

Climate Challenges and Solutions: NIH-Wide Climate Change and Health Initiative

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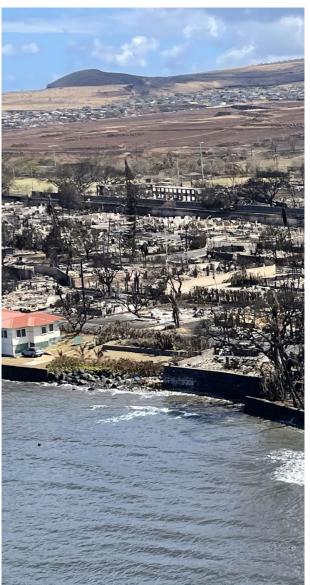
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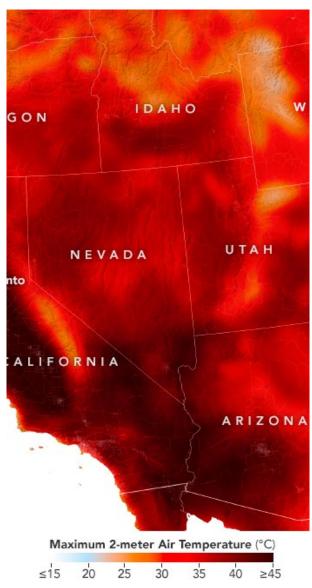
NC State University: Climate Leaders Program

September 29, 2023











GLOBAL AVERAGE TEMPERATURE

The Jan-Dec 2022 average global surface temperature was the sixth highest since global records began in 1880.

ARCTIC SEA ICE EXTENT

The 2022 Arctic maximum and minimum extents were both the 10th-smallest on record.

EUROPE

Europe had its second-highest yearly temperature on record. Warm and dry conditions during summer exacerbated drought conditions and fueled severe wildfires.

2022 was Asia's second-warmest year on record.

PAKISTAN

Record-breaking rain fell

devastating floods that

affected over 30 million

CHINA

NORTH INDIAN OCEAN

7 storms, including 1 cyclone.

SOUTH INDIAN OCEAN

CYCLONE SEASON

Near-average activity:

9 storms, including 5

Heavy rain caused severe flooding in parts of southern China in Jun. Some locations during Jul and Aug, causing were hit by the heaviest rain in 60 years.

SEASON

JAPAN

1875.

Below-average activity: 22 storms, including 12 typhoons.

A heat wave scorched Japan

weather in that month since

WESTERN NORTH

PACIFIC TYPHOON

in Jun, marking the worst documented streak of hot

鈲

WESTERN PACIFIC TYPHOONS

Typhoon Hinnamnor, which hit South Korea, and Typhoon Noru, which moved across the northern Philippines and into Vietnam and Laos, brought heavy rainfall, destructive flooding and strong gusts to the region in Sep.



OCEANIA

Oceania had a top-20 warm year.

AUSTRALIA

Extreme rain and flooding affected parts of eastern Australia from late Feb through early Mar.

SOUTHWEST PACIFIC CYCLONE SEASON

Below-average activity: 6 storms, including 2 cyclones.

Examples of Global Climate Events in 2022

NORTH AMERICA

2022 tied with 2011 and 2019 as North America's 15th-warmest vear on record.

CONTIGUOUS U.S.

Dry and warm conditions contributed to damaging wildfires across the West during Northern Hemisphere spring through fall.

HURRICANE AGATHA

Hurricane Agatha was the strongest May hurricane on record to hit Mexico's Pacific coast.

EASTERN NORTH SEASON

Near-average activity: 19 storms, including 10 hurricanes.

HURRICANE IAN

PACIFIC HURRICANE After knocking out Cuba's power grid, lan made landfall in southwestern Florida just shy of Category 5 strength causing record heavy rain and catastrophic storm surges across parts of Florida.

SOUTH AMERICA

South America had its 12th-warmest year on record.

SOUTHERN SOUTH ÁMERICA

An intense heat wave affected parts of the region in Jan, resulting in multiple temperature records.

ANTARCTIC SEA ICE EXTENT

The Antarctic had its fourth-smallest annual maximum and its smallest minimum annual extents on record.

CYCLONE SEASON Below-average activity:

2022 was Africa's 10th-warmest vear on record.

SOUTH AFRICA

ATLANTIC HURRICANE

HURRICANE FIONA

In Sep. Fiona affected the Caribbean.

strongest and costliest post-tropical

AFRICA

cyclone on record for Canada.

It made landfall in Nova Scotia as the people.

Near-average activity:

14 storms, including

SEASON

8 hurricanes.

Record-breaking rain fell across parts of eastern South Africa during mid-Apr.

GLOBAL CYCLONE ACTIVITY

88 storms, including 40 hurricanes/ cyclones/typhoons.

MADAGASCAR

Major cyclones Batsirai and Emnati, as well as Tropical Storm Dumako made landfall in Madagascar in Feb - the first time since Jan 1988 that three storms made landfall in Madagascar in a single month.

cyclones.

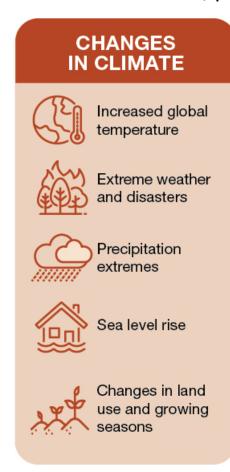
Most at Risk:

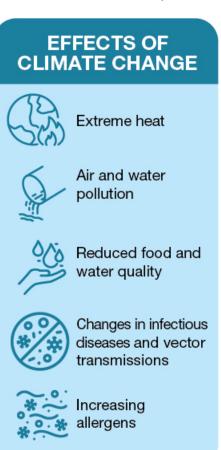
Under-resourced and marginalized populations

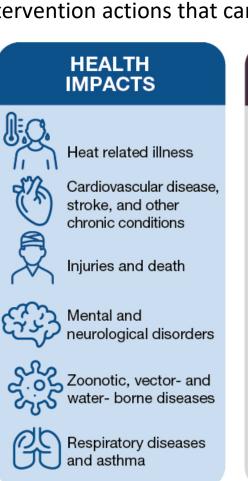


Impacts of Climate Change on Human Health and Associated Research Needs

A changing climate impacts a range of factors that can affect health. Research is needed to better understand complex health outcomes, prevention measures, and intervention actions that can save lives around the world.









Climate Change Affects Us Unequally



Under-served populations with health disparities

(Some communities of color; Low-income populations; Low-educational attainment groups; Immigrant groups; Indigenous populations)



Exposed workers

(e.g., farmers, construction workers)



Persons with disabilities



Vulnerability by life stage

(Fetal/pre-natal, infants, young children, pregnant women, elderly)



Vulnerability associated with chronic medical conditions

(e.g., diabetes, asthma, cardiorespiratory diseases, psychiatric diseases)

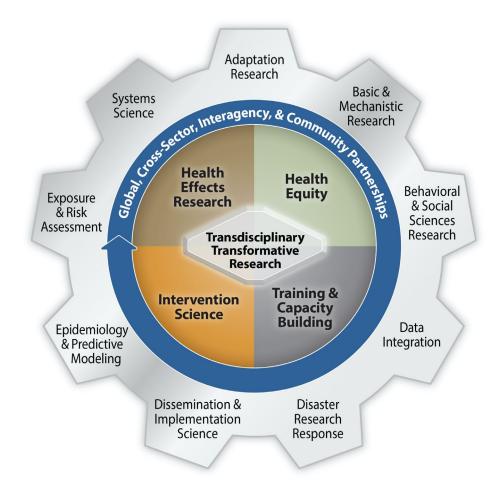


Populations in LMICs

(Higher rates of existing diseases, malnutrition, and extreme poverty)



https://www.nih.gov/climateandhealth







Generating Evidence for Climate Change Action

- There are many needs for evidence that will propel climate change action
 - Need for advanced scientific discoveries
 - Need for transdisciplinary understanding of the complex causes of changes in health with multiple concurrent environmental stressors
 - Need for assessments of tipping points that pose risks to health
 - Need for research enables tangible actions
 - Facilitation of early warnings to impending climate change threats to human health
 - Evaluation of the effects of adaptation and mitigation on health
 - Use of data to enhance accountability and transparency



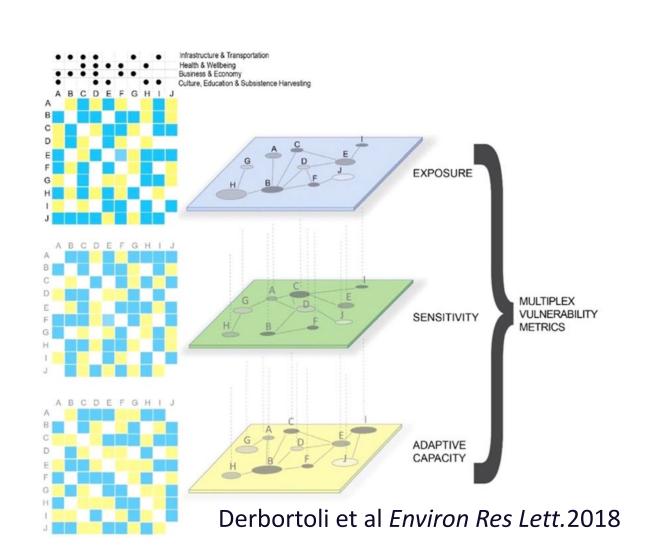


Climate Adaptation Science and Health Co-benefits of Mitigation

Examples of projects needing framing for health:

- Cyclone shelters
- Cooling centers
- Cash remittances to disaster victims
- Early Warning Systems for extreme weather
- Indoor air quality interventions
- Sea walls
- Tree planting and greenspace interventions
- Reforestation projects
- Vector-borne disease surveillance and response

Vulnerability may be conceptualized as a multiplex network with social and environmental variables interacting with the key components: exposure, sensitivity, and adaptive capacity





From 2011-2020 NIH funded 350 research grants on climate change and health topics. NIH conducted a portfolio analysis in development for our strategic framework.

Health Outcomes n=215

Respiratory

Birth/Premature Birth

Maternal Health

Occupational Health

Malaria & Dengue

Heat Stress

• Weather Related Concepts n=233

Extreme heat/weather/temperature

Drought/flood/rain/precipitation

Hurricanes /Tropical Cyclones

Climate variability/seasons

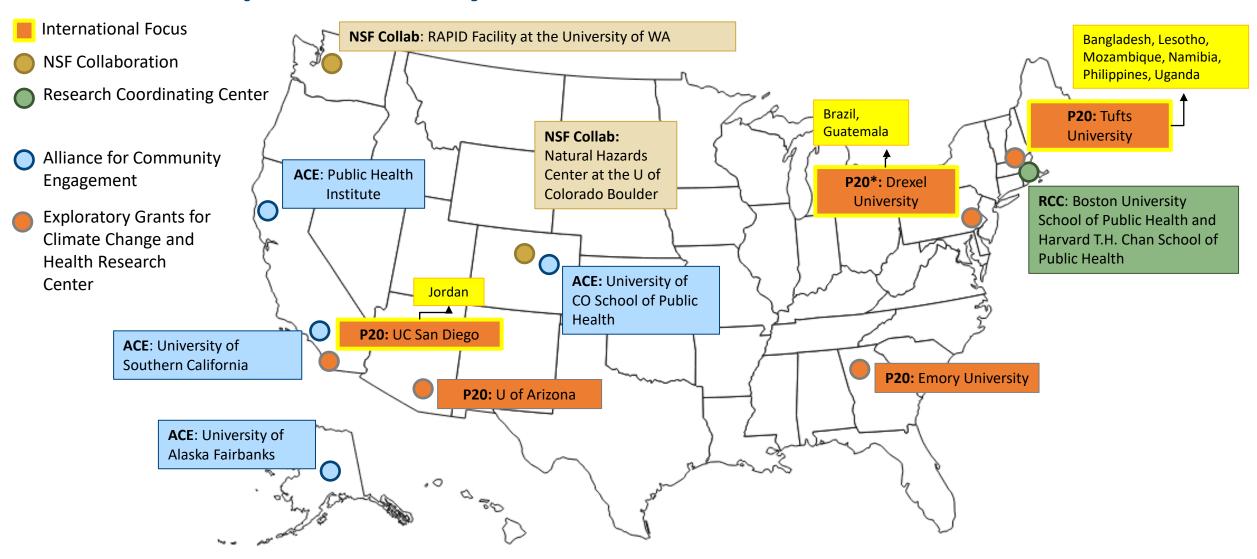
Fire/wildfire

Humidity

When analyzing the portfolio by research cog from our signature diagram, we found that most of the grants were in the epidemiology/predictive modeling, exposure and risk assessment cogs. Scientific gaps were noted for climate adaptation, interventions/implementation science, and systems science. We have a manuscript submitted with further details of our expanded portfolio analysis.



Map of Currently Funded NIH CCH Research Centers



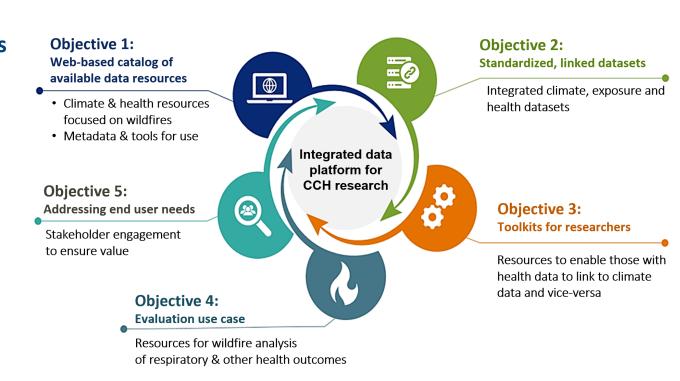


Data Integration: NIH Climate and Health Outcomes Research Data Systems (CHORDS)

Goal: This new project will create a resource that links climate and environmental data with health outcomes data so that researchers can identify, analyze, and reduce the health effects associated with climate-related events and improve patient and population health outcomes

Project: Effort to harmonize, standardize, and link diverse types of data, in order to produce publicly accessible data products and resources to improve patient and population health.

- Examples of data types:
 - GIS mapping data
 - Climate satellite data
 - Personal Exposure data
 - Electronic Health records



Collaboration partners: NIEHS, NHLBI, NIA, CDC, NASA, AHRQ, HHS-OS

NIH Intramural Targeted Climate Change and Health (ITCCH) Awardees



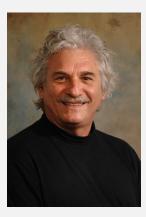
Lindsey Criswell, M.D., D.Sc., M.P.H.,

- Senior Investigator, NIAMS
- "Effects of wildfire smoke exposure on the epigenome and health in a multi-ethnic cohort."



Una Grewal, Ph.D., M.P.H.

- Senior Investigator, NICHD
- "Climate change and its effects on reproductive health, pregnancy, and birth outcomes



Edward Lakatta, M.D.

- Senior Investigator, NIA
- "Effects of climate change on cardiovascular aging and diseases."



Qing Lan, M.D., Ph.D., M.P.H.

- Senior Investigator, NCI
- "Combined effects of extreme climate and air pollution on multi-omics upper airway and plasma biomarkers related to risk of lung cancer."



Emily Ricotta, Ph.D., M.Sc.

- Independent Research Scholar, NIAID
- "Analysis of data management capacity in regions with high infectious disease spillover risk."



Dale Sandler, Ph.D.

- Senior Investigator, NIEHS
- "Characterizing the role of epigenetic adaptation in the relationship between extreme heat and metabolic dysfunction: A paired human and mouse study."



NIH P-20 Exploratory Grants [RFA-ES-23-007]

Exploratory Grants for Climate Change and Health Research Center Development

 This funding opportunity is to solicit applications for Climate Change and Health Research Centers which will support the development of a transdisciplinary research environment to sustain a program of fundamental and applied research to examine the impacts of climate change on human health.

Key Dates

- Letter of Intent Due Date(s): October 7, 2023
- Application Due Date(s): November 6, 2023





Current Funding Opportunities

- Notice of Special Interest (NOSI) Climate Change and Health [NOT-ES-23-006]:
 - Goal: Supports CCH research in the U.S. and globally. Encourages use of common data element and collection tools. Open for 3 years.
 - 16 Institutes @ NIH signed on



NOT-ES-23-006



NCI PAR Exploratory/Development Grant [PAR-23-153]

Exploratory Grants for Impacts of Climate Change Across the Cancer Control Continuum

 This notice of funding opportunity (NOFO) aims to support innovative research relevant to advancing the understanding of the effects of climate change across the cancer control continuum, from cancer etiology and cancer risks through survivorship, and ways to prevent or mitigate negative health effects. This includes, but is not limited to, studies to improve knowledge of the impact of climate change related environmental effects on cancer risks, control and behaviors.



Key Dates

- Next Open Date (Earliest Submission Date): February 5, 2024
- Open through February 2026
- Letter of Intent Due Date(s): 30 days prior to application due date.

NIH Climate Change and Health Resources

- NIH Climate Change and Health Initiative Information on the Initiative and Framework
 - www.nih.gov/climateandhealth



- Public Climate Change and Health Webinar Series

 Promoting transdisciplinary discussion and collaboration against this threat to health.
 - https://www.nih.gov/climateandhealth#seminar-series



- Climate Change and Human Health Literature Portal Searchable database to provide access to the most relevant scientific literature
 - https://tools.niehs.nih.gov/cchhl/index.cfm





Thank you!