

CLIMATE CHANGE IN THE DOCTOR'S OFFICE

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Disclosures:

No financial conflicts to disclose.

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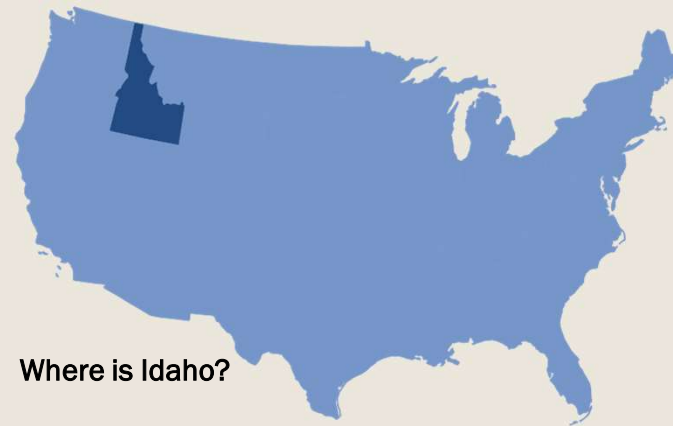
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Where is Idaho?



Boise Veterans Affairs Medical Center



Boise, Idaho

LAND ACKNOWLEDGEMENT

I am on the lands of the Shoshone, Bannock and Paiute Tribes



Learning Objectives

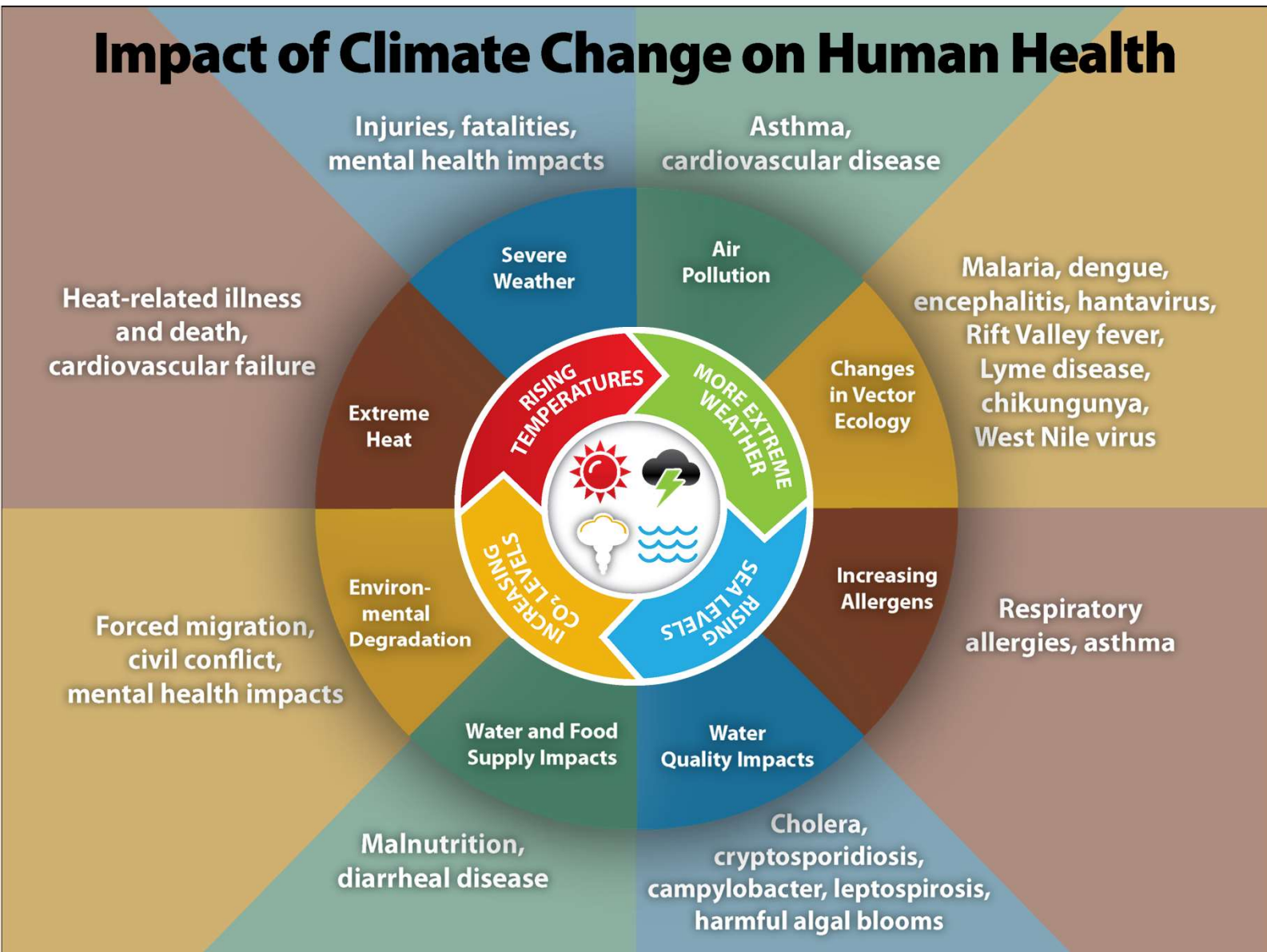
1. Apply the lens of Climate Medicine to examine climate change as a health issue
2. Identify populations at risk for illness due to climate change
3. Examine the health impacts of extreme heat, air pollution, and weather-related disruption of communities



1. CLIMATE CHANGE IS A HEALTH ISSUE



Impact of Climate Change on Human Health



Social Determinants of Health

| Economic Stability | Neighborhood and Physical Environment | Education | Food | Community and Social Context | Health Care System |
|--------------------|---------------------------------------|---------------------------|---------------------------|------------------------------|---|
| Employment | Housing | Literacy | Hunger | Social integration | Health coverage |
| Income | Transportation | Language | Access to healthy options | Support systems | Provider availability |
| Expenses | Safety | Early childhood education | | Community engagement | Provider linguistic and cultural competency |
| Debt | Parks | Vocational training | | Discrimination | Quality of care |
| Medical bills | Playgrounds | Higher education | | Stress | |
| Support | Walkability | | | | |
| | Zip code / geography | | | | |

Health Outcomes

Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations



2. IDENTIFY POPULATIONS
AT RISK FOR ILLNESS
DUE TO CLIMATE CHANGE

| Vulnerable Population | Vulnerability | Climate Effects | Health Threats |
|----------------------------|--|--|---|
| Children | <ul style="list-style-type: none"> •Breathe more air and drink more water per body weight than adults •Developing organs and low immunity •Dependent on adults •More time spent outdoors | <ul style="list-style-type: none"> •Air pollution •Extreme heat •Flooding and water contamination •Food insecurity •Drought | <ul style="list-style-type: none"> •Asthma and allergies •Neurological disorders •Heat-related illness •Dehydration •Diarrheal illness •Drowning and injuries •Psychological stress/imbalance •Increased vector-borne diseases •Malnutrition |
| Older Adults | <ul style="list-style-type: none"> •Low immunity •Pre-existing conditions •Limited mobility | <ul style="list-style-type: none"> •Extreme heat •Air pollution •Flooding | <ul style="list-style-type: none"> •Heat-related illness •Dehydration •Heart disease •Psychological stress •Falls |
| Racial / Ethnic Minorities | <ul style="list-style-type: none"> •Structural racism •Inadequate infrastructure •Health disparities •Lack of social capital •Language barrier | <ul style="list-style-type: none"> •Flooding •Physical damage to communities | <ul style="list-style-type: none"> •Psychological stress/imbalance •Increased heart and lung complications |
| Low-Income Communities | <ul style="list-style-type: none"> •Less resources and means to evacuate •Inadequate infrastructure | <ul style="list-style-type: none"> •Flooding •Physical damage to communities •Food insecurity | <ul style="list-style-type: none"> •Psychological distress/imbalance •Physical displacements •Malnutrition |

NPC
collective
poster
land
2006

ENVIRONMENTAL JUSTICE IS
OUR CRY OF DEFIANCE AGAINST
THE ONSLAUGHT
OF OPPRESSIVE
TOXINS AND
TOXIC OPPRESSIONS
THAT
THREATEN
TO SUBMERGE
OUR HOMES.

Artwork by Ricardo
Levins Morales, 2006.

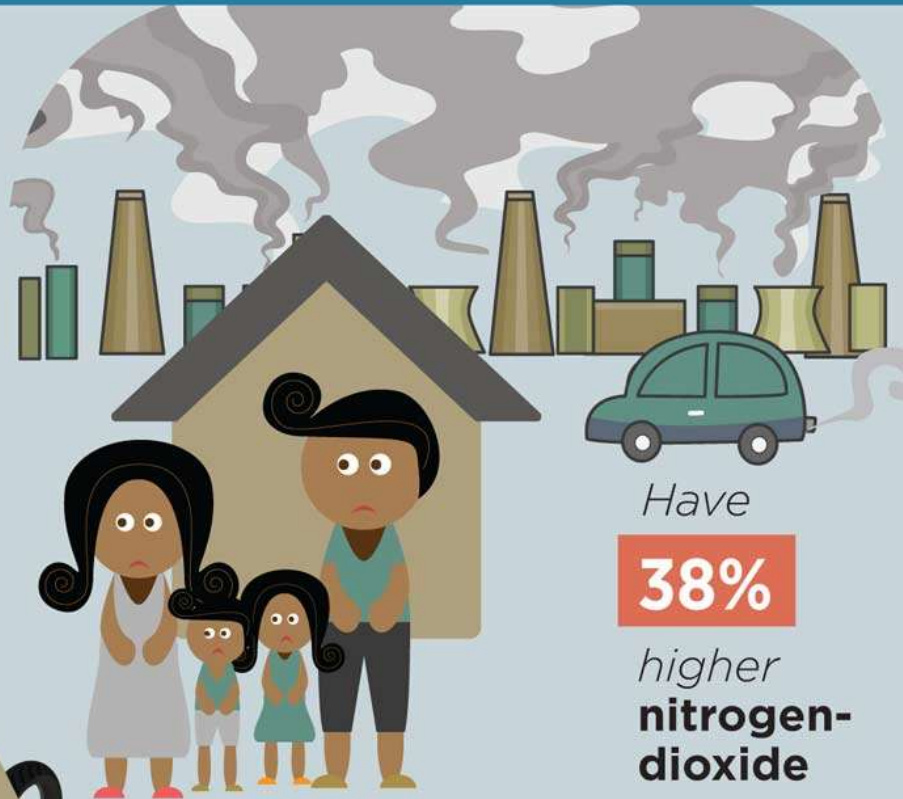


Environmental Racism Is Nothing New

Race is the most significant predictor of a person living near contaminated air, water, or soil.

56%

of the population near **toxic waste** sites are people of color.



People of color:

Have seen

95%

of their claims against polluters **denied by the EPA.**

Have

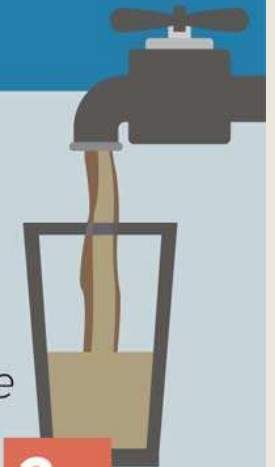
38%

higher **nitrogen-dioxide** exposure.

Are

2x

more likely to live without **potable water** and **modern sanitation.**





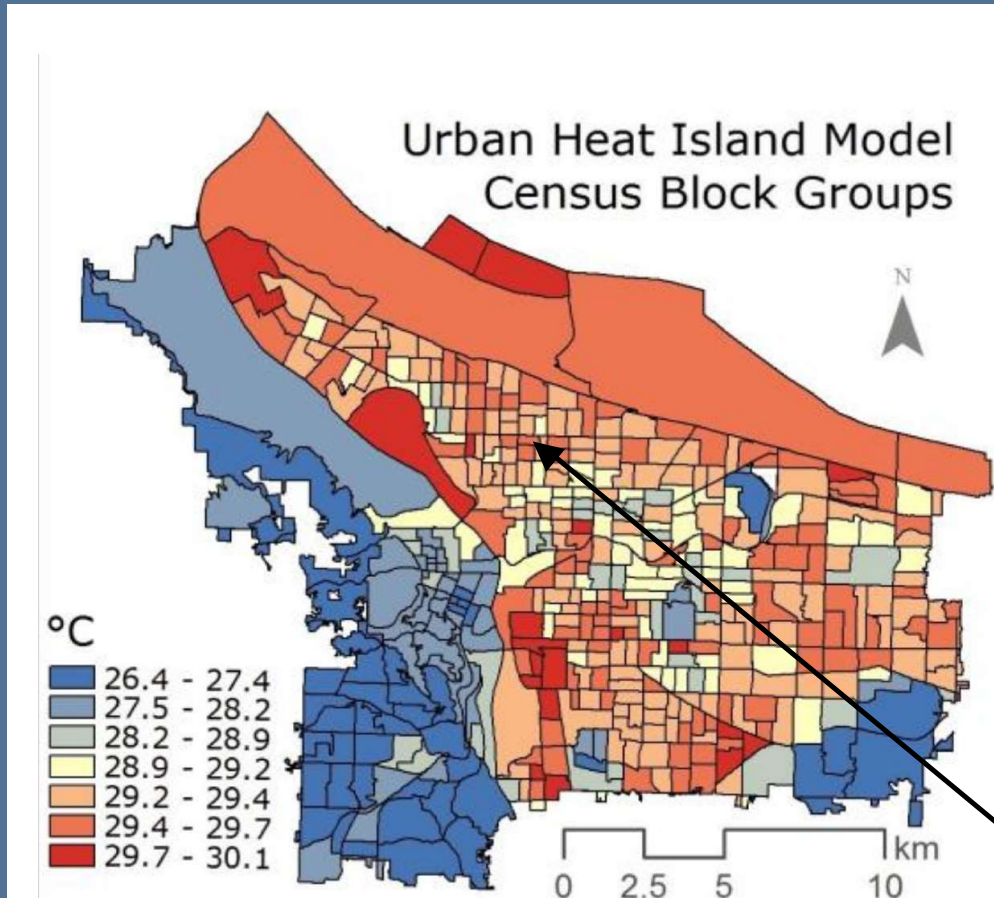
**3. EXAMINE THE IMPACT
OF CLIMATE CHANGE
ON INDIVIDUAL HEALTH**

Case #1

A 75 year-old widowed Black woman with hypertension and stage 3 chronic kidney disease who lives alone in a historically red-lined neighborhood in Northeast Portland, Oregon comes to clinic for a routine 3-month follow-up visit on a Friday in late July.

The forecast for the entire week ahead is maximum high temperatures between 35°C - 38°C.

How do you address the risks to her health from the anticipated extreme heat event?

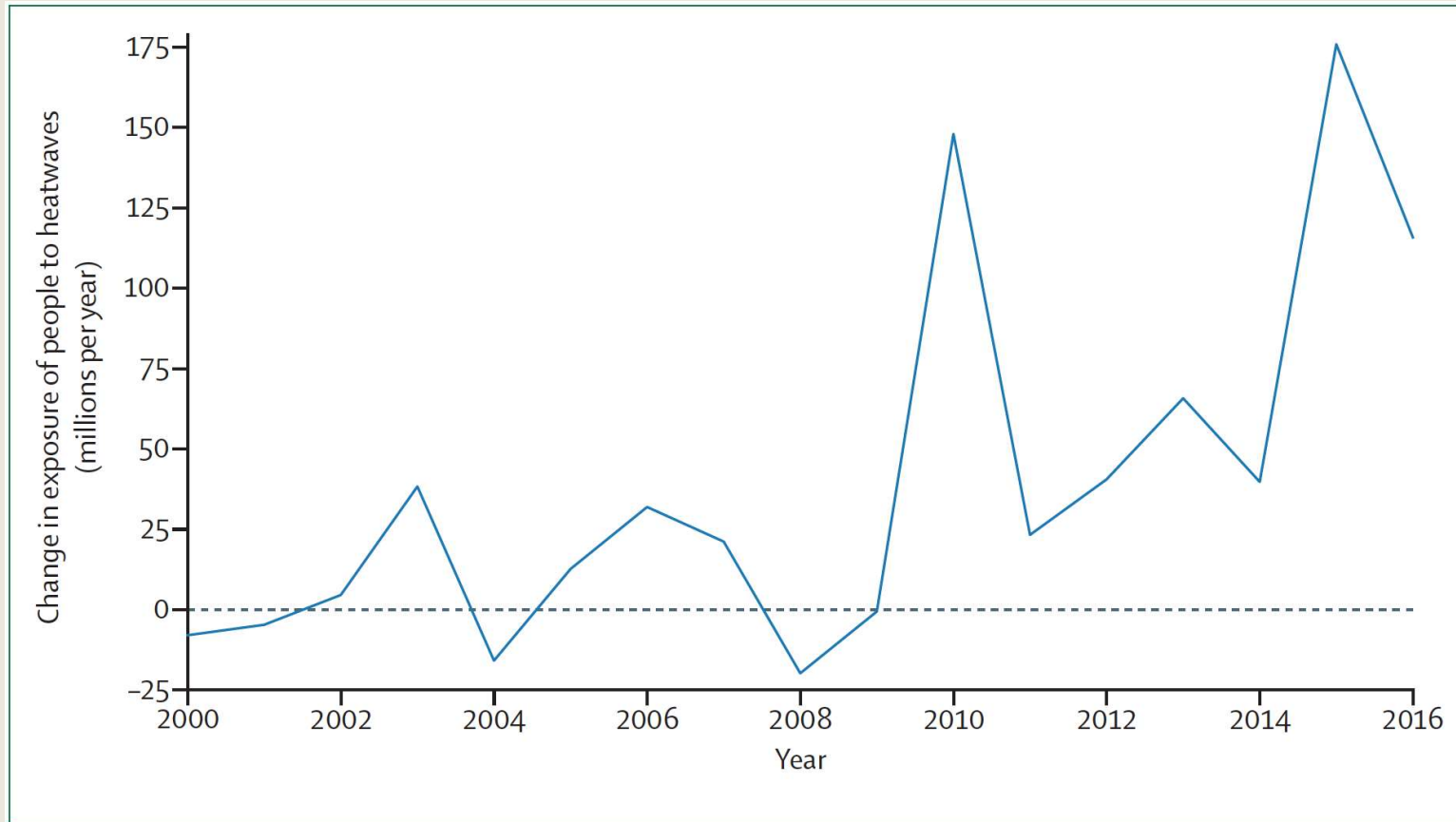


Disproportionately:

- Low-income
- Non-white
- Minimally-educated
- Poor English language skills

Approximate location of patient's home.

Exposure to Extreme Heat is Rising Globally



Heat and Elderly

- Factors characterizing susceptibility are both social and medical
 - *physiological responses deteriorate with aging*
 - *medication interacts with thermoregulation and risk perception*
 - *functional status declines*
 - *isolation and dependency on social network*
- Elderly account for the majority of preventable deaths during extreme heat events
 - *In 1995 Chicago heat wave, 75% deaths were in those >65 years old*
 - *Increased hospital admissions for cardiovascular, kidney and respiratory disorders*
 - *Some heat-related illness and death rates have diminished in recent years, likely due improved forecasting, heat-health early warning systems, increased access to air conditioning*

Heat Related Kidney Disease

- Related to dehydration + chronic heat exposure
 - *Ischemia, temperature induced oxidative stress*
- Mesoamerican nephropathy, aka CKDu (CKD of uncertain etiology)
 - *Compounded by exposure to agrochemicals, heavy metals, infectious agents*
 - *High prevalence in specific regions of El Salvador, Nicaragua, Guatemala, Costa Rica*
- Risk factors:
 - *Agricultural and physically demanding work in hot climate*
 - *Exposure to pesticides or agrochemicals*
 - *Low socioeconomic status*
 - *Male sex*
 - *Low body mass index and malnutrition*

Indirect Impacts

Impact on health services

- Increased ambulance call-outs and slower response times
- Heat cramps
- Response times
- Increased number of hospital admissions
- Storage of medicines



Increased risk of accidents

- Drowning
- Work-related accidents
- Injuries and poisonings



Increased transmission of

- Food and waterborne diseases
- Marine algal blooms



Potential disruption of infrastructure:

- Power
- Water
- Transport
- Productivity



Direct Impacts



Heat illness

- Dehydration
- Heat cramps
- Heat stroke



Accelerated death from:

- Respiratory disease
- Cardiovascular disease
- Other chronic disease (mental health, renal disease)



Hospitalization

- Respiratory disease
- Diabetes mellitus
- Renal disease
- Stroke
- Mental health conditions

Health
Impacts of
Exposure to
Extreme heat

Doctor's Orders

Rx for Individual

- Stay in the coolest room in your home, especially at night. Temperature should be $<32^{\circ}\text{C}$ during the day, $<24^{\circ}\text{C}$ at night
- If not possible to keep your home cool, spend 2-3 hours/day in temperature-controlled environment
- Minimize strenuous activities and time spent outdoors. If you must be outside, aim for coolest time of the day, between 4:00-7:00

Rx for Community

- Cooling shelters or other access to low-cost air conditioning for patients
- Urban green spaces and other strategies to address urban heat islands including urban development programs directed at lower income neighborhoods
- Community programs to check-in on most vulnerable during extreme heat events

Case #1 Takeaways: Extreme Heat

- Extreme heat is one of the most significant health impacts of climate change.
- The most vulnerable to the health consequences of extreme heat are the elderly, those with chronic health conditions (especially cardiovascular, cerebrovascular, and chronic kidney disease).
- Urban heat islands amplify the magnitude of extreme heat events.
 - *These areas are concentrated in locales impacted by discriminatory practices in urban development and housing*
- Health systems need to work with communities to be ready for extreme heat events to avoid overwhelming existing health system resources.

Case #2

AIR QUALITY

Visibility camera (image updated every 15 minutes)



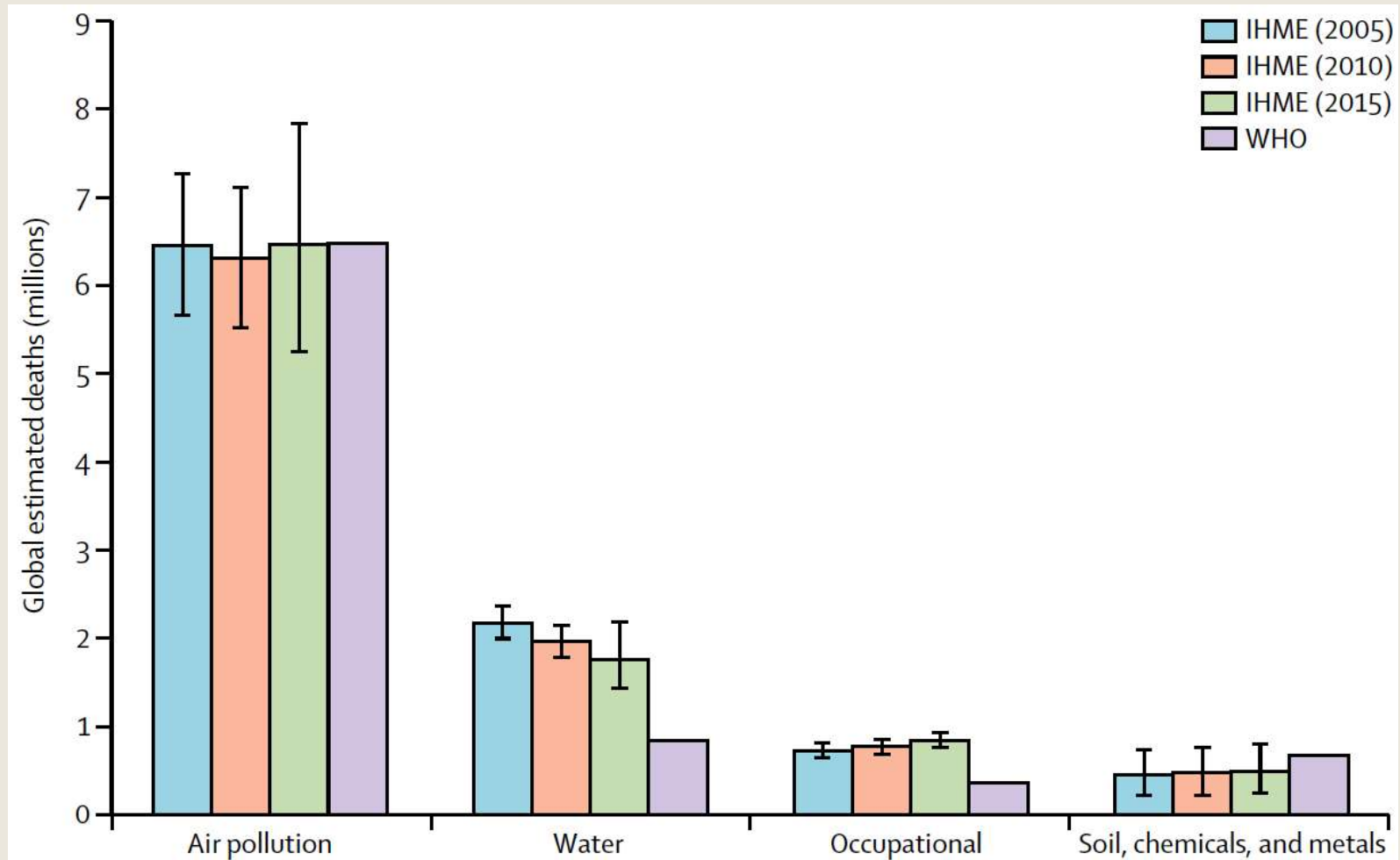
A 70 year old male Vietnam veteran and retired farm equipment operator presents for follow-up after hospitalization for exacerbation of chronic obstructive pulmonary disease (COPD).

Following a prior hospitalization over a year ago, you have been working with him to successfully quit smoking, get on an appropriate inhaler regimen and complete a pulmonary rehabilitation program.

However, 3 weeks ago, he attended the outdoor funeral of a good friend 150 miles away from home, driving through poor air quality due to wildfire smoke that led to his most recent hospitalization.

He asks what he can do now to prevent recurrent flares of COPD during “fire season”?

Air pollution more deadly than other pollution



Landrigan *Lancet* 2017; slide adapted from Chris Carlsten, MD MPH



2017 Ventura, California
Image from CNN.

Climate change exacerbates existing health threats

- **Exposure to smoke** (carbon monoxide, ozone, toxic chemicals, fine and coarse particulate matter)
- **Acute and exacerbated respiratory** problems, such as shortness of breath, asthma, and COPD
- **Risk of cardiovascular disease** and premature death
- Low infant **birth weight**
- **Motor vehicle deaths and injuries**
- **Burns and injuries to first responders**
- **Psychiatric** – PTSD, depression, and anxiety

Doctor's Orders

Rx for Individual

- Ensure appropriate medical therapy
 - *Patient education about proper inhaler technique*
 - *Store medications away from heat*
 - *Smoking cessation & pulmonary rehab*
- Modify activities to minimize exposure to air pollution
 - *Check air quality regularly*
 - *Indoor air filtration, N95 mask*
 - *Evacuate / relocate*

Rx for Community

- Promote regulations to protect clean air:
 - *Wintertime bans on smoke/fires*
 - *Support for emissions tests*
 - *Reduction of idling, traffic flow to reduce traffic jams, alternates to pollution-producing cars*
- Non-polluting energy sources – Idaho Power 100% clean by 2045

Case #2 Takeaways: Air Pollution

- Air quality has important impacts on those patients with cardiopulmonary disease
- Patients can be educated to monitor air quality and responding accordingly
- Health professionals need to educate patients on co-benefits of exercise, and work with communities

Case #3

A 42 year old female agricultural worker with a history of type 2 diabetes presents to an urgent care clinic in the middle of summer complaining of shortness of breath for 3 months.

She describes difficulty breathing that starts at the end of her work shift and persists in the evening when she gets home from work. It is accompanied by chest tightness and anxiety. It is worsening in the last month since wildfires started in the area.

What is your differential diagnosis?

How does climate change contribute to this?

Case continued...

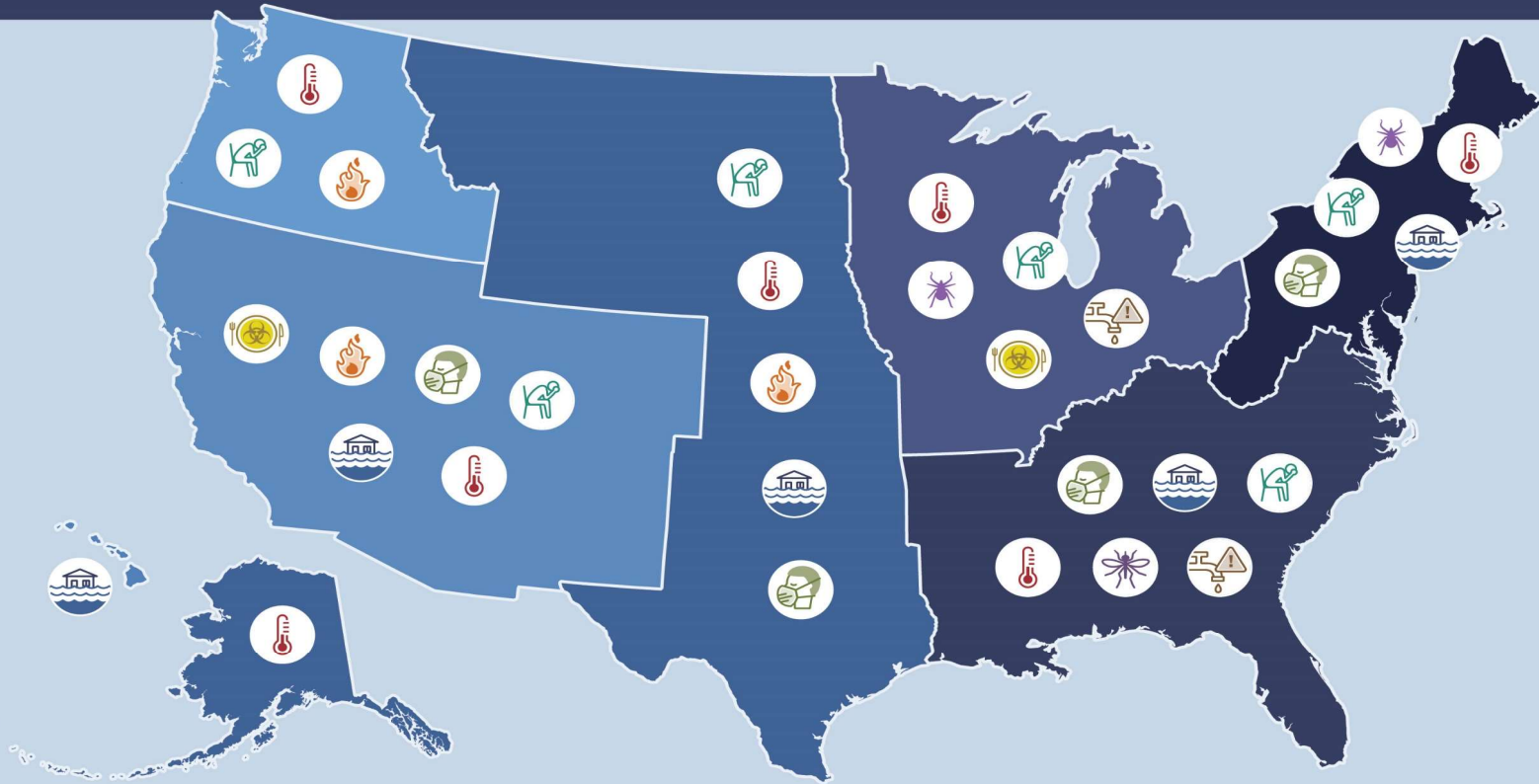
Our patient reports she emigrated to southern California 8 months ago from El Salvador with her two teenaged children to live with her sister, after the coffee cooperative community her extended family farmed succumbed to progressive dry weather and repeated bouts of coffee leaf rust. She reports hypervigilance related to concerns about her undocumented status.

After negative work-up for pulmonary and cardiac disease, you suspect she is experiencing generalized anxiety with panic attacks.

What are risk factors associated with climate anxiety?

How can we help this patient?

How Our Health is Harmed by Climate Change: Impacts Differ by Geographic Region



Extreme Temperatures



Outdoor Air Quality



Extreme Events
Flooding, Hurricanes,
Storms, Drought



Food-Related Infection & Agriculture



Water-Related Infection



Mosquito- and Tick-Borne Infections



Wildfires



Mental Health & Well-being

This graphic illustrates key impacts of climate change on health and is based on reports from the U.S. Global Change Research Program. For more information, visit www.globalchange.gov.

Climate contribution to mental health

- Extreme weather, fires and flood can threaten, damage or destroy people and their homes, communities, loved ones and social networks
- Climate migrants have high rates of mental illness
 - *Limited legal protections during migration*
 - *Experience disruption of many domains of the social determinants of health.*

Mental Health Impacts of Climate Change



- Multiple behavioral health conditions related to climate change and environmental degradation have been described in both direct and indirect effects – including PTSD, depression, anxiety, substance use disorder, and domestic violence.
- **Direct mental health effects** of climate change include PTSD and grief, which are linked to weather related disasters.
- **Indirect mental health effects** of climate change include climate anxiety, which is more broadly related to environmental degradation and the uncertainty around how it will impact health and livelihood.



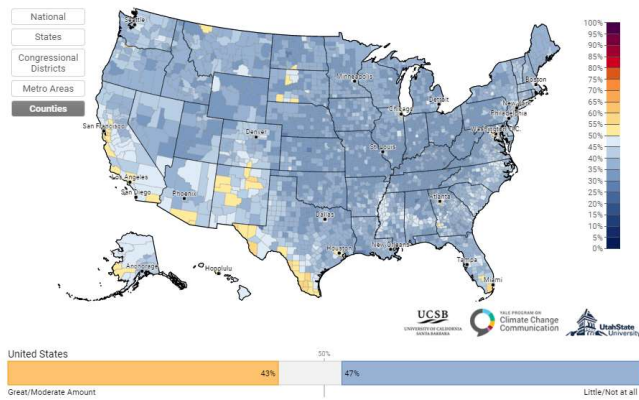
Climate anxiety is higher in certain populations:

- Youth
- Elderly
- Individuals with pre-existing mental illness
- Low-income communities
- Indigenous communities

Estimated % of adults who think global warming will harm them personally (43%), 2020

Select Question: Absolute Value

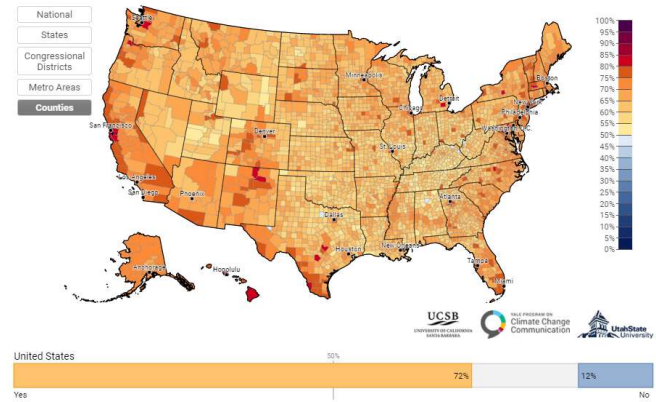
Click on map to select geography, or:



Estimated % of adults who think global warming is happening (72%), 2020

Select Question: Absolute Value

Click on map to select geography, or:





Approach to Treatment

- Gauge for readiness to discuss climate related health effects
- Validating patient's feelings can be therapeutic
- Problem based strategies may be associated with more long term benefits:
 - *Limit excessive news consumption*
 - *Find community through joining climate action groups*
 - *Incorporate lifestyle changes to mitigate climate change such as using public transportation, adopting a more plant based diet*
- Emotion focused strategies, such as cognitive behavioral therapy

Case #3 Takeaways: Climate Anxiety

- Extreme weather events disrupt many domains of the social determinants of health and are associated with a variety of mental health illness, including PTSD, depression, anxiety, substance use disorder and domestic violence.
- Climate anxiety, similar to eco-anxiety, is related to more general concerns about climate change and has higher prevalence among youth.
- Populations with highest risk for mental health impacts of climate change include youth, elderly, climate migrants, those with pre-existing mental illness, and Indigenous communities.

Summary

- Climate change is a health issue
- The populations disproportionately impacted by climate change are the same communities that experience broader health disparities
- In the doctor's exam room, connecting individual health issues with climate change in a broader context is important to build coalition for change

QUESTIONS?

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