

# Climate Change and Disaster Medicine

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Education

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A dramatic photograph of a firefighter in silhouette, wearing full protective gear and carrying a hose, standing in front of a massive, intense fire at night. The fire is a large, bright orange and yellow wall of flames and thick smoke, dominating the background. The firefighter is positioned in the lower center, facing away from the camera towards the fire. The ground is dark and appears to be covered in ash or soot. The overall scene conveys a sense of scale and the overwhelming nature of the fire.

# Unprecedented times

“We are the first generation to feel the impacts of climate change and the last generation that can do anything about it.”





# THE LANCET

Volume 373 · Number 9676 · Pages 1659–1734 · May 16–22, 2009

[www.thelancet.com](http://www.thelancet.com)

"Climate change is  
the biggest global  
health threat of the  
21st century."

See The Lancet Commissions page 1693

## Comment

Compensation for brain drain  
from developing countries  
See page 1665

## Correspondence

Amnesia from canned tuna?  
See page 1672

## Articles

RECORD4: Rivaroxaban for  
thromboprophylaxis after  
total knee arthroplasty  
See page 1673

## Articles

TACT: sequential docetaxel as  
adjuvant chemotherapy for  
early breast cancer  
See page 1681

## The Lancet Commissions

Management of health effects  
of climate change  
See page 1693



The background of the slide is a photograph of several white wind turbines standing in a field of bright yellow flowers. The sky is blue with scattered white clouds. A semi-transparent grey rectangular box is positioned on the right side of the image, containing the main title and subtitle text.

# **TACKLING CLIMATE CHANGE COULD BE THE GREATEST GLOBAL HEALTH OPPORTUNITY OF THE 21ST CENTURY**

**The Lancet, June 2015**

# INCREASED ANTHROPOGENIC GREENHOUSE GAS EMISSIONS

## CLIMATE PRESSURES



Increasing temperatures



More extreme weather



Rising sea levels



Extremes of precipitation

## EXPOSURE PATHWAYS



Extreme heat & heatwaves



Air pollution  
(PM<sub>2.5</sub> & O<sub>3</sub>)



Water contamination



Changes in vector ecology



Increasing allergens



Food supply and quality



Population displacement

## HEALTH OUTCOMES



Heat stress & heat stroke



Respiratory disease



Cardiovascular disease



Gastrointestinal illness



Vector-borne diseases  
(Lyme, West Nile, Zika)



Mental health illness/  
worsening mental health



Adverse birth outcomes



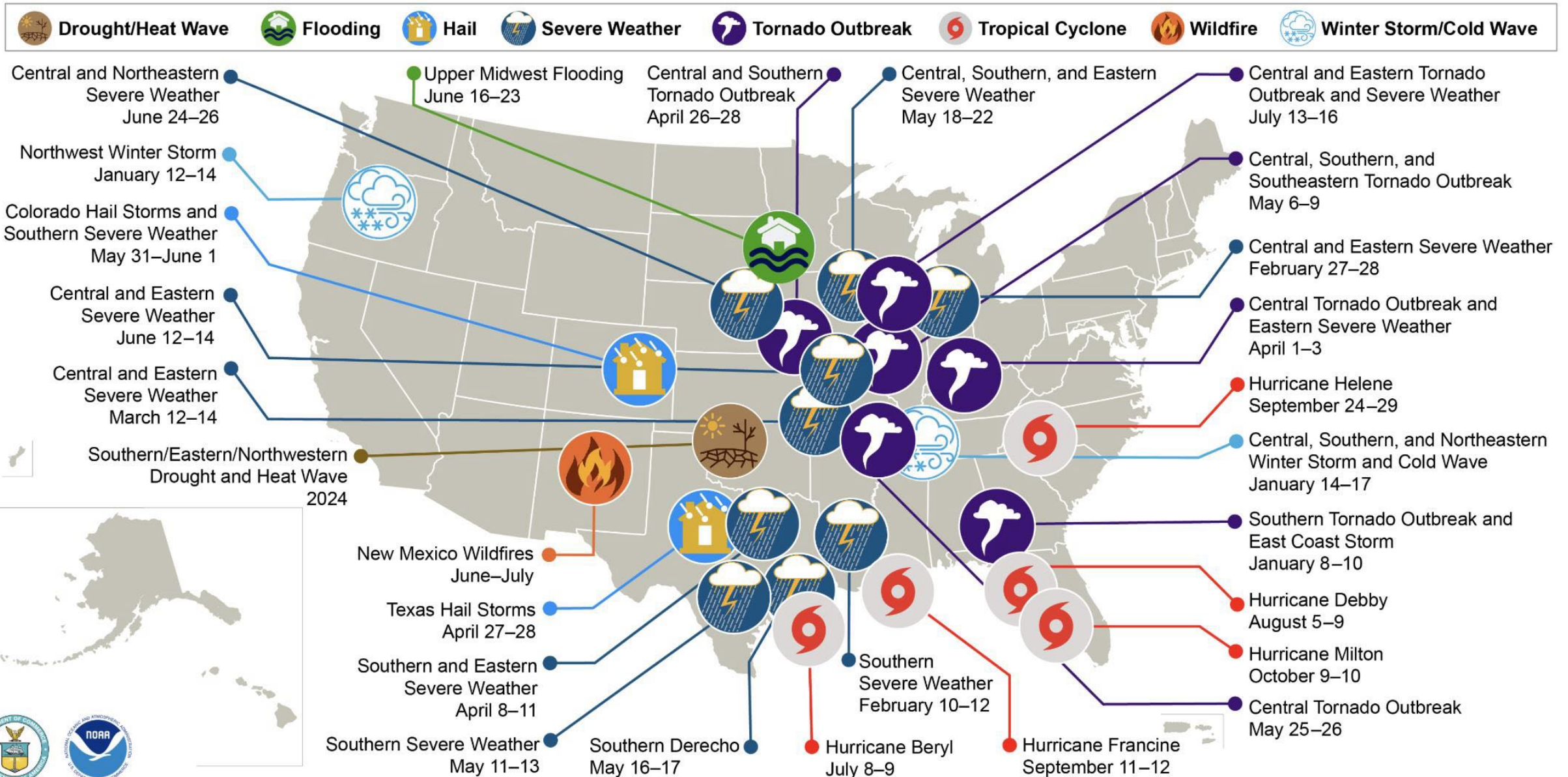
Physical trauma and death

Populations especially vulnerable are children, older adults, pregnant women, those with chronic medical conditions, those with lower socioeconomic status, outdoor workers, and racial minorities.



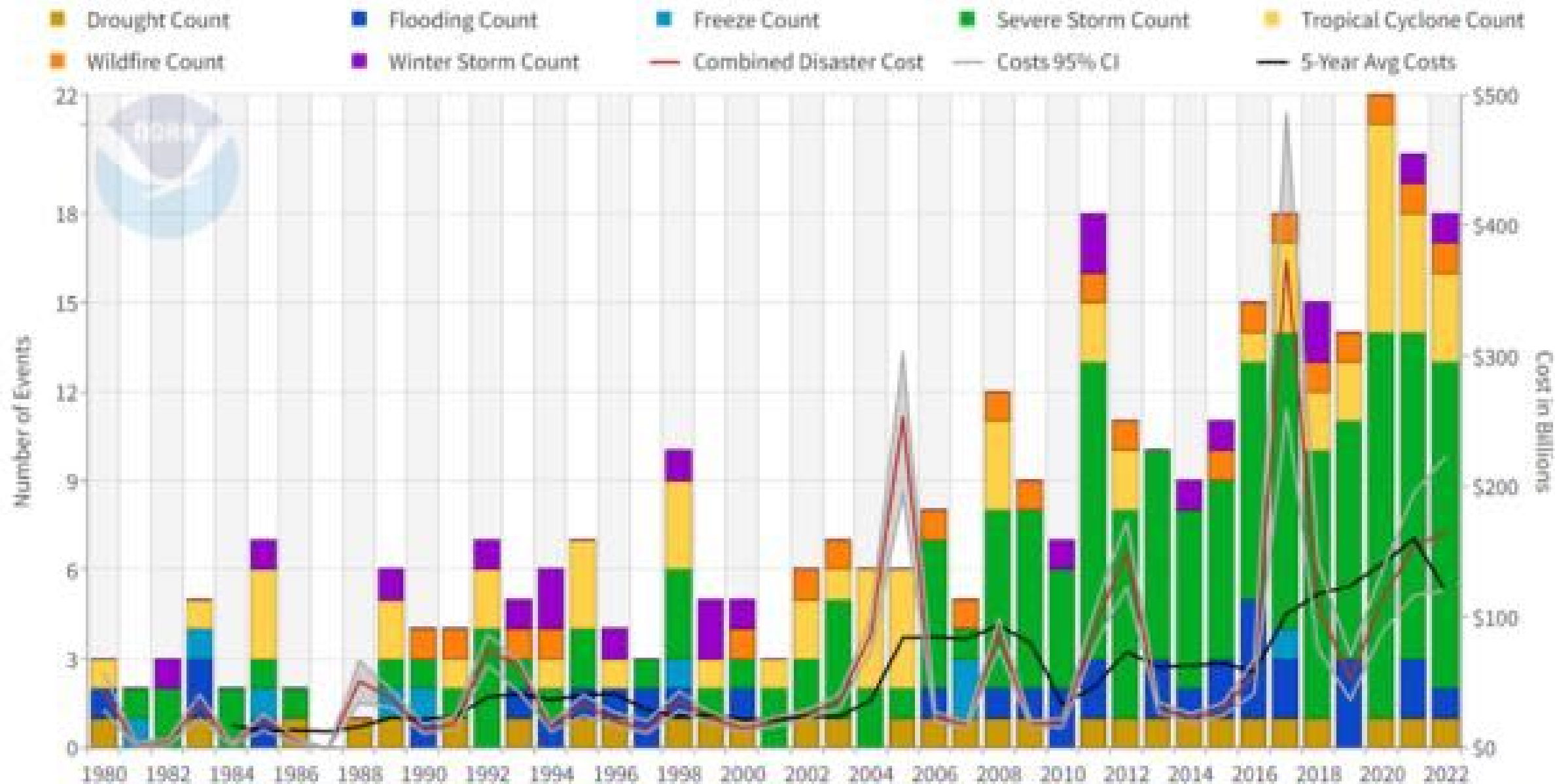


# U.S. 2024 Billion-Dollar Weather and Climate Disasters



*This map denotes the approximate location for each of the **27 separate billion-dollar weather and climate disasters** that impacted the United States in 2024.*

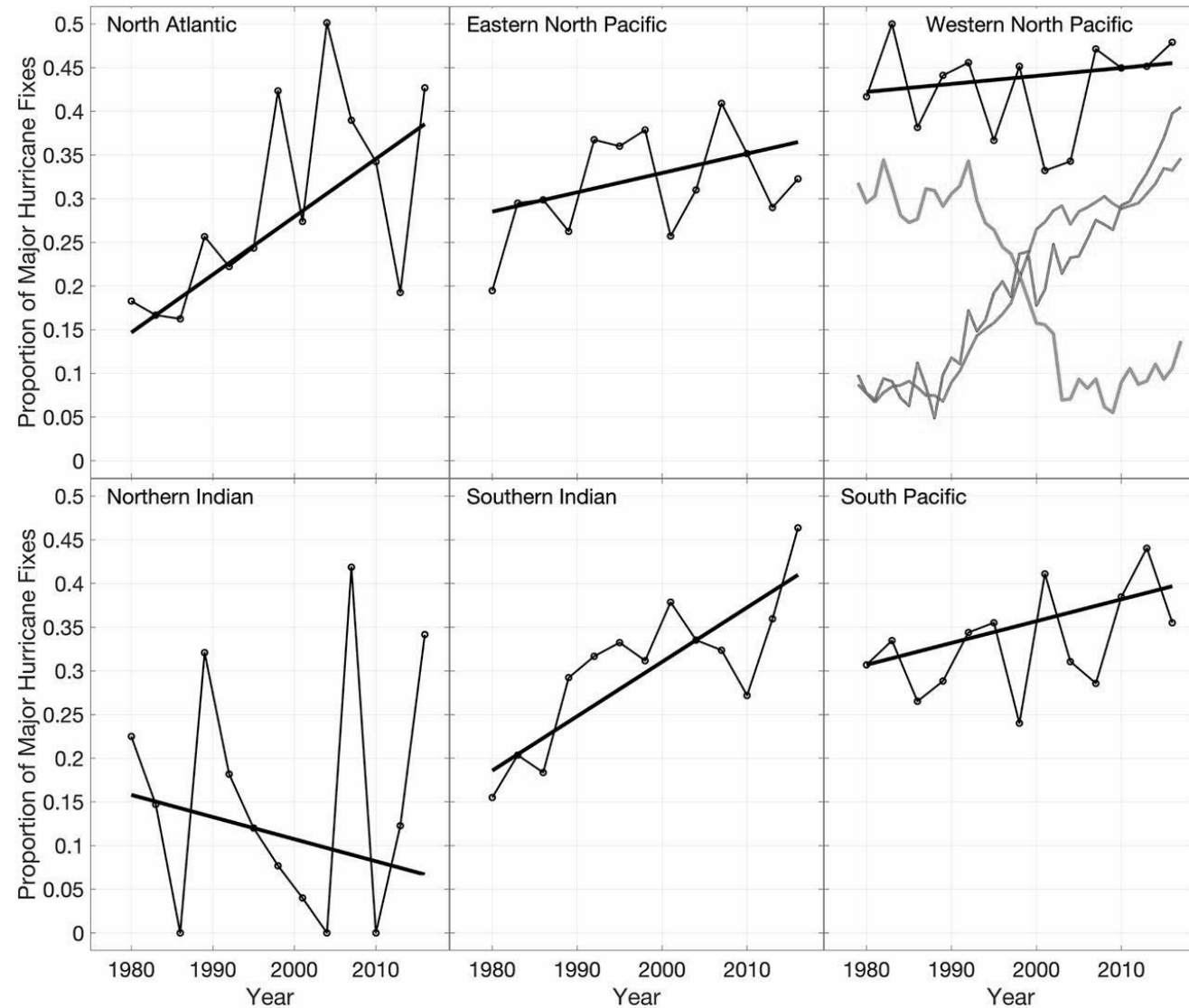
# United States Billion-Dollar Disaster Events 1980-2022 (CPI-Adjusted)



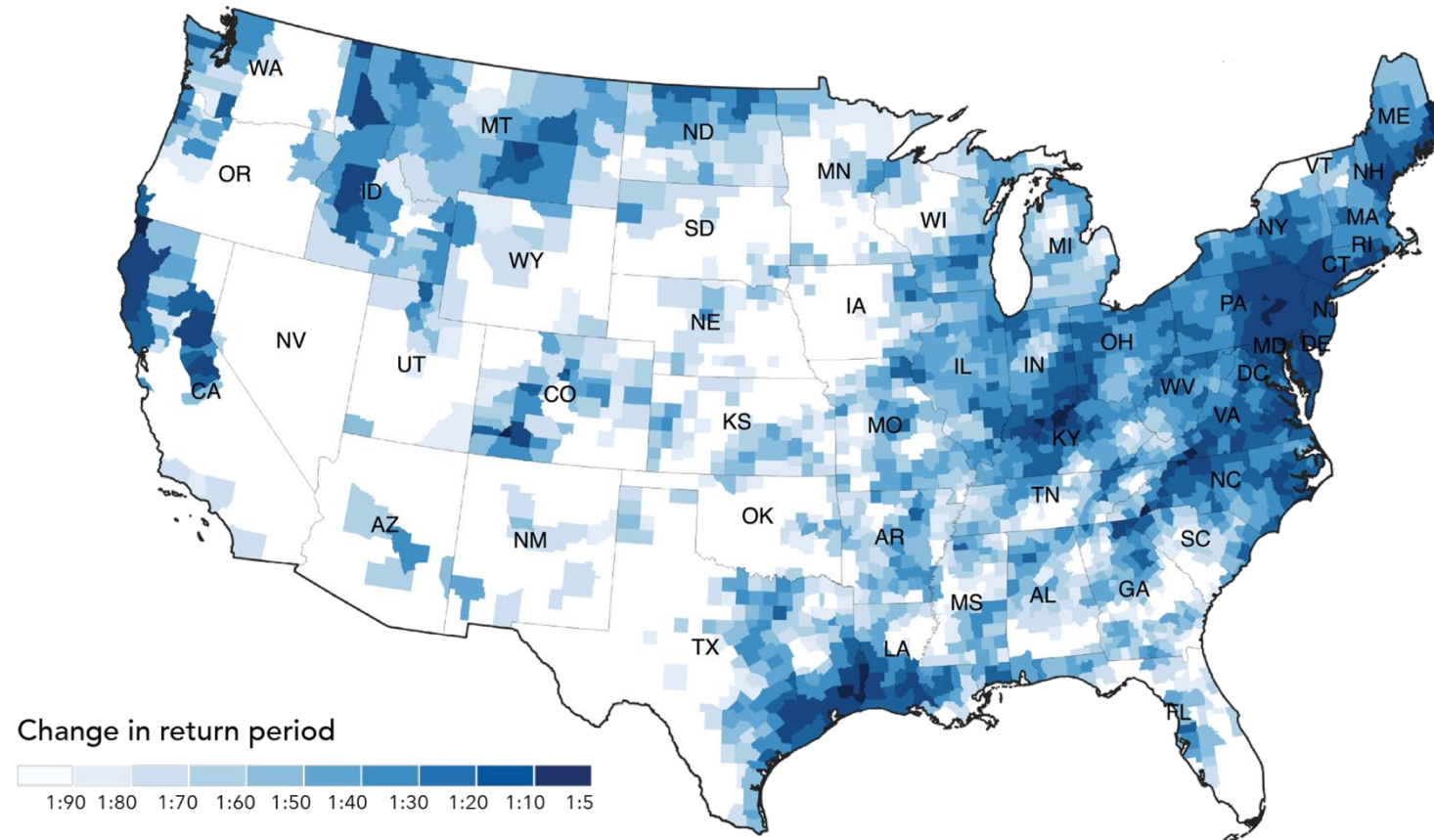


# Proportion of hurricanes that become major hurricanes is increasing in most ocean basins.

Figure credit: Kossin, Knapp, Olander, & Velden. Global increase in major tropical cyclone exceedance probability over the past four decades. PNAS Earth Atmospheric and Planetary Sciences. May 2020.



# Flooding & Extreme Rainfall Future?



**1-in-100 year flooding** can now be expected **every 8 years...**

-First Street Foundation





PING STORY  
FLOOD HOSPITAL ER CLOSED TO WALK-INS,  
MORE PATIENTS EVACUATED



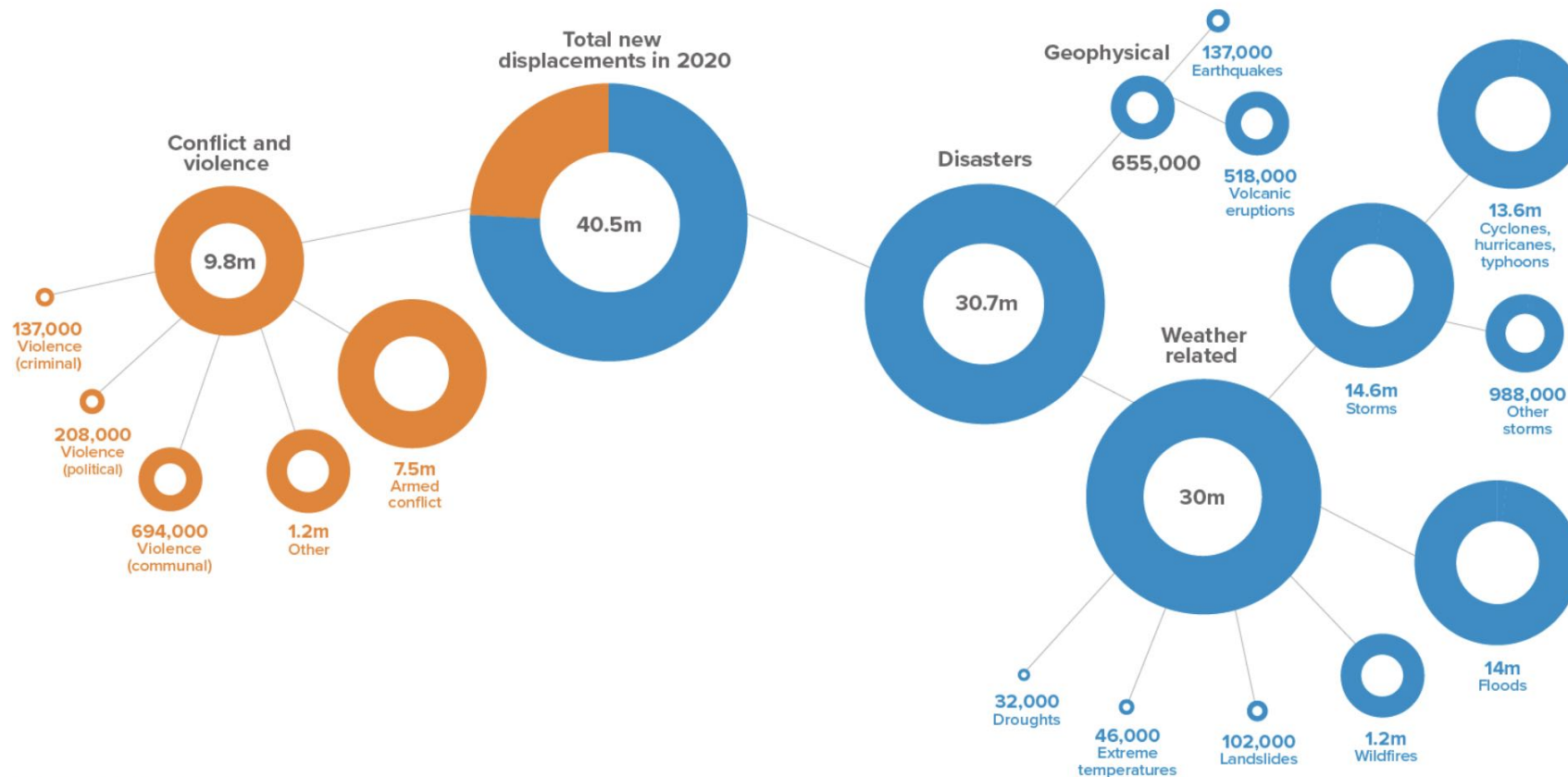
The New York Times

## U.S. Hospitals Wrestle With Shortages of Drug Supplies Made in Puerto Rico



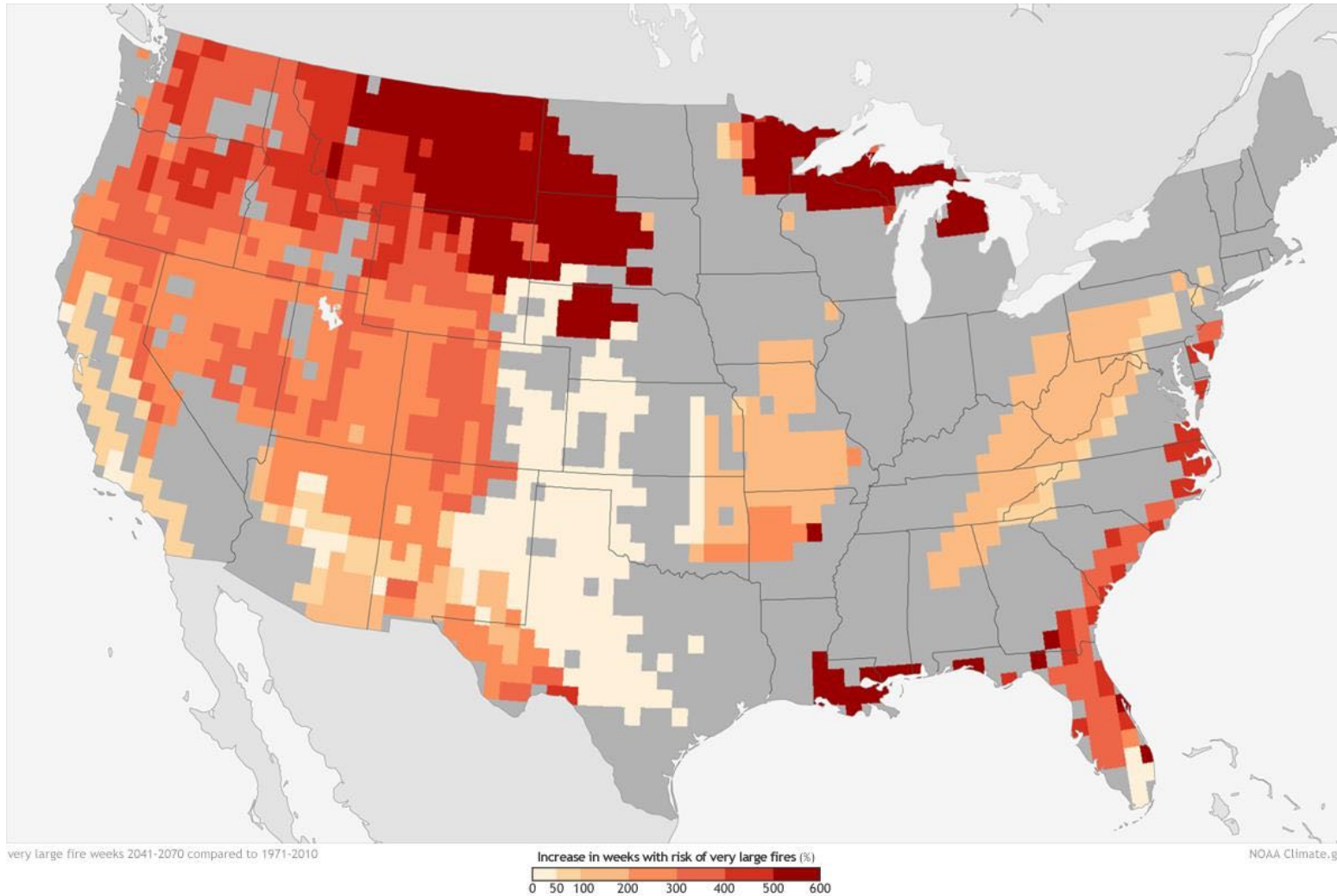
# Extreme Weather and Forced Migration

## New displacements in 2020: breakdown for conflict and disasters





# Wildfire Future?



Map showing “**projected increase in the number of “very large fire weeks”—weeks in which conditions are favorable to the occurrence of very large fires—by mid-century”**

Model based on RCP8.5.

Image: Climate.Gov, from Barbero, R.; Abatzoglou, J.T.; Larkin, N.K.; Kolden, C.A.; Stocks, B. 2015. Climate change presents increased potential for very large fires in the contiguous United States. *International Journal of Wildland Fire*.

# The many roles of the health professional





- Undertake healthcare climate vulnerability assessments
- Build evidence-base to understand complex interactions between climate change and individual health
- Create, update, and adjust health guidance and treatment standards to diagnose and treat anticipated health burdens from climate change

**R<sub>x</sub>**

PATIENT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_

Prescription:

***Adapt clinical care  
and services  
delivery planning  
for current climate  
realities***

\_\_\_\_\_

Date \_\_\_\_\_ Signature \_\_\_\_\_

\_\_\_\_\_

R<sub>x</sub>

PATIENT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

Prescription:

***Train for recognition  
and management of  
climate-related  
illnesses AND  
systems  
preparedness***



## Emergency Management of Heatstroke: AN EVIDENCE-BASED APPROACH

### 1 Heat Alert Triggered

Computer prompts triage clinician to consider heat alert if all of the following are present:

- Season = high risk season based on local climate patterns, active regional heat advisory, or high heat index
- Patient temperature  $\geq 40^{\circ}\text{C}$
- Chief complaint includes: Altered Mental Status OR Confusion OR Unresponsive OR Seizure

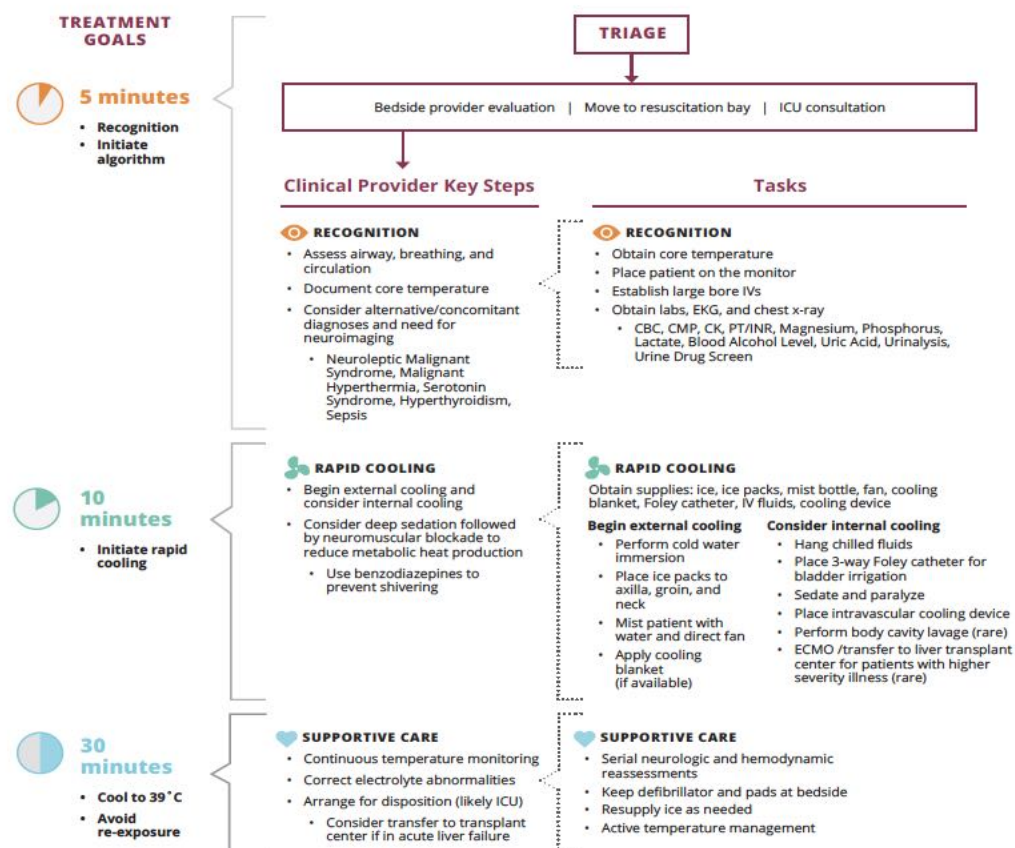
### 2 Triage Clinician Evaluation

Activate heat alert if clinical suspicion is high based on:

- Recent history of environmental (indoor or outdoor) heat exposure OR strenuous physical activity
- Central nervous system dysfunction
- Tachycardia, tachypnea, +/- hypotension
- Flushed or warm skin +/- sweating
- Lower suspicion for sepsis, toxidrome, or metabolic abnormality (e.g. hypoglycemia)

### 3 Begin Heat Response Algorithm

This guide to key actions does not replace clinician judgement; actions should be initiated simultaneously if feasible. More aggressive interventions are available at select facilities by professionals trained to do so.





R<sub>x</sub>

PATIENT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

Prescription:

***Advocate for and lead  
healthcare decarbonization  
efforts at departmental,  
institutional and community  
levels***

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature



If the global health care sector  
were a country, it would be  
**the 5th largest emitter  
on the planet.**

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a new report:

## HEALTH CARE'S CLIMATE FOOTPRINT





# Healthcare Climate Pledge

## Who has committed to the Climate Pledge

**More than 100 prominent health organizations in the U.S. have signed the White House/Health and Human Service Health Sector Climate Pledge**

**More than 1,080 federal and private sector hospitals have committed to HHS Climate Pledge, representing more 15% of U.S. hospitals.**

**More than 70 health care institutions representing the interests of over 14,000 hospitals and health centers in 25 countries have joined UN Race to Zero with Health Care Without Harm.**

### White House/HHS Health Sector Climate Pledge Signatories as of April 12, 2023

#### • Health Systems, Hospitals and Other Providers (78)

AdventHealth, Advocate Aurora Health, Advocate Children's Hospital, AltaMed Health Services Corporation, Ascension, Aspirus Health, Atlantic Health System, Atrium Health, Baystate Health, Berkshire Health Systems, Beth Israel Deaconess Medical Center, Boston Children's Hospital, Boston Medical Center, Care Alliance Health Center, CentraState Healthcare System, Cherokee Health Systems, Children's National Hospital, Children's Hospital Los Angeles, ChristianaCare, CommonSpirit Health, Dana-Farber Cancer Institute, DaVita, Denver Health and Hospital Authority, Eastern Connecticut Health Network, Englewood Health, Gillette Children's, Greater Lawrence Family Health Center, Gundersen Health System, Hackensack Meridian Health, Hartford HealthCare, HealthPartners, Henry Ford Health, HonorHealth, John Muir Health, Kaiser Permanente, Keck Medicine of USC, Kedren Health, Legacy Health, Mass General Brigham, Memorial Health Services (MemorialCare), Montefiore, Mount Sinai Health System, Nebraska Medicine, Northern Arizona Healthcare, Northern Light Health, Northwell Health, NYC Health + Hospitals, NYU Langone Health, OhioHealth, OLE Health, Oregon Health & Science University, Providence Health, Rochester Regional Health, Rush University System for Health, RWJBarnabas Health, Seattle Children's Hospital, Southcoast Health, SSM Health, Stanford Children's Health, Stanford Health Care, Stanford Health Care Tri-Valley, Steward Health Care System, Stony Brook University Hospital, Sun River Health, Texas Children's, The Valley Health System, Tufts Medicine, University Medical Center of El Paso, University of Arkansas for Medical Sciences, University of California Health, University of Nebraska Medical Center, University of Pittsburgh Medical Center, University of Utah Health, UW Medicine, Valley Children's Healthcare, Waterbury Hospital, WellSpan Health, Western Wisconsin Health

#### • Other Industry Organizations (26)

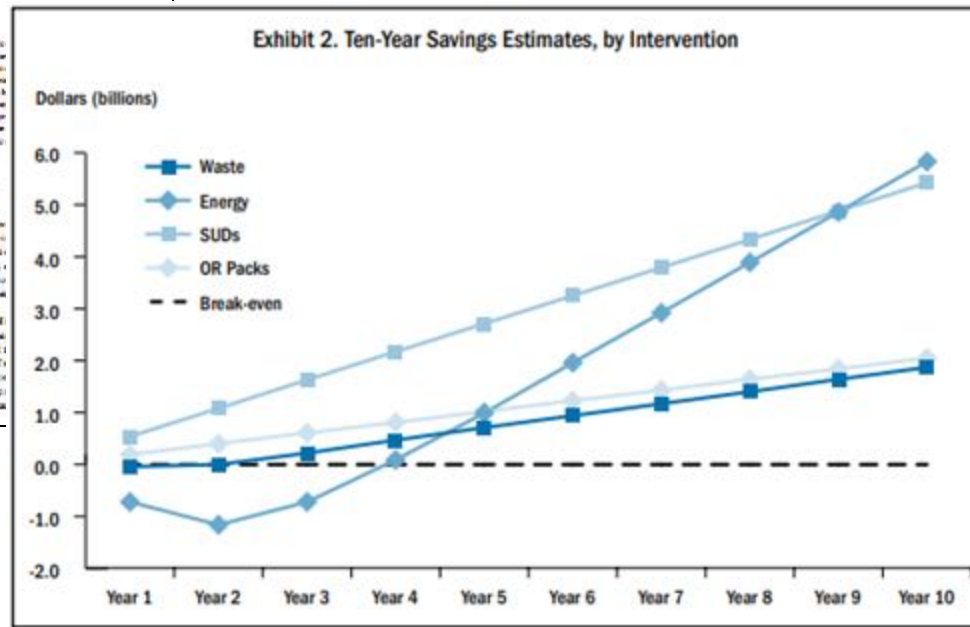
AmerisourceBergen, AstraZeneca, Biogen, Blue Cross Blue Shield of Massachusetts, Blue Shield of California, Blue Zone Technologies, Cardinal Health, Chiesi Group, Daniels Health, Eaton, Elevance Health, Excellus Health, GE HealthCare, GSK, MindClick, Inc., NewGen Surgical, Owens & Minor, Pfizer, Philips, Premier, Inc., Prime Therapeutics, Sanofi, Vizient, WCM Waste and Compliance Management

#### • Associations, Nonprofits and Technical Assistance Organizations (15)

Abt Associates, American College of Physicians (NJ), American Medical Women's Association, Association of American Medical Colleges, Children's Hospital Association, ecoAmerica, Envinity, Inc., Health Care Without Harm, Health Promotion Consultants, Kimball Sustainable Healthcare, Mazzetti, My Green Lab, National Academy of Medicine, The Joint Commission



# Can sustainable hospitals help bend the health care cost curve?



If all US hospitals adopted best practices.....

\$5 billion savings / 5 years

\$15 billion / 10 years

- Energy use
- Waste segregation
- Single-use device reprocessing
- OR kit reformulation

<https://pubmed.ncbi.nlm.nih.gov/23214181/>

R<sub>x</sub>

PATIENT NAME \_\_\_\_\_

ADRESS \_\_\_\_\_

Prescription:

***Educate ourselves  
our patients and our  
communities***

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

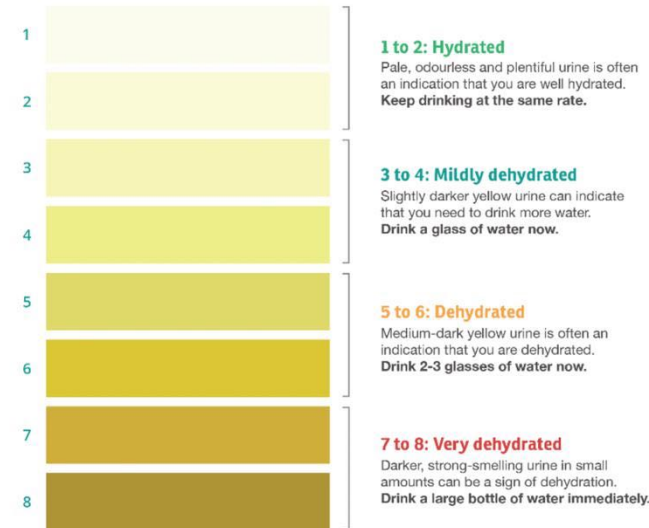
# At work... Patient Discussions

- ✓ Heat
- ✓ Air Pollution



Guidance from the Western States Pediatric Environmental Health Specialty Unit

## Climate Change and Pregnancy



**CLIMATE Rx**  
PRESCRIPTION FOR CLIMATE ACTION

All of us can care  
for our health and  
our climate

Find out how, today!



## BEAT THE HEAT: Extreme Heat

Heat-related deaths are preventable

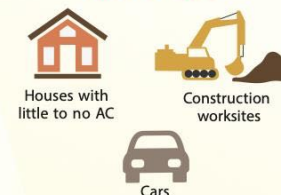
### WHAT:

Extreme heat or heat waves occur when the temperature reaches extremely high levels or when the combination of heat and humidity causes the air to become oppressive.

### WHO:



### WHERE:



### HOW to AVOID:



During extreme heat the temperature in your car could be deadly!

Outside Temperature 80°





# Global Consortium on Climate and Health Education

A

MAILMAN SCHOOL  
OF PUBLIC HEALTH



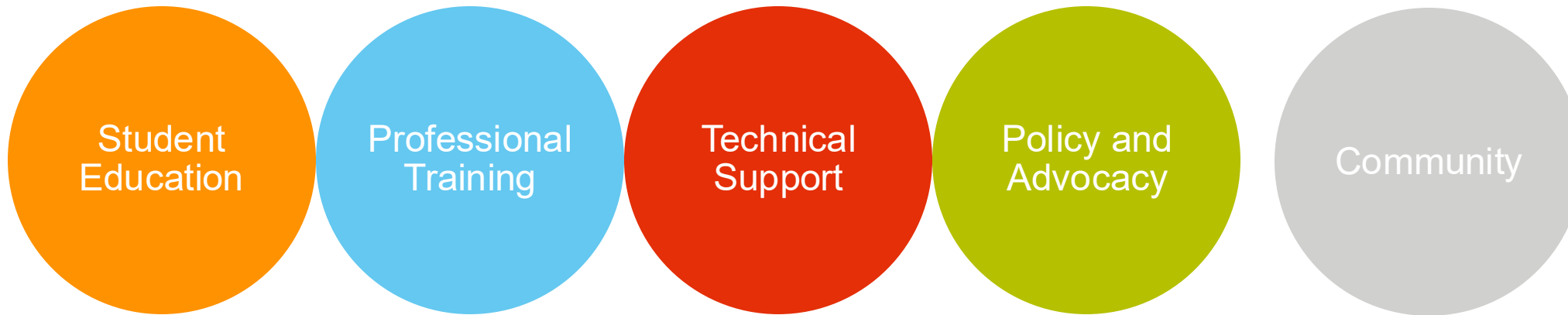
# Our Mission

Ensure that all health professionals throughout the world have the knowledge and skills to identify, prevent, reduce, and respond to the health impacts of climate change, thereby reducing health disparities and improving quality of health and well-being.





# Our Approach



# Student Education

- 420 health professional member schools from 75+ countries
- Reaching an estimated 300,000 students annually



## School Type

- Host
- Public Health
- Medical
- Nursing
- Other



**IMANA**  
ISLAMIC MEDICAL ASSOCIATION  
OF NORTH AMERICA



Climate and Health Program  
SCHOOL OF MEDICINE  
UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS



**MSC** Medical  
Schools  
Council



**TEPHINET**  
Training Programs in Epidemiology and  
Public Health Interventions Network



Western States PEHSU  
Pediatric Environmental Health Specialty Unit



Santé  
Canada Health  
Canada



Secretaría de Salud  
Subred Integrada de Servicios de Salud  
Centro Oriente E.S.E.



THE GLOBAL  
CLIMATE & HEALTH  
ALLIANCE







# Climate and health competencies

- (1) Climate and health knowledge and analytic skills
- (2) Climate change and public health practice
- (3) Climate change and clinical practice
- (4) Policy aspects of climate change and health
- (5) Climate and health communication



*Global Consortium on Climate and Health Education:  
Climate & Health Key Competencies for Health Professions Students*

About Us ▾

Academics ▾

Research ▾

People ▾

Become a Student ▾

Info For ▾



## GLOBAL CONSORTIUM ON CLIMATE AND HEALTH EDUCATION

### Mission

Advancing global health security and educating professionals on the effects of climate change. →

**Resources available:** [Publichealth.Columbia.edu/GCCHE](https://Publichealth.Columbia.edu/GCCHE)

# Climate and Health Responders Course

## Concluded

-  Pan American Climate Resilient Health Systems Course
-  North America Climate and Health Responder
-  Caribbean Climate and Health Responder Course (2nd edition)
-  South America Climate and Health Responder Course
-  European Climate and Health Responder Course
-  Southeast Asia Climate and Health Responder Course
-  African Climate and Health Responder Course

## Under Development

-  Southeast Asia Climate and Health Responder Course
-  Western Pacific Climate and Health Responder Course



**In the last 3 years, we have trained 30,000 individuals from 168 countries**



# Consulting

Building technical capacity within

- Governmental and intergovernmental organizations
- Health organizations and associations



# Policy and Advocacy

- Building technical capacity within health associations
- Advocating for inclusion of climate and health on professional exams
- Participation in Education sub-committee of National Academy of Medicine Grand Challenge on Health System Decarbonization



NATIONAL ACADEMY OF MEDICINE



AAMC Association of American Medical Colleges

ASPPH ASSOCIATION OF SCHOOLS & PROGRAMS OF PUBLIC HEALTH



GLOBAL NETWORK  
FOR ACADEMIC PUBLIC HEALTH

ADEA THE VOICE OF DENTAL EDUCATION



# Community

Climate Care  
Champions Program

Community health  
worker training in India





# Community

Community member training  
in the  
Dominican Republic

## CURSO DE CLIMA COMUNITARIO Y PRIMEROS AUXILIOS DE RESPUESTA ANTE CATÁSTROFES



**Obtén un Certificado de la Universidad de Columbia,  
UNIBE y la Cruz Roja Dominicana**

**¿Tienes interés en?:**

- Entender cómo afectará el cambio climático a la salud en R.D.
- Aprender a proteger tu familia y comunidad en un clima cambiante
  - Adquirir valiosas habilidades de salud y liderazgo



# Thank you!

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