

Joint Session J2A.3: A Smoke Heatmap Overlay for Wildfires to Inform Health Risk and Track Associated Symptoms

presented by



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Presenter - Eric Klos

(Founder and CEO)

Following a 25+ years career in Federal Health IT, Eric successfully co-founded G2Xchange Health, a membership-based online competitive intelligence firm for Federal Health IT executives.

Recognizing that environmental factors have been long neglected by the medical community when it comes to personalized health, he then founded DailyBreath, LLC.

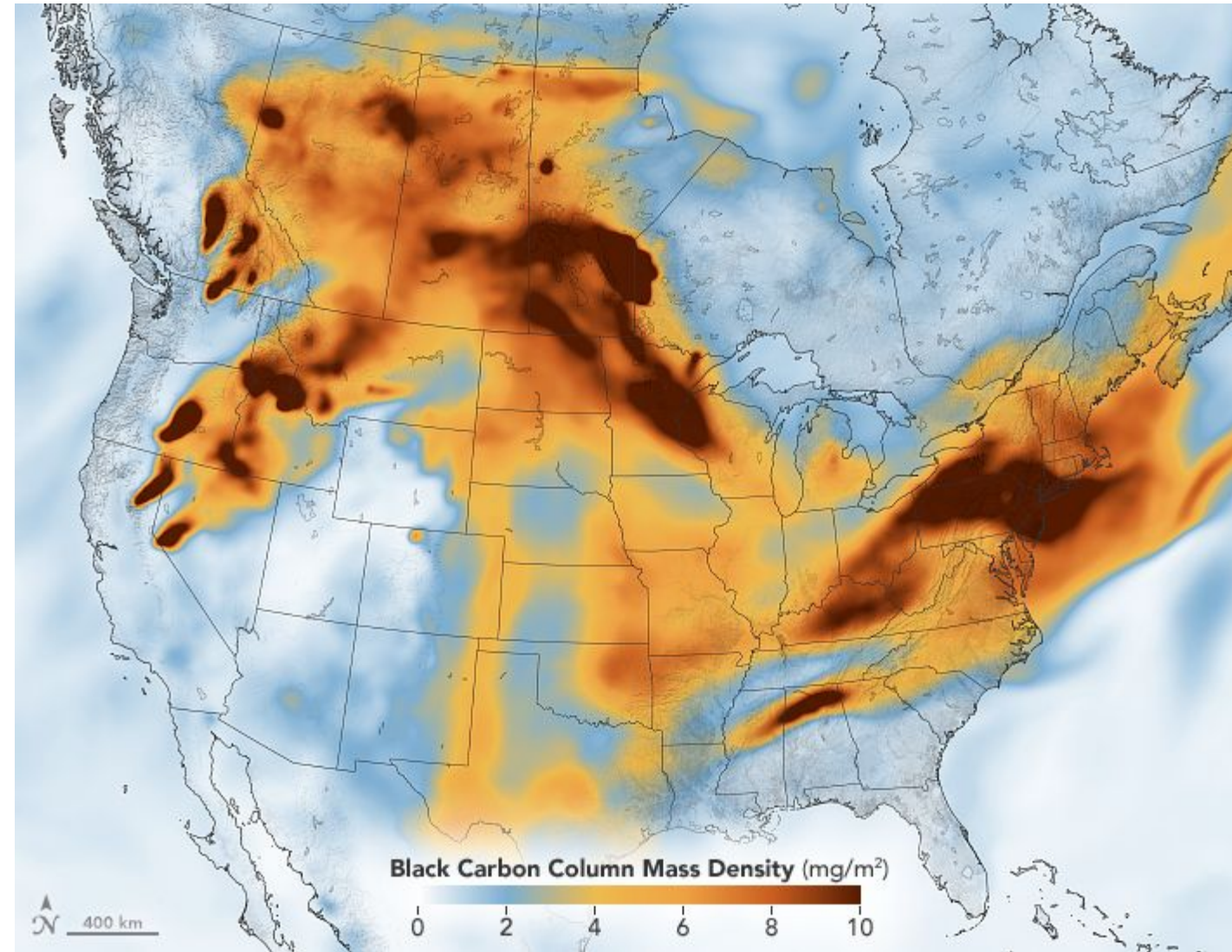
DailyBreath is a cloud-based SAAS environmental health intelligence and wellness platform that helps people to track symptoms, pinpoint THEIR triggers, and reduce potential health impacts.



Wildfire Smoke - Climate Change's New Normal

Particulate matter (PM), especially fine particles (<PM_{2.5}) released during wildfires (and combustion of fossil fuels) is a national health threat.

The anticipated rise in the frequency and extent of wildfires, driven by climate change, underscores the importance of addressing this health concern.



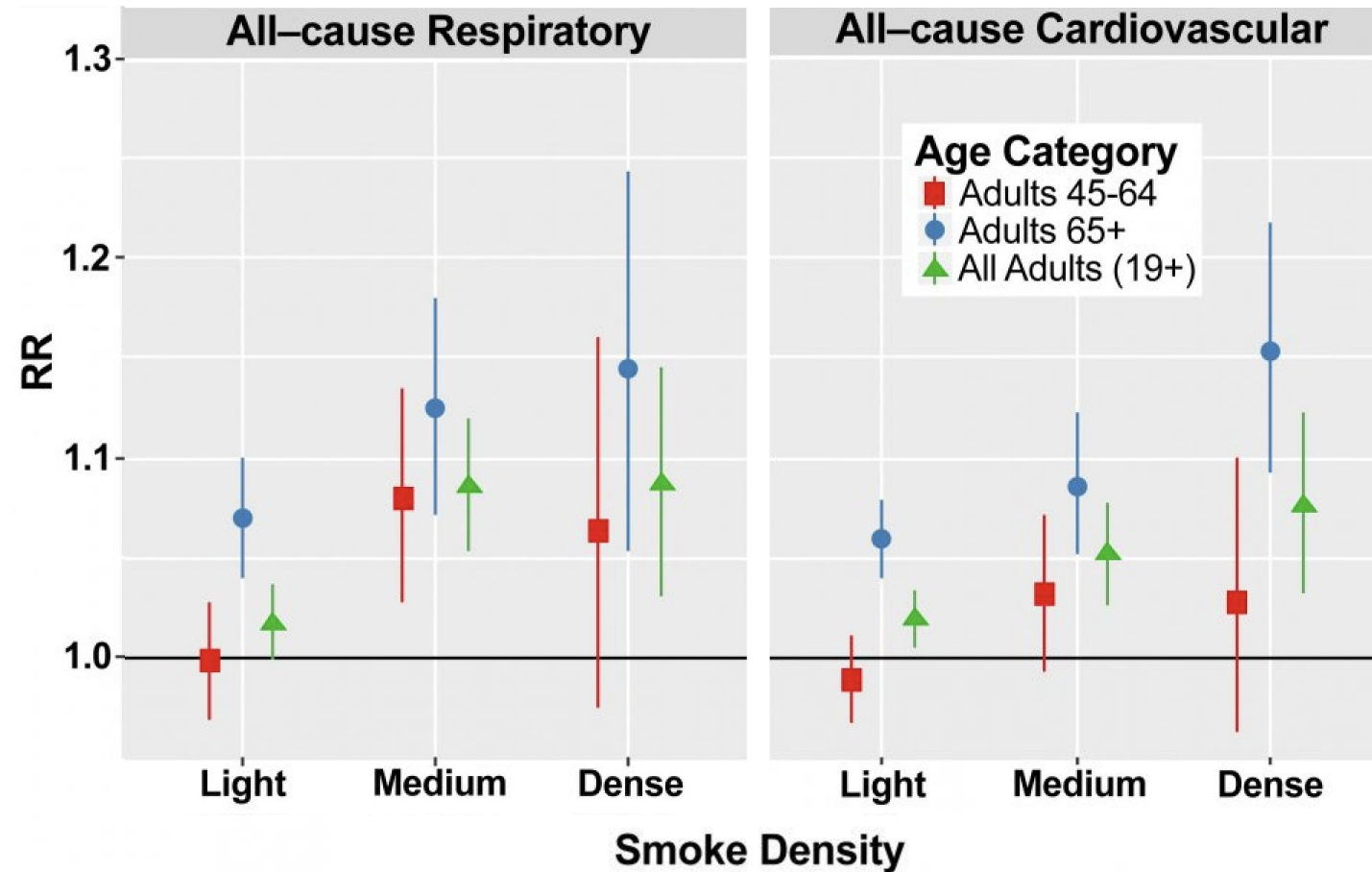
Source: earthobservatory.nasa.gov/images/148610/smoke-across-north-america

Why Wildfire Smoke is a Health Concern

Wildfire smoke is comprised of:

- Gaseous pollutants (e.g., carbon monoxide)
- Hazardous air pollutants (HAPs) (e.g., polycyclic aromatic hydrocarbons [PAHs])
- Water vapor
- Particulate matter (PM)

PM represents a main component of wildfire smoke and the principal public health threat.



Source: Adapted from Wettstein et. al. (2018).

Relative risk (RR) and 95% confidence intervals for emergency department visits for all cardiovascular and respiratory outcomes relative to smoke free days, at lag 0 days, stratified by age.

Acute Impacts to Real-Time exposures (Triggers)

(e.g., minutes, hours, during your day)

- Acute Symptoms for Respiratory patient population: asthma, bronchitis, emphysema, COPD, COVID
 - Coughing, phlegm, wheezing, worsening symptoms, reduced lung function, difficulty breathing
- Cardiovascular effects
 - Heart failure, heart attack, stroke



Source:
<https://www.keckmedicine.org/blog/how-wildfire-smoke-can-affect-your-health>


Short-term exposures

(e.g., during a wildfire smoke event)

Nationally, asthma- and COPD-related ER visits were **17% higher than normal** during 19 days of wildfire smoke April-August 2023, according to a CDC survey of 4,000 hospitals.

Hospital traffic rose **46%** in New York and New Jersey.

Asthma-associated ER visits jumped 82% in New York on the worst air quality day, June 7.



None of the studies looked at other measures of health, such as increases in heart attacks or deaths.

Studies have not evaluated the health effects attributed to wildfire smoke exposure over multiple seasons.

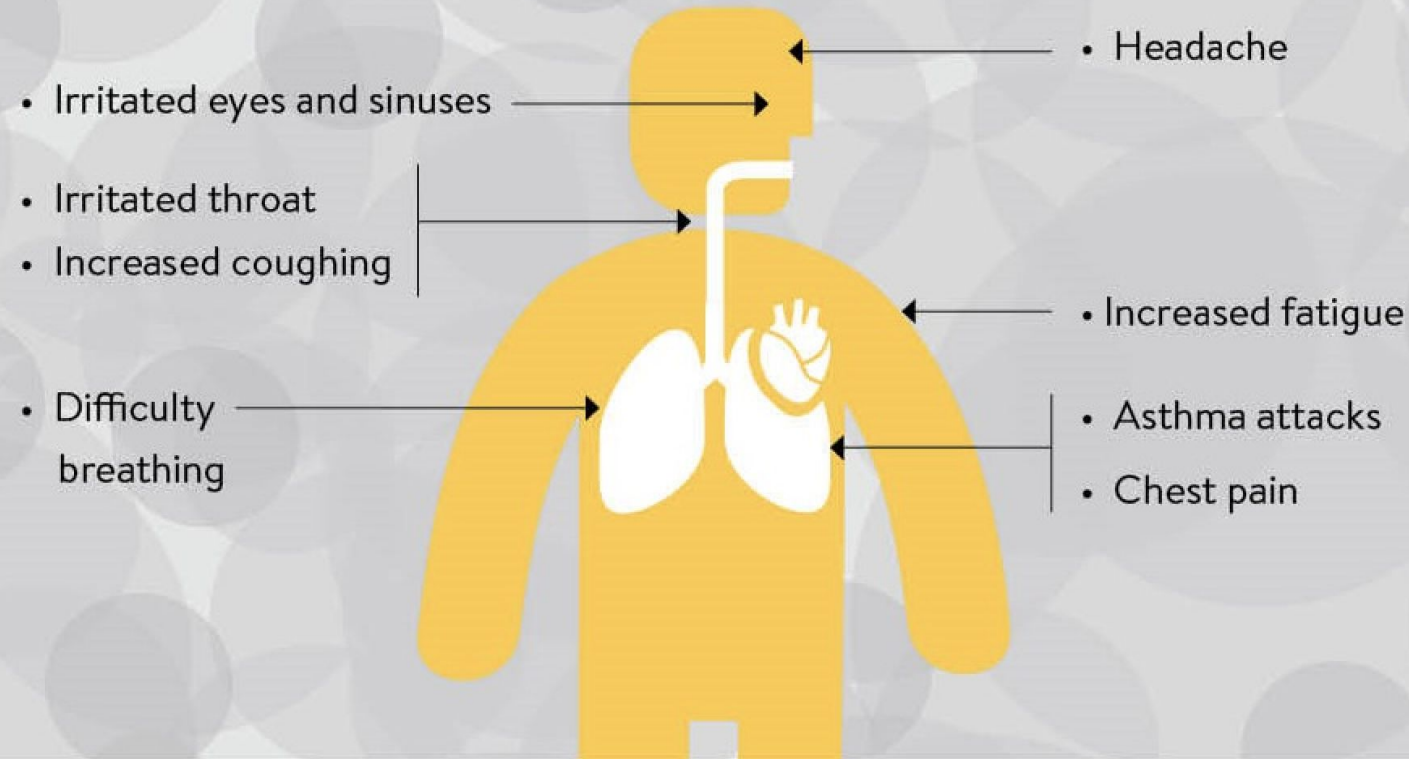
Source: Bjoern Kils/Reuters

Short-term exposures - Cumulative Impacts

(e.g., over a few days / weeks, multiple, successive exposures)

- Irritation of the eyes and respiratory tract
- Respiratory effects
 - Bronchitis, reduced lung function, asthma, other lung diseases (incl. COPD, COVID)
- Cardiovascular effects
 - Higher Blood Pressure
 - Heart failure, heart attack, stroke
- **Other broader health impacts including cognitive impacts**

Fine particles (PM 2.5) pollution from wildfire smoke can cause:



Source: www.health.state.mn.us

Challenges in Predicting Wildfire Effects

Wildfires generate intense heat, sending smoke high into the air, with PM descending and spreading as air cools.

Predictions of the extent of PM spread and concentration is influenced by:

- terrain
- air temperature
- wind
- precipitation
- humidity
- access to sensors (granularity)



Source: Fire and Smoke Map

Translating Exposure Risk Broadly into a Personalized Health Model - Personalizing Public Health

The dynamic impact of wildfire smoke may be reflected in tracking the dispersion paths of ground- and atmospheric-level smoke.

The incremental impact of wildfire smoke particulates may be reflected in the tracking of user symptoms that occur within those dynamic paths.

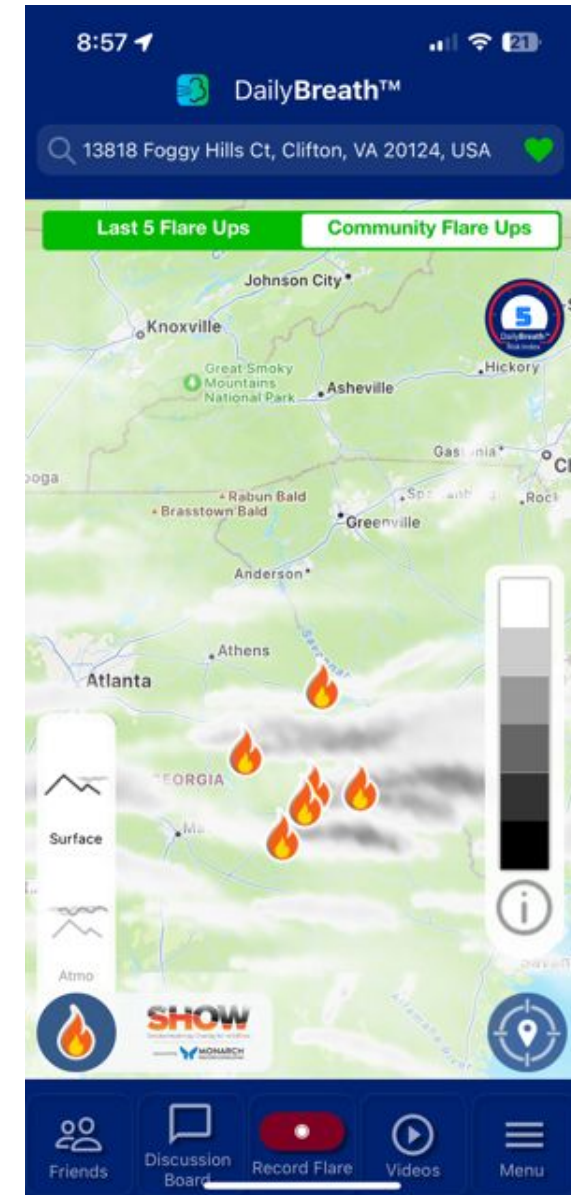


Source: Getty Images

SHOW, our Smoke Heatmap Overlay for Wildfires

- Options to view dispersion paths for ground-level and atmospheric wildfire smoke.
 - Fire location provides weather variables that impact dispersion.
- If symptoms are recorded by a user who is geographically located within either dispersion path, they are uniquely identified.
- Additional functionality on our roadmap to enhance the value of SHOW to our subscribers.

Available for DailyBreath
Subscribers





thank you.

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**Thick Smoke
From Western
Canada Wildfires**