

Climate Change and Health

Current and Future Research in MetroHealth

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Source: <https://showyourstripes.info/> ([#ShowYourStripes](#))

1910

1930

1950

1970

1990

2010

Outline

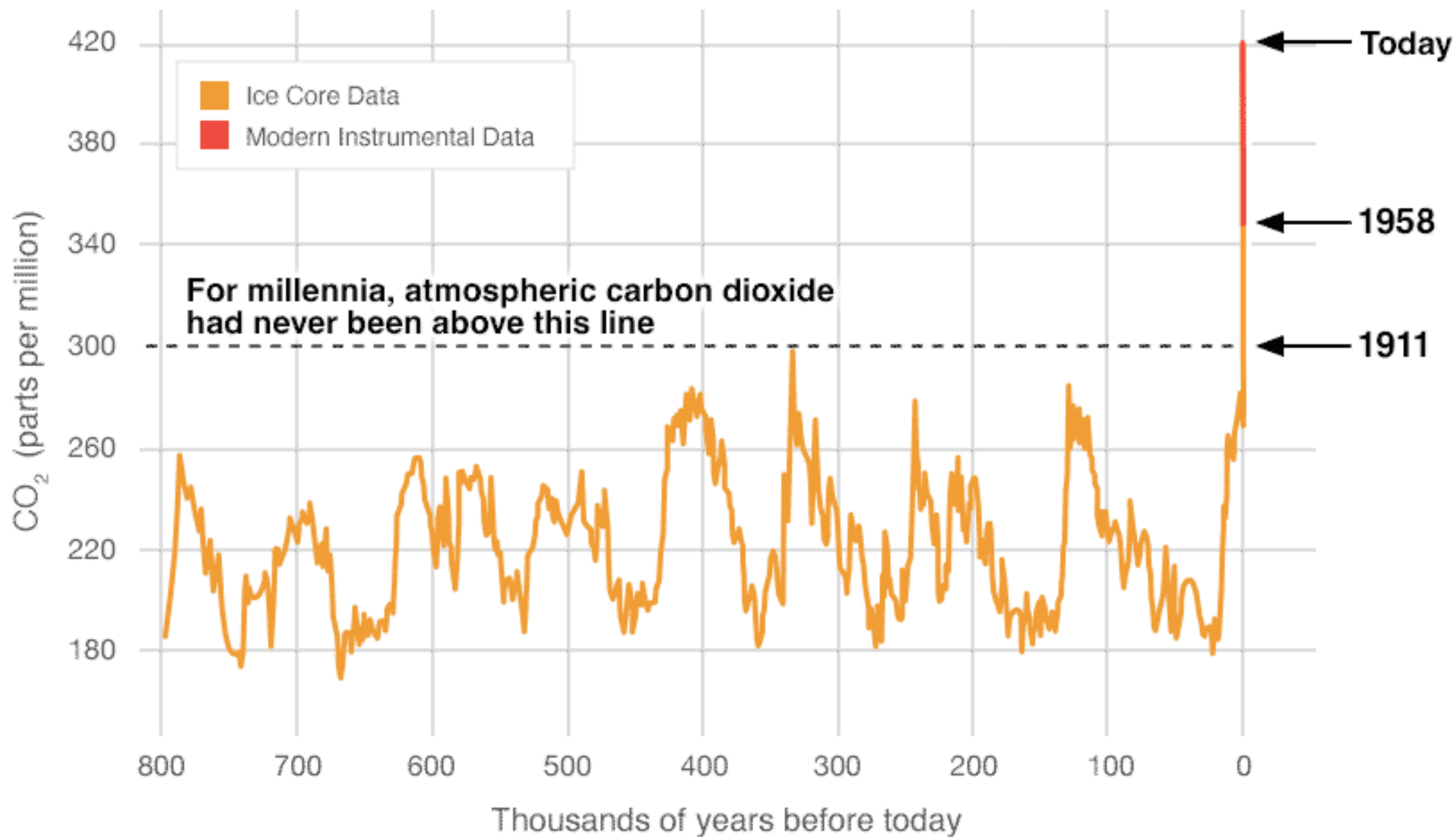
I. Background

1. Climate change
2. Impacts on health

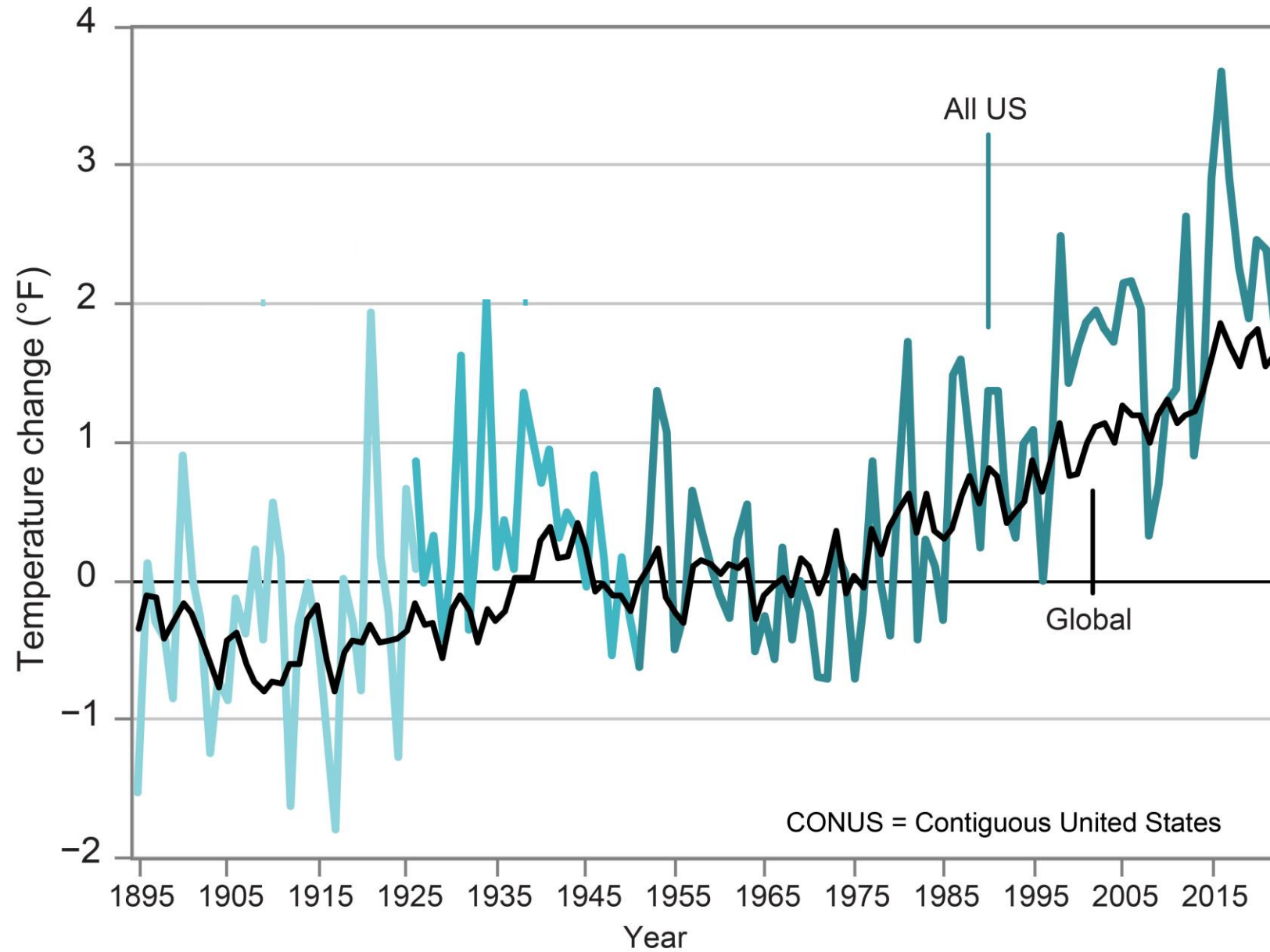
II. Current projects

1. EPA Community Change Grant
2. Natural disasters / extreme weather events
 - a. A national study
 - b. A local study

III. Explore mutual interests & collaborations



US and Global Changes in Average Surface Temperature



Climate change

World Health Organization (2023), Climate change.
<https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

Health risk

Vulnerability factors

- Demographic
- Geographical
- Biological factors & health status
- Sociopolitical
- Socioeconomic
- Health system capacity
- Gender & equity

Climate-related hazards

- Extreme weather events
- Heat
- Sea level rise
- Air pollution
- Vector distribution & ecology
- Water scarcity
- Reduced food production

Exposure

- People & communities
- Health workforce
- Infrastructure
- Energy systems
- Water systems
- Food systems
- Health systems

Environmental threats
and GHG emissions

Health outcomes

Health systems & facilities



Review

> [Pediatrics](#). 2020 May;145(5):e20193169. doi: 10.1542/peds.2019-3169. Epub 2020 Apr 7.

Climate Change as a Social Determinant of Health

Maya I Ragavan ¹, Lucy E Marcil ², Arvin Garg ²

Affiliations + expand

PMID: 32265296 PMCID: [PMC7193972](#) DOI: [10.1542/peds.2019-3169](#)

- Worsens health
- Increases health care costs
- Disproportionately impacts vulnerable populations
- Exacerbates other SDOHs

A two-pronged approach to combating climate change

Mitigation =

Lower or remove carbon dioxide
(CO₂) emissions

Examples:

- Decarbonization (move away from fossil fuel sources)
- Enhance CO₂ “sinks” – e.g., restore wetlands and forests

Adaptation =

Reduce vulnerability to impacts
of climate change

Examples:

- Early warning and preparedness
- Nature-based – e.g., restore wetlands, plants trees in urban heat hotspots

1. Community Change Grant (EPA)

- **Motivation:** improve health and reduce reliance on fossil fuels (decarbonization)
- **Intervention** (1,200 homes with asthma individuals)
 - Stove change out (gas → electric stoves)
 - Ventilation hoods
 - Financial incentives to switch to renewable energy
 - Electric vehicle chargers
- **Evaluation** (baseline & post-intervention)
 - Indoor air quality monitoring – NO₂, PM_{2.5}
 - Asthma symptom questionnaire
 - Review utility bills and estimation of GHG emissions



**DOES SOMEONE IN
YOUR HOME HAVE
ASTHMA?**

**DO YOU HAVE A
GAS STOVE?**

Cooking on gas stoves is a major source of indoor air pollution and may worsen asthma.

You may be eligible for a new electric induction stove at no cost.



YOU MAY QUALIFY IF |



YOU LIVE IN:

- Akron
- Canton
- Cleveland
- East Cleveland
- Euclid
- Garfield Heights
- Maple Heights
- Newburgh Heights
- Warrensville Heights



**SOMEONE IN
YOUR HOUSEHOLD
HAS ASTHMA**



**YOU USE A GAS
STOVE FOR COOKING**

**POTENTIAL
BENEFITS**

Participating in this project may reduce indoor air pollution and improve asthma symptoms.

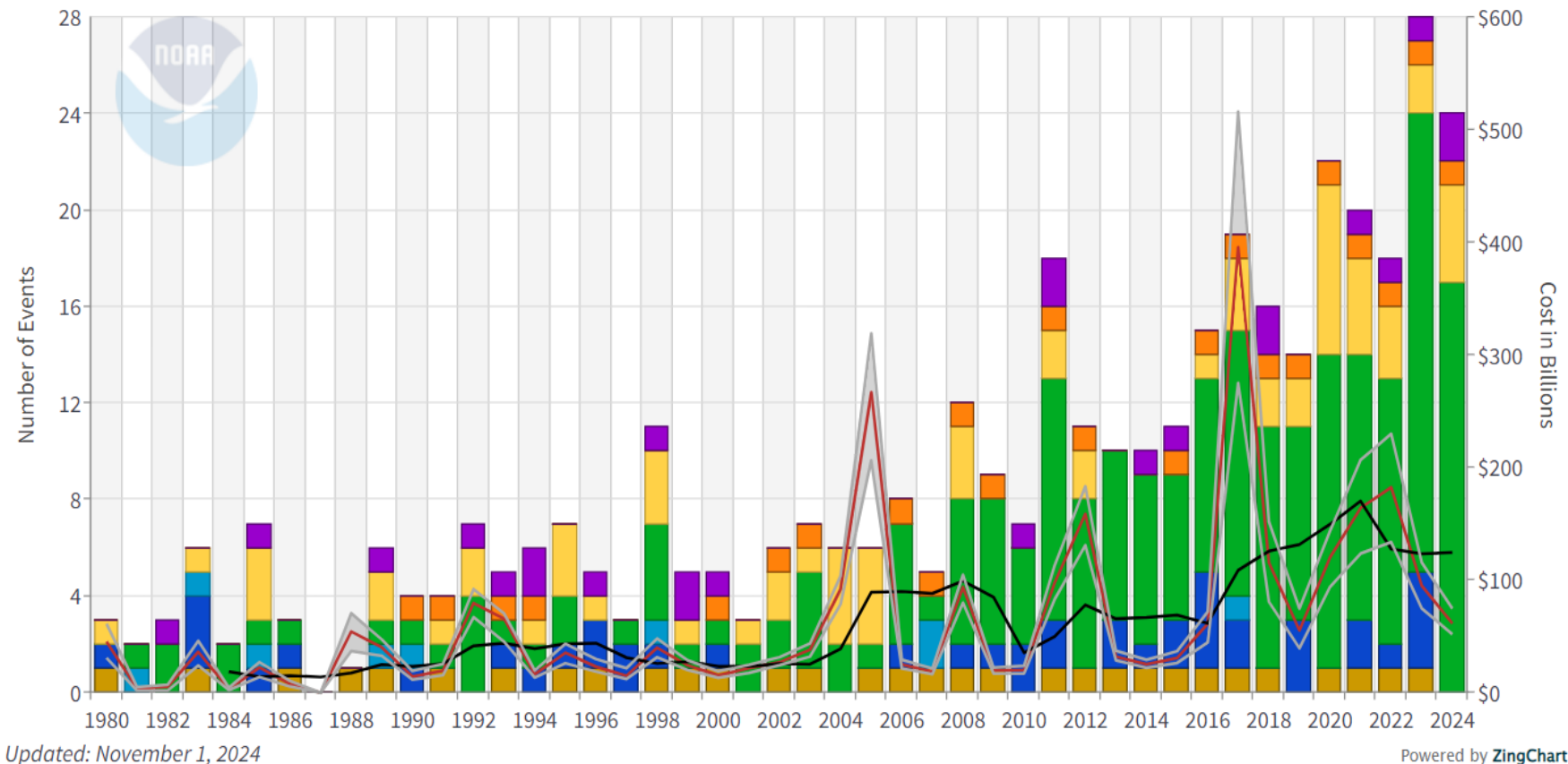
**THE PROJECT
TEAM WILL**

- Install new electric stove
- Install 240-volt kitchen outlet if needed
- Repair or install ventilation hood
- Ask you to complete an asthma questionnaire
- Measure indoor air pollution
- Review your utility bills

We are recruiting! Please help spread the word.

2. Natural Disasters

United States Billion-Dollar Disaster Events 1980-2024 (CPI-Adjusted)



2a. Disaster-induced displacement and impacts (national)

2b. Natural disasters and power outages (NE Ohio)

2a. Natural disasters and displacement (national)

- **Knowledge gaps:**
 - No systematic monitoring of disaster-induced displacement in the U.S.
 - Current knowledge based on an individual disaster or a type of disaster
 - Only a few studies have looked at intersection with SDOHs
- Data source:

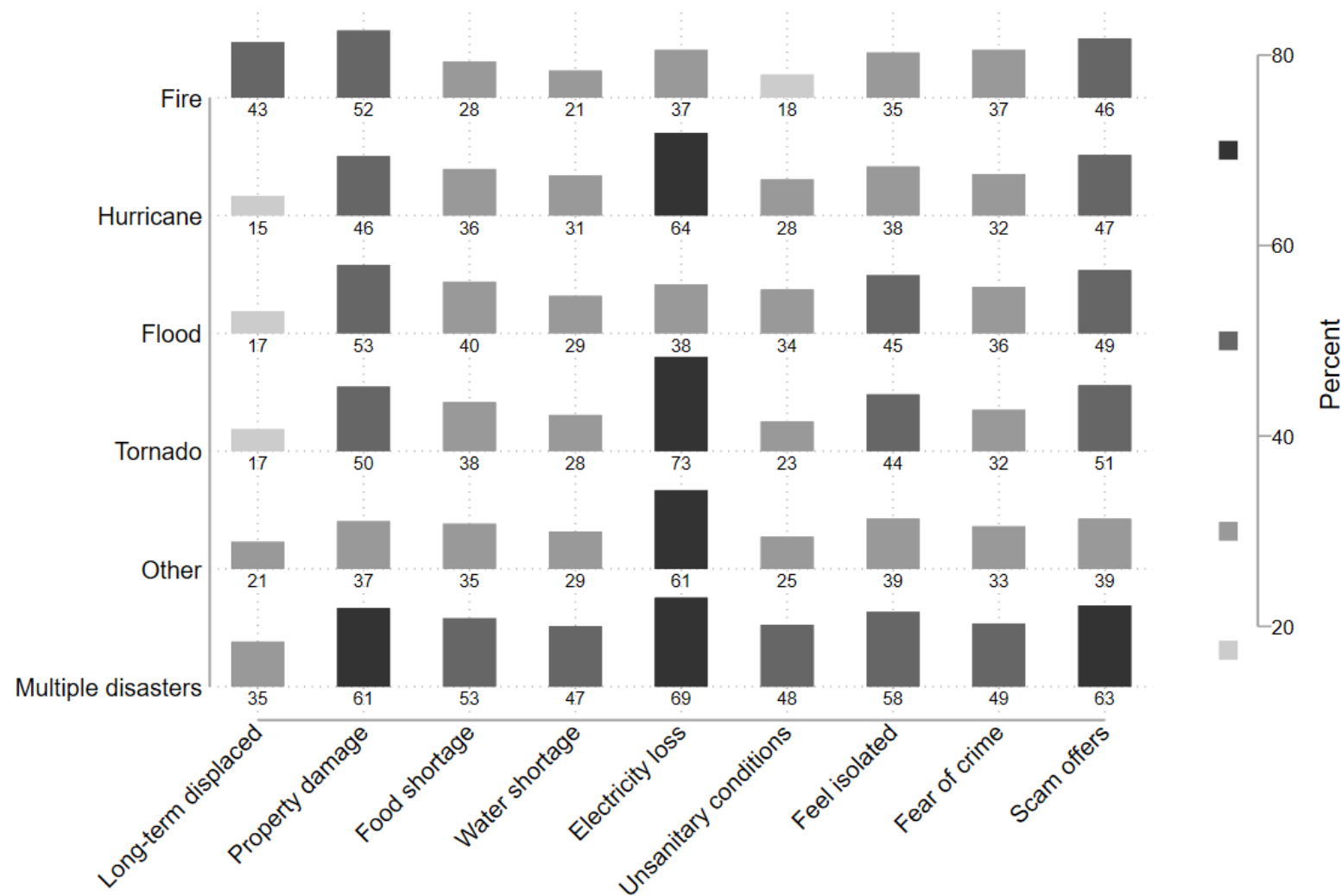
United States[®]
Census
Bureau



Results

- Over 3 million Americans displaced in 2022-2023
- Populations more likely to be displaced:
 - ≥ 75 years old
 - People of color (non-Hispanic Other, non-Hispanic Black)
 - Sexual and gender minorities
 - Those with disabilities
 - Those with unfavorable SDOH:
 - Behind on rent/mortgage
 - Food insecure
 - Energy insecure
 - Geography: South and West census regions

Prevalence of Impacts by Natural Disaster

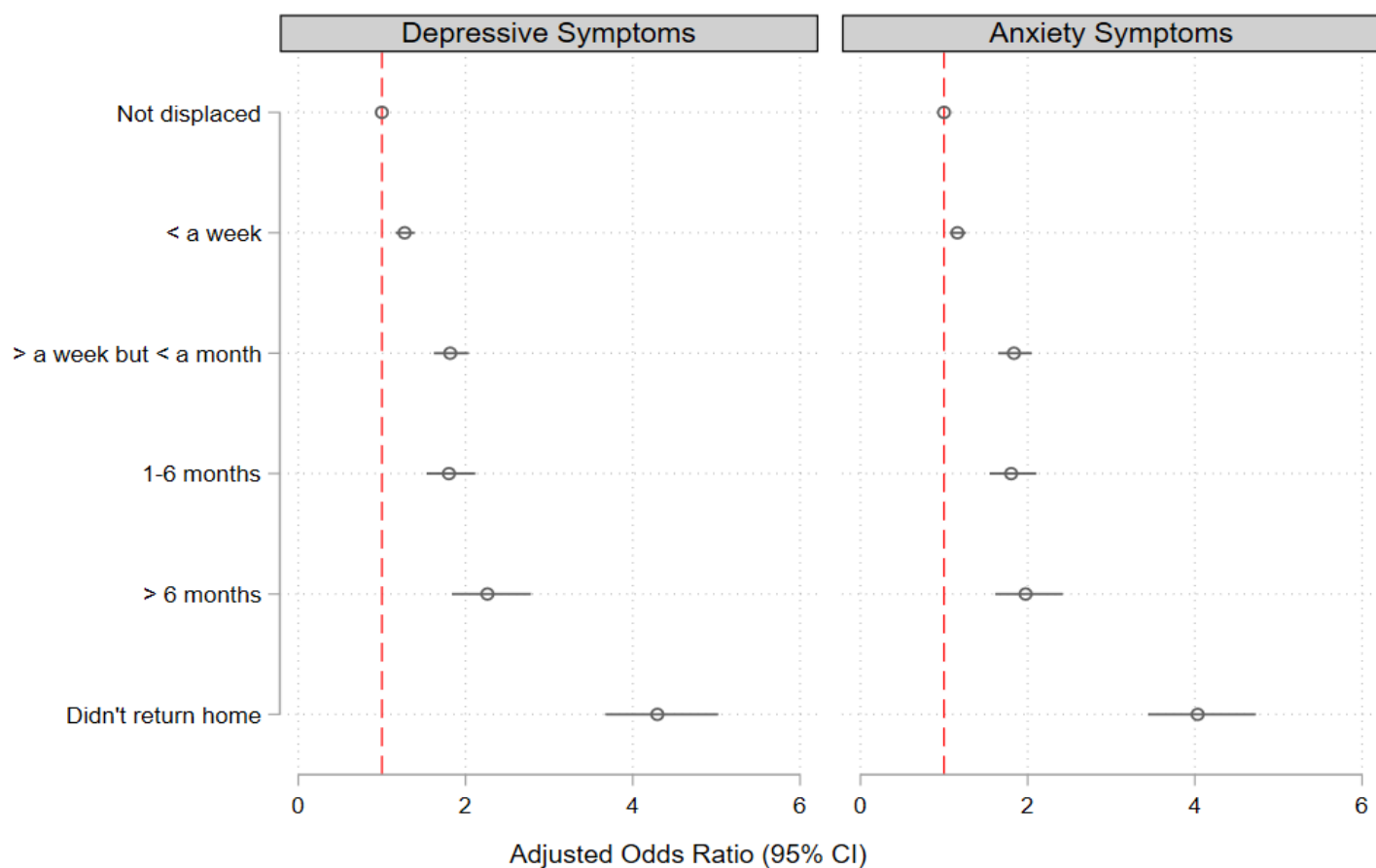


Conclusion

- Climate change may exacerbate existing health disparities
- SDOH implications:
 - Addressing SDOHs may help improve disaster preparedness and mitigate post-disaster impacts
 - Pre-disaster food insecurity associated with hurricane displacement, and experiencing food, water and medicine shortages post-disaster (Arlinghaus KR, et al. 2019)
- Need for longitudinal studies pre- and post-disaster on SDOH

Disaster induced-displacement and mental health

(with Kari O'Donnell, Susan De Luca, Doug Gunzler, Ash Sehgal)



Adjusted for:

- Age
- Sex
- Race & ethnicity
- Education
- Income

2b. Natural disasters and power outages (PO)

- August 2024 storms in NE Ohio
- 300,000 lost power in Cuyahoga County lasting days
- Vulnerable pop: electricity-powered Durable Medical Equipment (DME) users
- Pilot study (Mary Jo and Ther (co-PIs), Daryl, Ash)
 - Objective: better understand how DME users coped during PO and what they need to be better prepared for future POs
 - Method: qualitative interviews with 20 e-powered DME users
 - Status: interviewing and recruiting



Theme 1: Interruptions in health care

Participant 1 (64 years, F, N-H Black):

I didn't go to dialysis that day...At one point we heard fire trucks coming through and an ambulance. I tried to find out who the ambulance was for....The person who the ambulance was for had been missing his dialysis. He ended up passing away. So sad...

[I] did not go to dialysis on Saturday. Finally, on Monday, the electricity went back on, which was good cause I needed to go to dialysis on Tuesday; if they hadn't gone on, I would have had to get the fire department to take me.

Theme 2: Worry about food and other neighborhood hazards

Participant 1 (64 years, F, N-H Black):

I had to throw out a lot of food after the storms. I contacted food stamps, and they said they would add some extra money to my card. Do you know how much they gave me? \$4.00, \$4.00. What am I supposed to do with \$4.00?

Participant 3 (60 years, M, N-H, Black) received a generator on a loan:

...somebody tried to steal the generator, I live in a tough neighborhood. Mm-Hmm...So I said, hey, could you please bring me a locking chain so I could lock it up?

Theme 3: Importance of social capital

Participant 1 (64 years, F, N-H Black):

On Saturday, I went to a neighbor who is on the 1st floor apartment to wash up. They were able to help me wash up and I have wounds, one on my side and they helped change my pads for the wound.

What can MetroHealth or others do to help people like you cope with future extreme weather events?

Participant 1 (urban):

Get the word out about how to prepare for a weather disaster...Maybe letters could be sent out to seniors about how to deal with extreme weather...There should be Senior Expos on the subject. At the expo, a list of what to put into an emergency bag and a list of places to call if you need help with different things, like oxygen, food, transportation to dialysis.

Participant 2 (rural):

Every community is going to be different...I mean, there should be at least a list of people in a neighborhood where you live that you need to check up on...maybe that that would be a start right there.

We are recruiting! Please help spread the word.



Extreme weather and its effect on health and wellbeing of persons with chronic conditions

- Do you use a wheelchair for mobility or Durable Medical Equipment that need electricity to run?
- Were you effected by the storms in early August that produced heavy rain, winds, tornadoes, flooding, and power outages?
- Are you over 18 years old and are English Speaking?

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- Worsens health
 - Direct and indirect ways
- Disproportionately impacts vulnerable populations
 - Lower income/education, people of color, sexual and gender minorities, disabilities
- Exacerbates other SDOHs
 - Food and energy insecurity, housing
- Increase health care costs

Discuss Mutual Interests and Collaborations

- What climate change related research do you think are critical and would like to see happen at MetroHealth/ in the region?
 - How can we collaborate?

Acknowledgements:

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MetroHealth medical team
