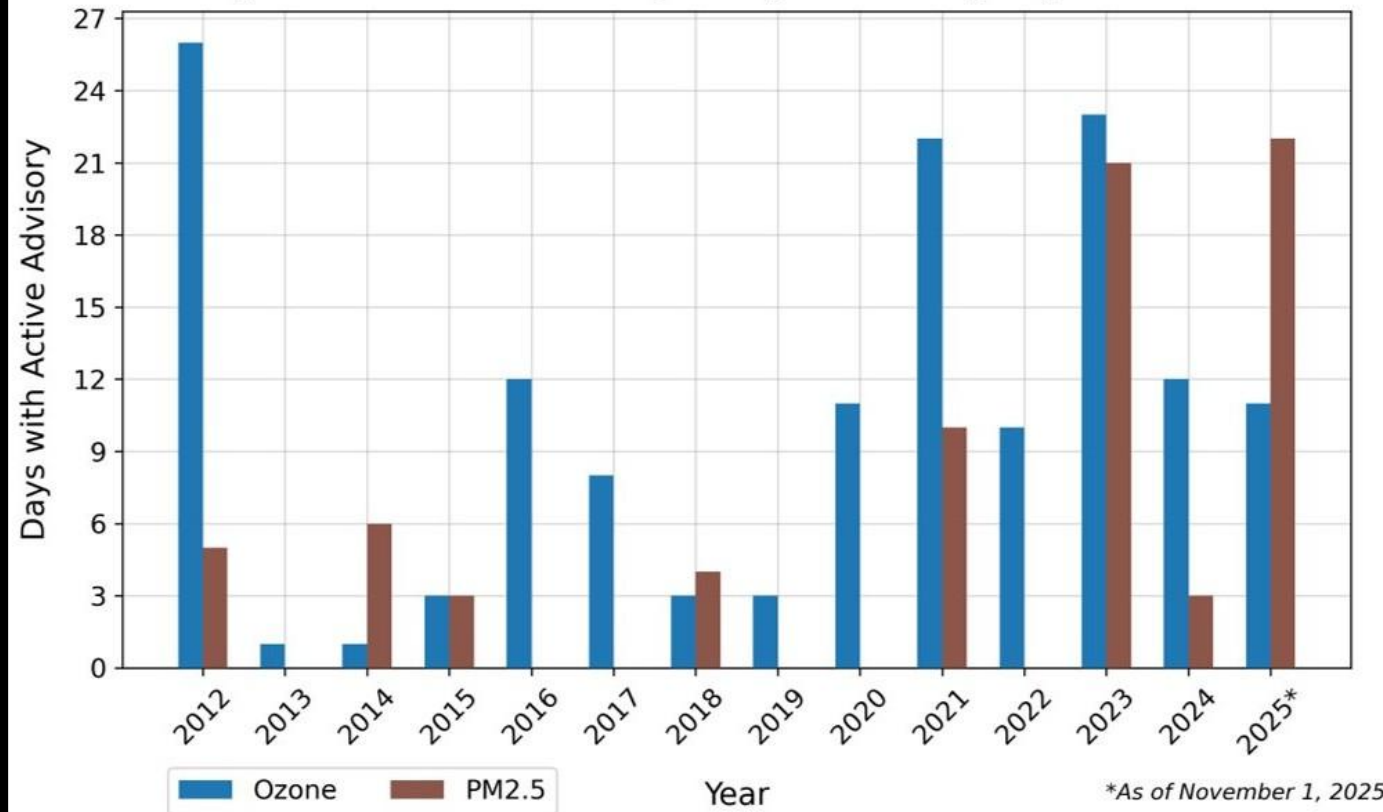
In summer 2023, Canada experienced its most intense wildfire season on record. Smoke from wildfires in Alberta and Quebec was transported thousands of miles, driven by favorable meteorological conditions, resulting in record-breaking poor air...



NASA Scientific Visualization Studio / Apr 27

AIR QUALITY ALERT DAYS

Count of Total Ozone and PM2.5
Days with Active Air Quality Advisory by Year in WI



Data from the Wisconsin Climatology Office

DATA YOU CAN USE



HEALTH EFFECTS

- In 2023: 90% of total PM_{2.5} came from wildfire smoke events
- In 2023: ~33,000 or 1.2% of total all-cause deaths in the United States
- Wildfire smoke particles thought to be more toxic than other forms of PM_{2.5} Very few epidemiological studies on wildfire smoke events

OTHER EFFECTS

FOX WEATHER

The FOX Weather App
LEARN MORE

Weather News How to Watch Extreme Weather **Learn** Local Weather Earth & Space Lifestyle Deals Video America's Weather

Why does wildfire smoke cause more flight delays than rain or fog?

Water droplets from rain and fog don't typically impact navigation systems, but solid particles, such as smoke and ash, can cause the systems to be less effective.

By Angeli Gabriel | Source FOX Weather



CNN Sports NFL NBA MLB WNBA Golf Soccer Tennis Motorsport More

MLB postpones games as wildfire smoke continues to wreak havoc on US sports



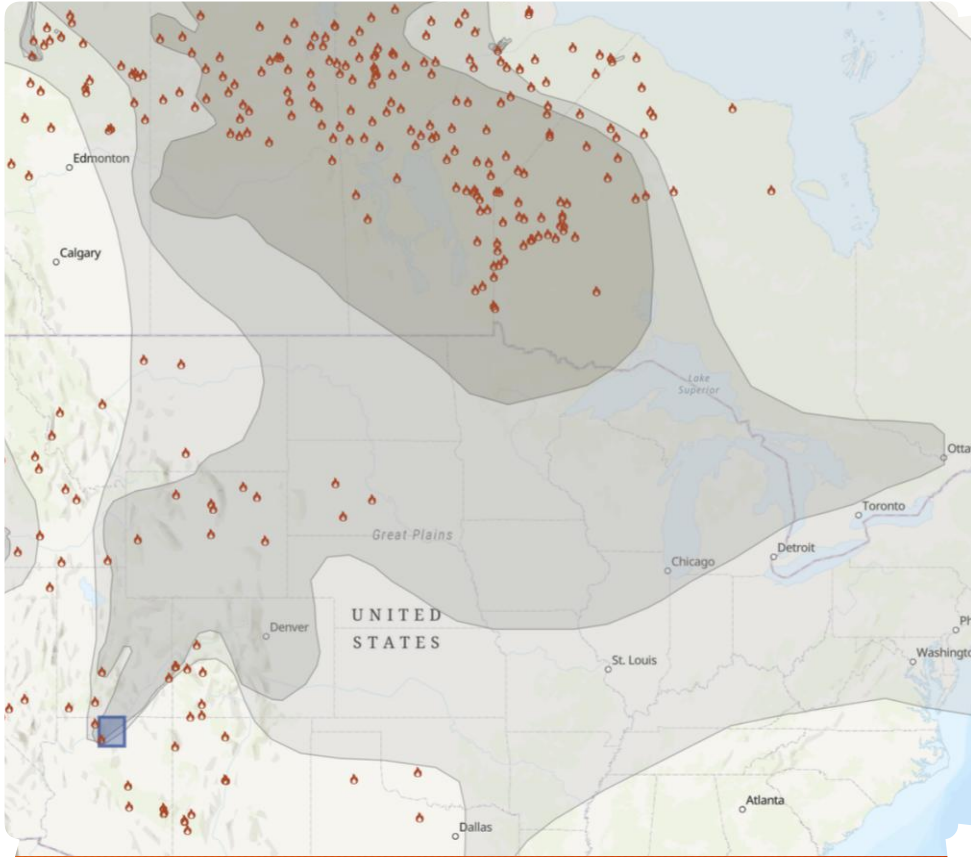
By Amy Woodyatt, David Close and Jacob Lev, CNN

3 min read · Updated 11:59 AM EDT, Thu June 8, 2023

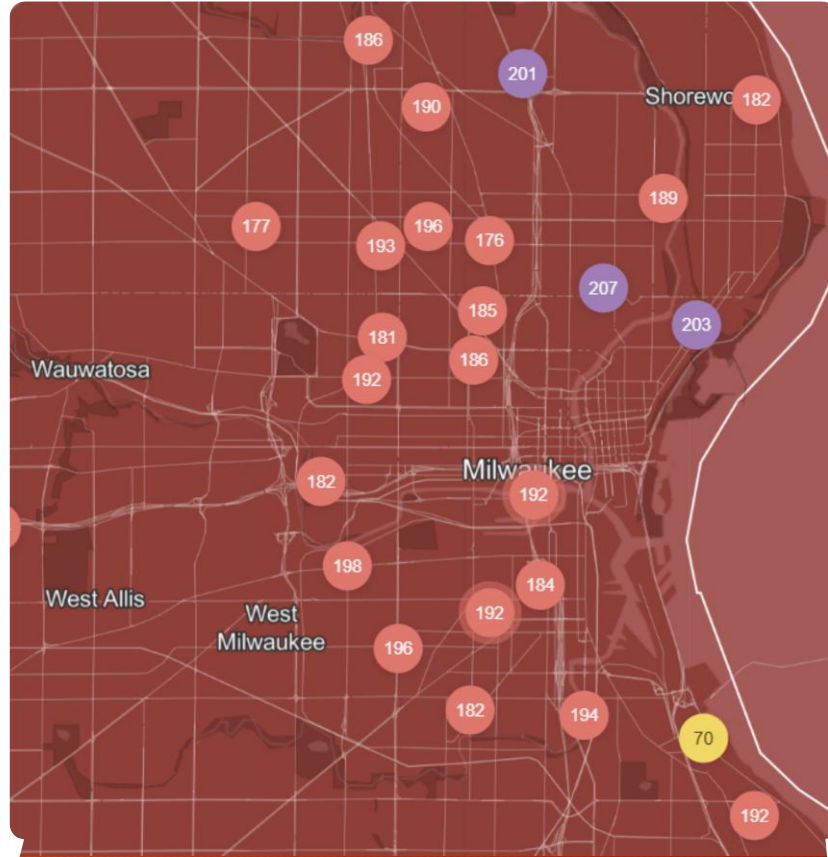


Milwaukee had the worst air quality in the entire United States at 10 a.m. on Sunday, Aug. 3. Additional areas with extremely poor air quality included areas in Wisconsin and Michigan topping out the top five spots.

WILDFIRE SMOKE DAYS 2025

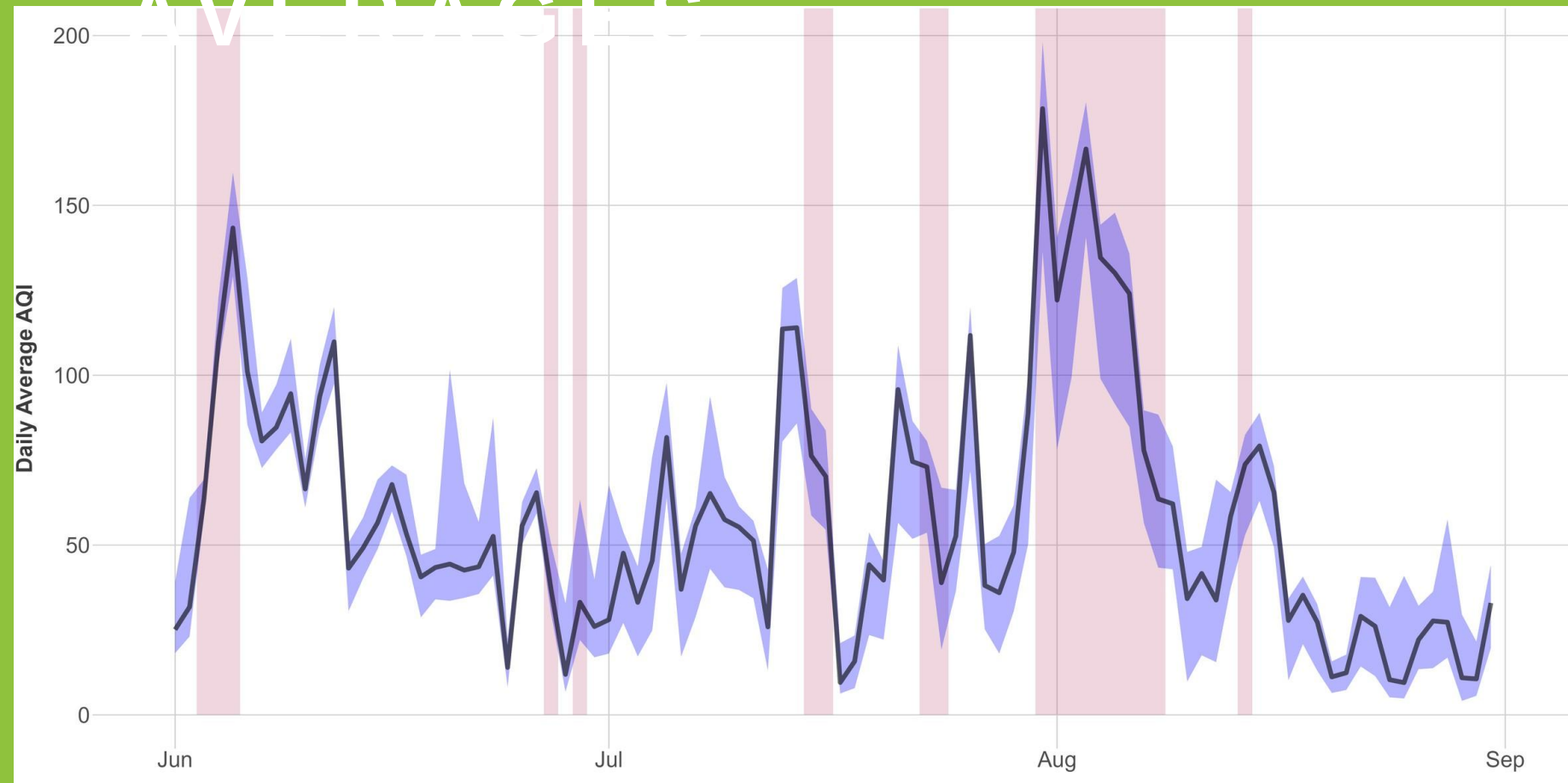


July 31, 2025



- May 30th
- June 3rd - 5th
- July 23rd - 24th
- July 31st - Aug 8th
- Aug 14th

2025 AIR QUALITY ALERT DAYS & FRESHAIR SENSOR AVERAGES



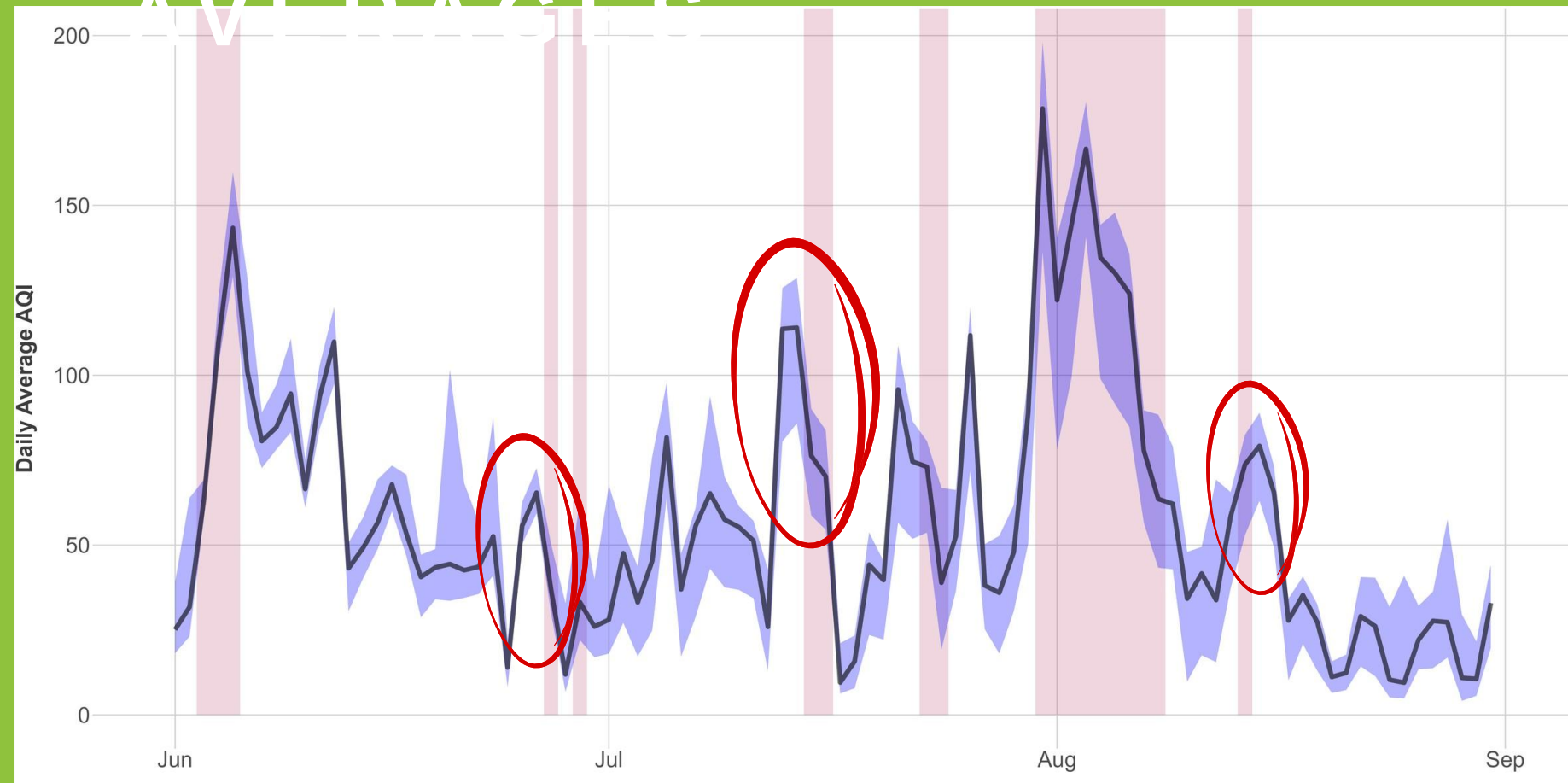
Variability
each day

Air Quality
Alert Day

DATA YOU CAN USE



2025 AIR QUALITY ALERT DAYS & FRESH AIR SENSORS AVERAGES



Variability
each day

Air Quality
Alert Day

DATA YOU CAN USE



Community Solutions



PUBLIC HEALTH ADVICE

PROTECT YOURSELF FROM SMOKE



MONITOR
AIR QUALITY



CLOSE WINDOWS
& DOORS



USE
N95 MASKS



CARB-CERTIFIED
AIR CLEANER



MONITOR
YOUR HEALTH



AVOID
VACUUMING



AVOID
GAS-POWERED
APPLIANCES



RUN AC ON
RECIRCULATE WITH
A NEW FILTER



DIY
TEMPORARY
AIR PURIFIER

What to Do When
Air Quality is **Bad**
or During **Smoke Events**



Check the Air

Limit **Outdoor** Activity



Mask Up



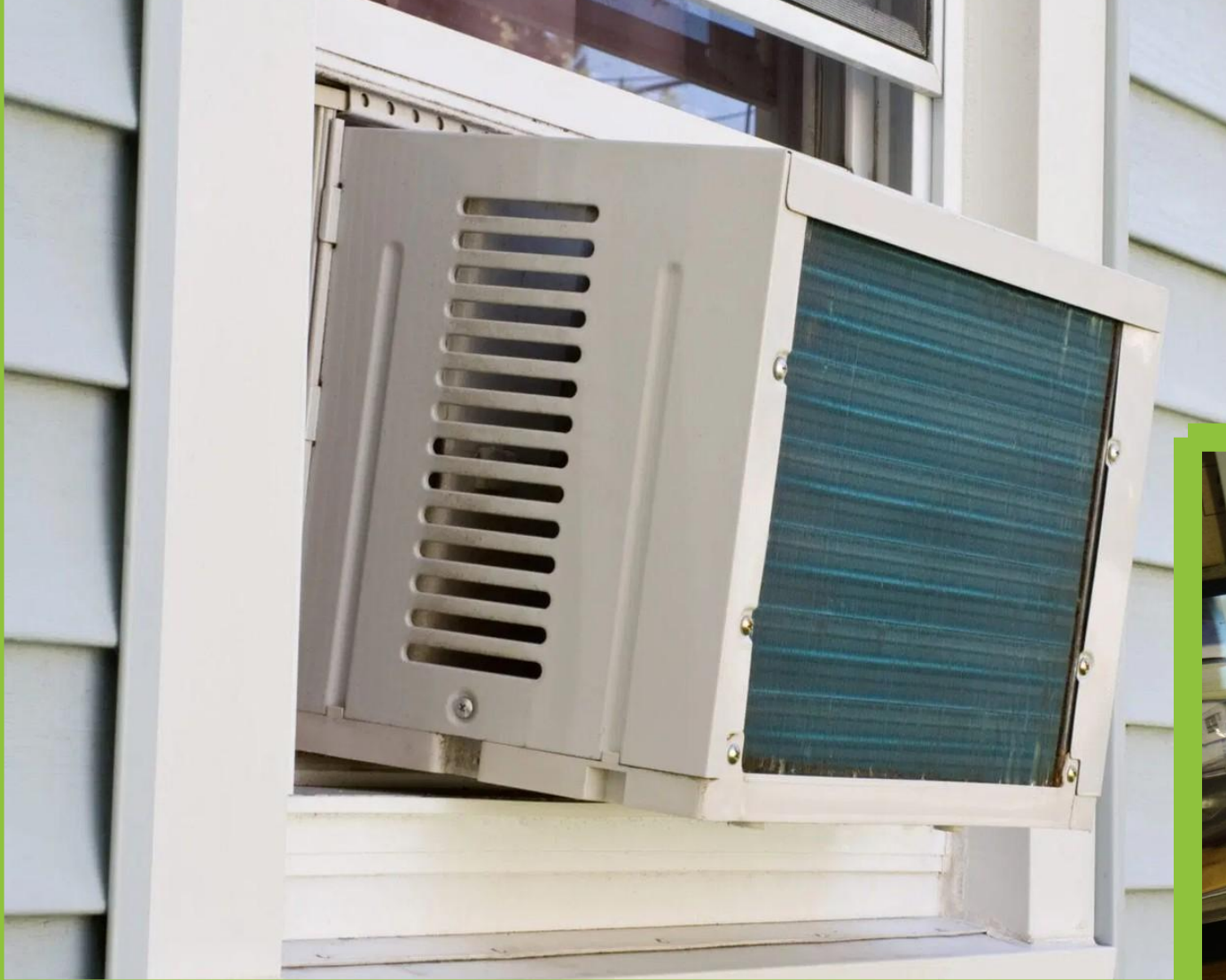
Clean **Indoor** Air



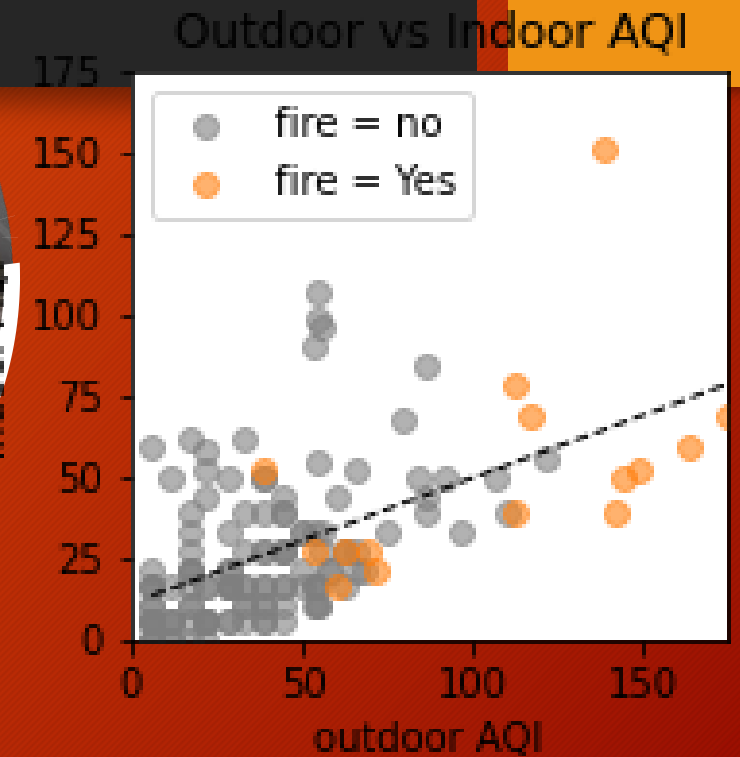
Stay **Informed**

Follow us for local air quality tips, alerts,
and ways to protect your health!





CASE STUDY: MY HOUSE



Wildfire smoke led to significantly worse outdoor air quality ($t=5.9$, $p<0.0001$)
Mean AQI: smoke=105, no smoke=38

Wildfire smoke also led to significantly worse indoor air quality ($t=3.0$, $p=0.009$)
Mean AQI: smoke=52.3, no smoke=26.2

Indoor air quality is significantly correlated with outdoor air quality
AQI: slope=0.38, $R^2=0.30$, $p<0.0001$

COMMUNITY SOLUTIONS

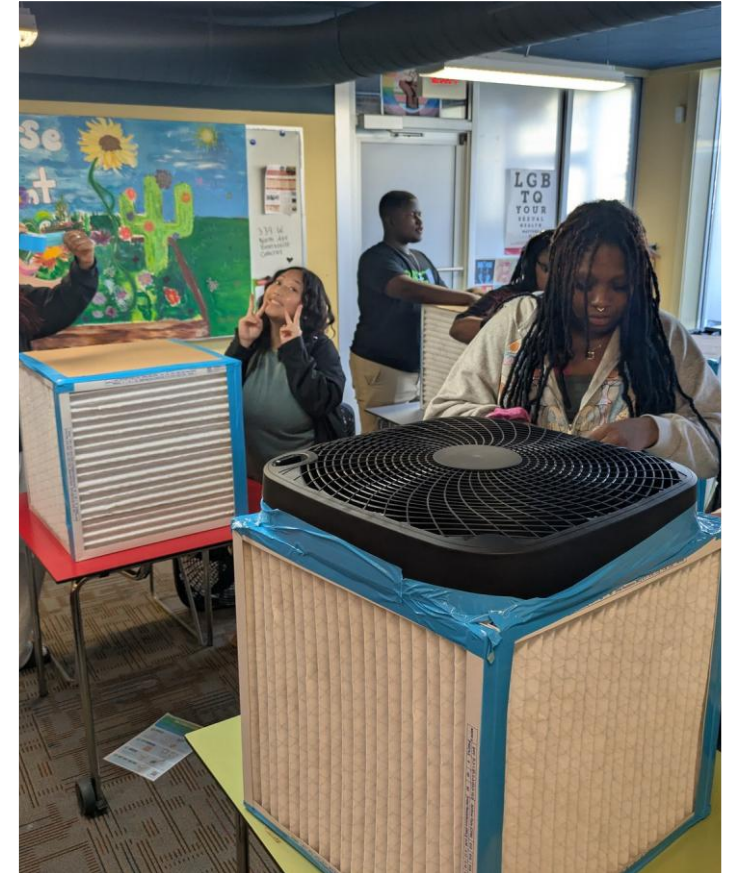
What to Do When
Air Quality is **Bad**
or During *Smoke Events*



Messaging & Public Outreach



Real-time Neighborhood-level
Air Quality Data



Workshops: Education &
DIY Air Cleaners

DIY Air Cleaner Workshop

Build your own DIY air cleaner to clean your air.
Proven to remove:

- Allergens
- Asthma Triggers
- Bacteria & Viruses
- Dust
- Mold Spores
- Odors
- Pollen
- Pollutants
- Wildfire Smoke



The CR Box: A DIY Air Cleaner
Dirty air in, clean air out



Harambee
ECO Neighborhood
Thursday 7/16

Time: 5pm - 7pm
Location: Solomon Community Temple
3295 N Dr Martin Luther King Dr

Learn more:

<https://www.mkefreshair.com/projects/indoor-air-quality>



KEEP CONNECTED WITH US



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www.mkefreshair.com



THANK YOU TO
OUR FUNDERS:



APHA



QUEST
FOUNDATION



WISCONSIN DEPARTMENT
of HEALTH SERVICES

References

- [DNR air quality website](#)
- [IQ Air](#)
- [Purple Air](#)
- [Air Now](#)
- [Love My Air Wisconsin](#)
- [MKE Fresh Air Collective](#)
- [Outdoor Air Quality](#)

Contact Information

- MKE Fresh Air Collective
 - Danika Hill-Paulus: Danika@mkefreshair.com
- MHD Environmental Health Team
 - Environmentalhealth@milwaukee.gov

Questions?

