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# Climate Change and Health Initiative & Strategic Framework

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*14 March 2022*

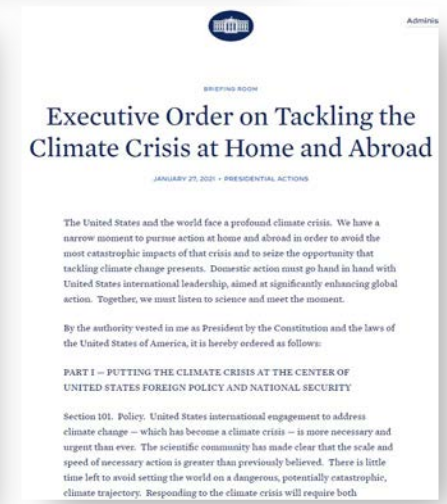
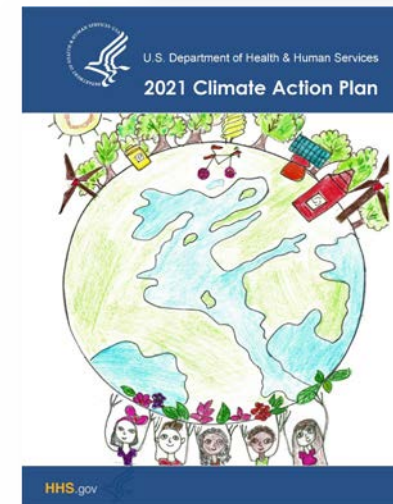
# Renewed Federal Actions on Climate Change

## Federal Government Activities Emphasize a Renewed Focus on Climate Change Across Agencies

- New HHS Office of Climate Change and Health Equity
- New Climate Action Plans
  - Include discussion of roles for NIH
- New Strategic Plans
  - HHS calls out NIH for climate action

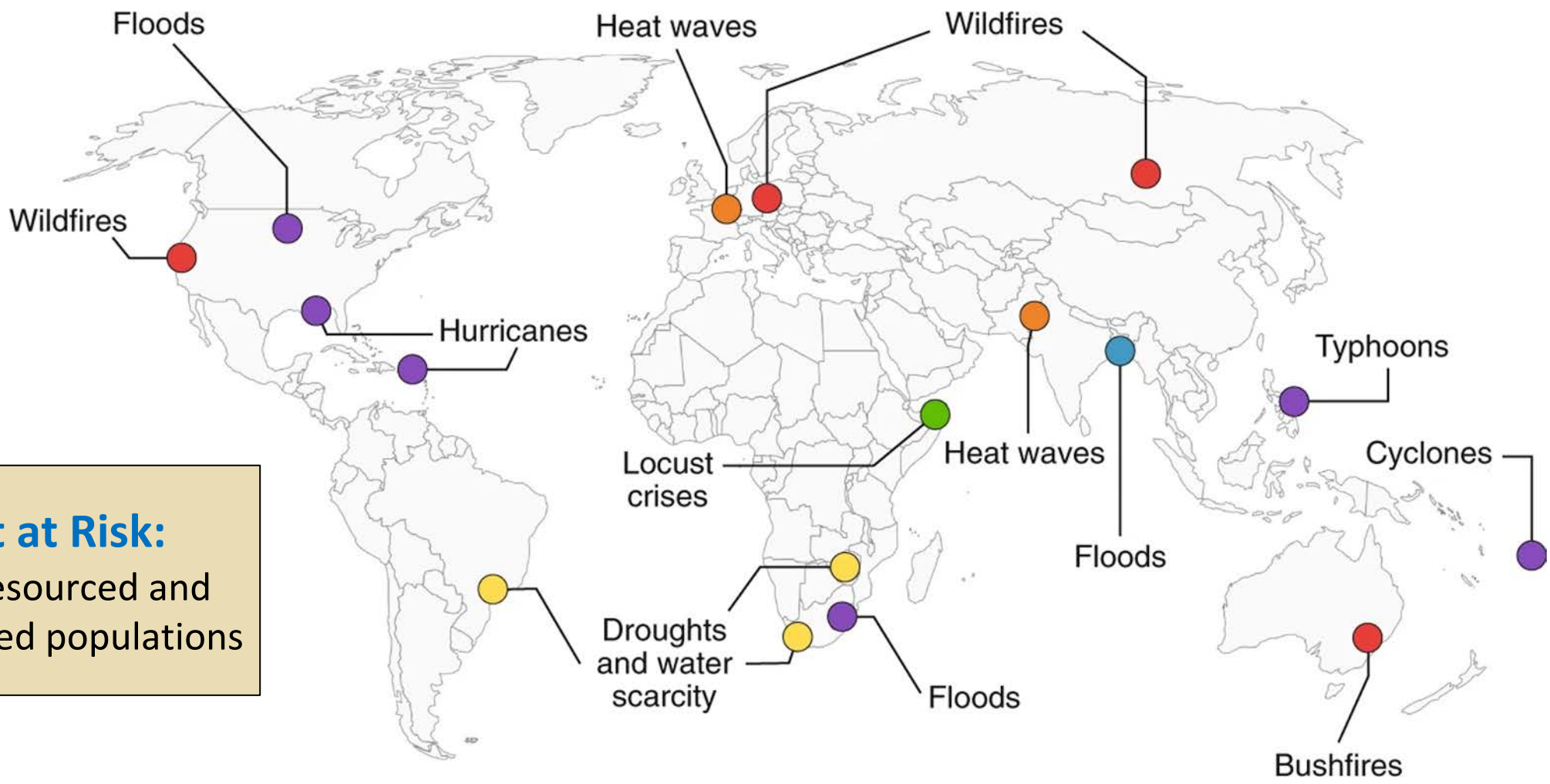
## Executive Orders Impel Renewed Focus on Climate Change Across Agencies

- Executive Order 14008 *Tackling the Climate Crisis at Home and Abroad*





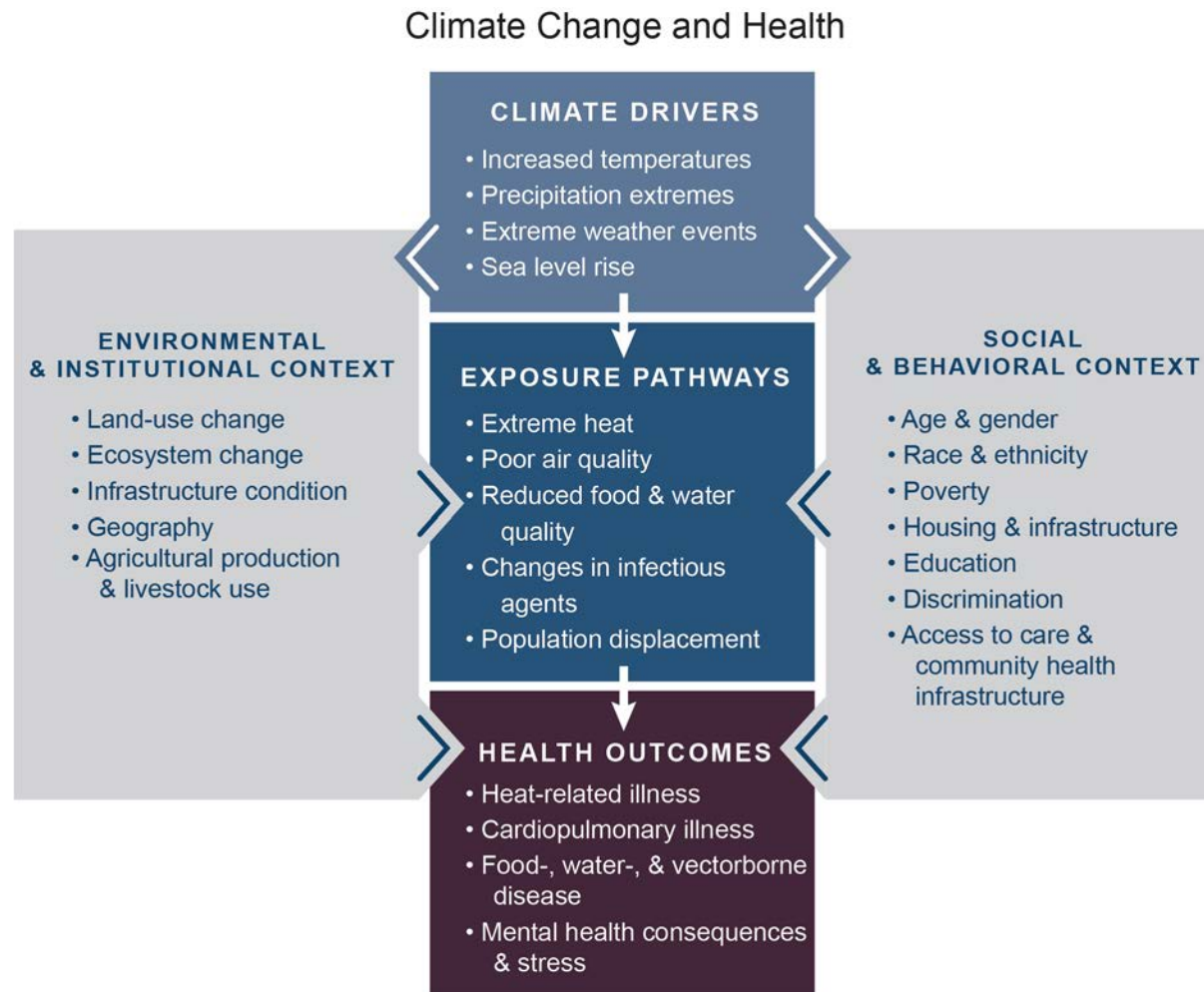
# Global View of Climate Related Disasters and Events During 2019-2020



**Most at Risk:**  
Under-resourced and marginalized populations

## Climate Change Impacts on Health

- Direct and indirect effects of climate have impacts on many health outcomes
- Health impacts are **mediated** by interrelated environmental, exposure, social, and behavioral factors
- Solutions require innovative **transdisciplinary** research which uses **systems approaches**
  - Move beyond stovepiping of scientific disciplines dictated by traditional funding streams





## Climate Change Affects Us All but Unequally



### Underserved 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/prenatal, infants, young children, pregnant women, elderly)



### Vulnerability associated with chronic medical conditions

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



### Global Impacts

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



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# The Initiative



## Governance Structure for CCH Initiative

### Executive Committee

- Composed of: NIEHS, FIC, NIMHD, NIMH, NINR, NICHD, NHLBI
- Governance

### Steering Committee

- Representatives of all EC ICs
- Planning, strategy, and implementation

### Climate Change and Health Working Group

- 18 ICs, 4 Offices
- 140+ participants
- Interest group, engagement, and ideas



## An NIH Opportunity: Initiative Goals and Objectives

**Goals:** Reduce health threats across the lifespan and build health resilience in individuals, communities, and nations around the world, especially among those at highest risk.

### Objectives:



**Identify risks and optimize benefits** to the health of individuals, communities, and populations from actions to mitigate or adapt to climate change.



Develop the necessary **research infrastructure and workforce** to enable the generation of timely and relevant knowledge, drawing from the full spectrum of biomedical disciplines.



**Leverage partnerships** with other scientific and social disciplines and organizations to achieve the most impactful results.



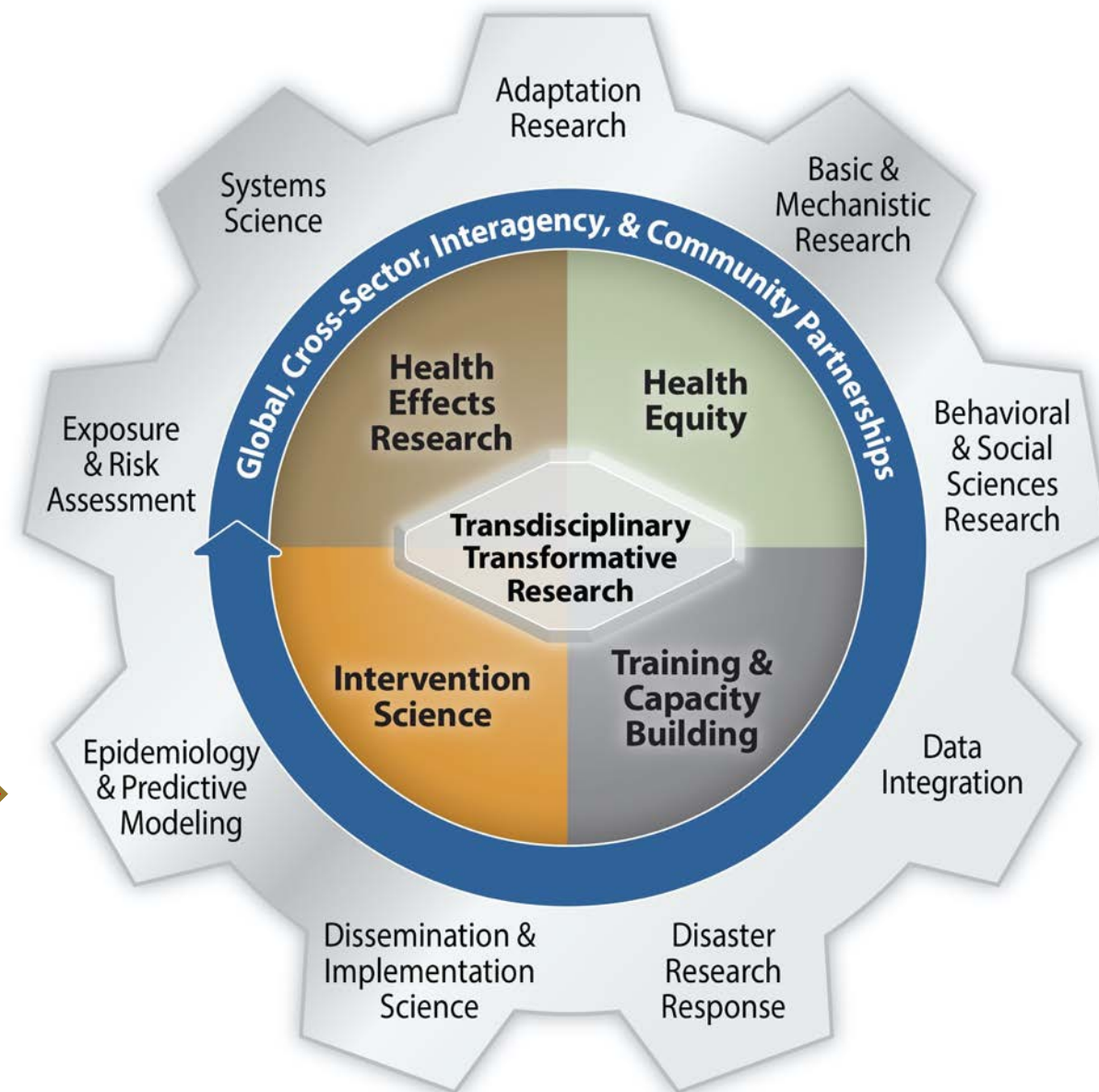
**Innovate** across the research translation continuum to ensure findings are credible, accessible, and actionable for achieving these goals.





## Strategic Framework Core Elements

- Solutions oriented
- Community engaged
- Transdisciplinary
- Intervention Science
- Research and capacity building



<https://www.nih.gov/climateandhealth>



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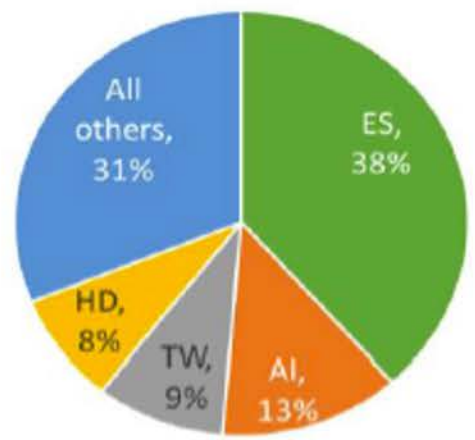
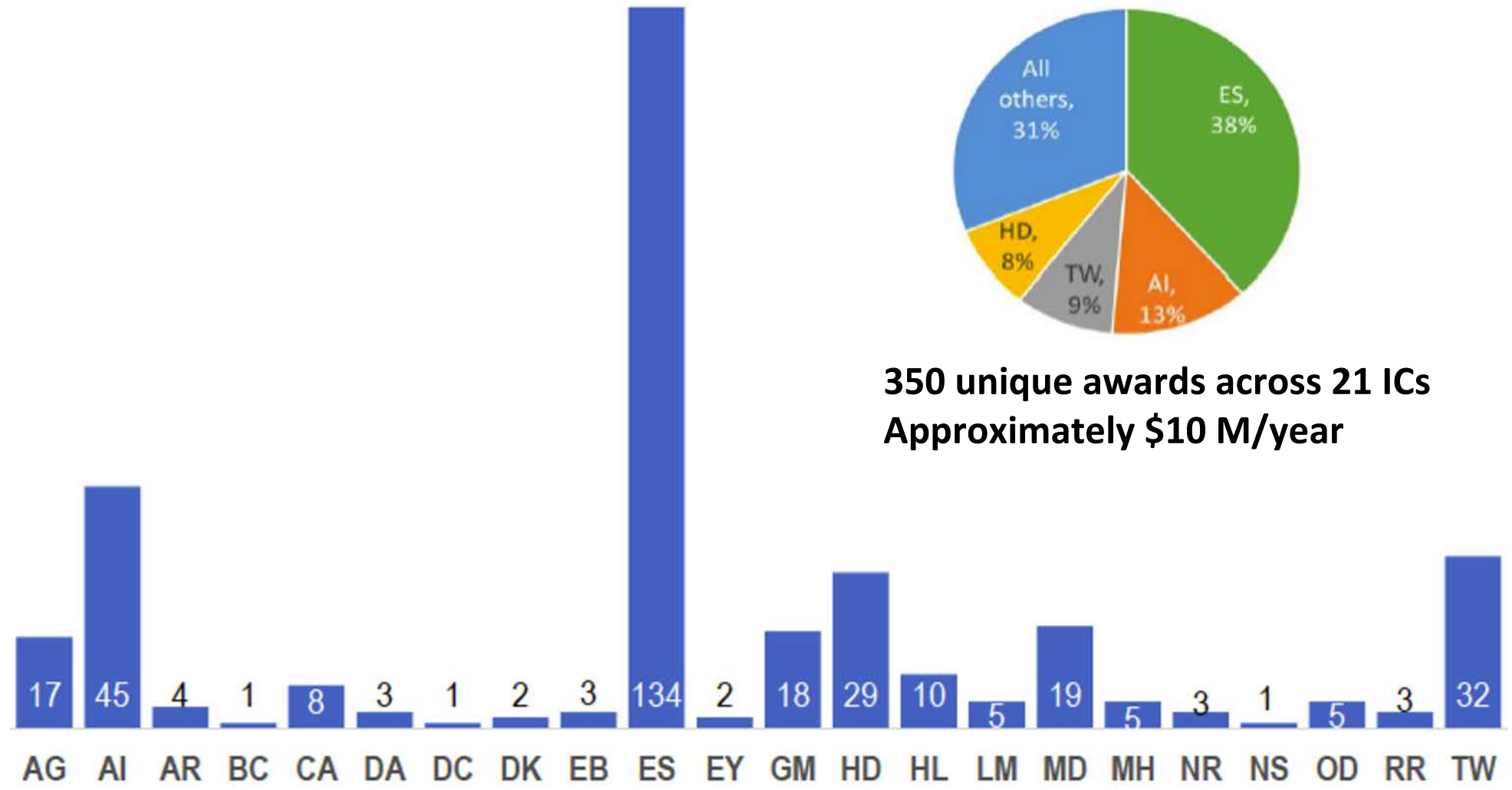
# Climate Change and Health Initiative: Data Inputs



## Portfolio of Existing Grants Across NIH ICs

*Distribution of Grants across NIH ICs (FY2011-2020)*

**NIH  
Portfolio  
Analysis**



**350 unique awards across 21 ICs  
Approximately \$10 M/year**



## Characterizing 2011-2020 CCH Portfolio

*Most Common Weather and Health Outcome RCDC Concepts*



### Weather Related Concepts

(233 awards)

- Extreme heat/weather/temperature
- Drought/flood/rain/precipitation
- Hurricane
- Climate variability/seasons
- Fire/wildfire
- Humidity

### Outcome Concepts

(215 awards)

- Respiratory
- Epidemic
- Birth/Premature Birth
- Maternal Health
- Occupational Health
- Malaria
- Heat Stress
- Dengue



## Landscape Analysis

Landscape Analysis -  
HHS & Interagency Partners

High-level overview to identify areas for unique NIH contributions, collaboration opportunities, potential overlap, and the state of the field.

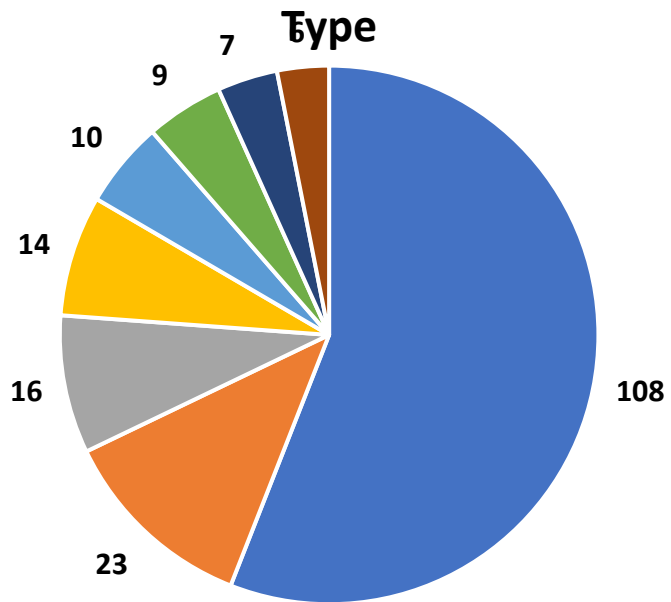
	Coordination	Climate and health-focused	Relevant to health
US Government Agencies	<ul style="list-style-type: none"> <li>• USGCRP</li> <li>• HHS/OCCHE</li> </ul>	<ul style="list-style-type: none"> <li>• <b>CDC</b></li> <li>• EPA</li> <li>• NOAA</li> <li>• USDA</li> </ul>	<ul style="list-style-type: none"> <li>• NASA</li> <li>• NSF</li> <li>• DOE</li> <li>• USAID</li> </ul>
International Organizations	<ul style="list-style-type: none"> <li>• Belmont Forum</li> <li>• WHO</li> <li>• WMO</li> </ul>	<ul style="list-style-type: none"> <li>• Wellcome Trust</li> <li>• European Commission</li> <li>• Sweden – SIDA</li> </ul>	<ul style="list-style-type: none"> <li>• International Development Research Centre</li> </ul>



## RFI Responses (184)



**Submitter Organization**



- Academic institution
- Government agency
- Other
- Health care system
- Professional association
- NGO
- N/A
- Industry

**Priority Area**





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Adaptation  
Research

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# Health Impacts of Climate Change

## Crosscutting Example: Heat-related Research with Multiple Health Outcomes

- Elevated pre-term delivery of babies with prolonged heat exposure during warm seasons
- Stroke rates in adults are very high in public housing during heat waves
- Cardiovascular events during and following heat waves
- Kidney diseases associated with droughts and chronic high temperatures

### Example Projects:

- *Mechanistic studies to understand how heat exposures impact cellular systems such as mitochondrial function and oxidative stress*
- *Randomized Control Trials with cooling space/hydration for elderly and pregnant mothers*
- *Characterizing social and environmental determinants of health among higher risk communities for respiratory diseases*
- *Developing measures of longitudinal clinical change in Black, Indigenous, and People of Color due to climate change*



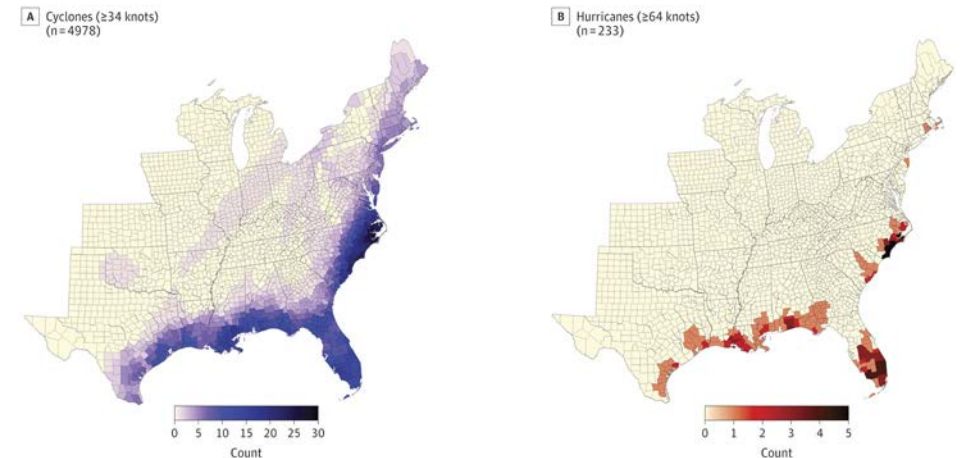
Image: Roy Scott; EHP  
2015





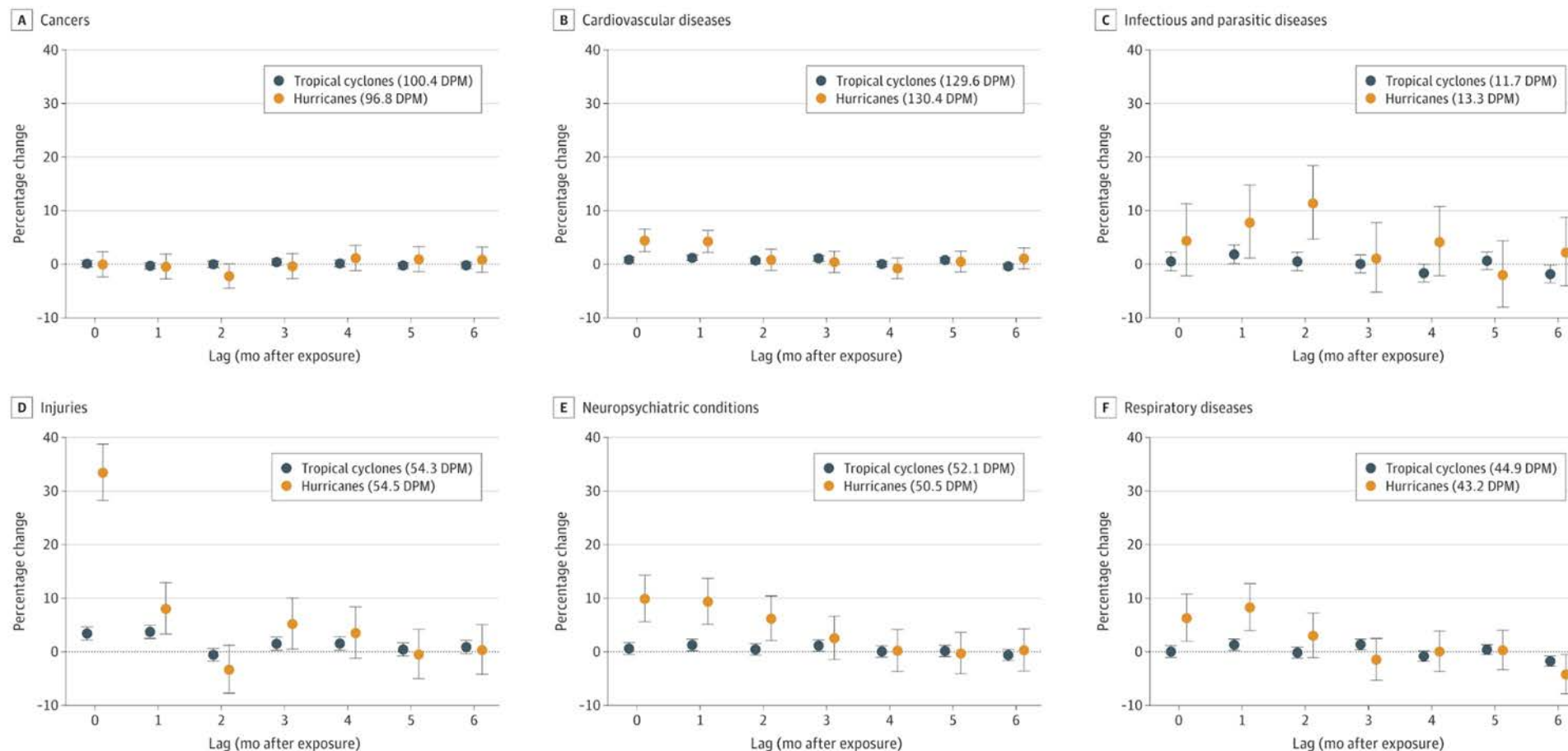
## Association of Tropical Cyclones and Hurricanes with County Death Rates 1988-2018

- Retrospective analysis of data from 33.6 million deaths in 1,206 US counties that experienced at least 1 tropical cyclone from 1988-2018.
- Each additional cyclone day per month was associated with modestly higher death rates in the month following the cyclone for several causes of death including infectious and parasitic disease, respiratory disease, cardiovascular disease, and neuropsychiatric condition
- Elderly and high socially vulnerable populations most affected





# Percentage Change in Death Rates per 1-Day Increase in Monthly Tropical Cyclone or Hurricane-Only Exposure by Cause of Death, and Lag Time



Dots indicate point estimates; whiskers, 95% credible intervals. Values in parentheses indicate overall deaths per 1 000 000 for 2018 monthly age-standardized median rate (DPM).

Parks RM, Benavides J, Anderson GB, et al. Association of Tropical Cyclones With County-Level Mortality in the US. *JAMA*. 2022;327(10):946–955.

doi:10.1001/jama.2022.1682



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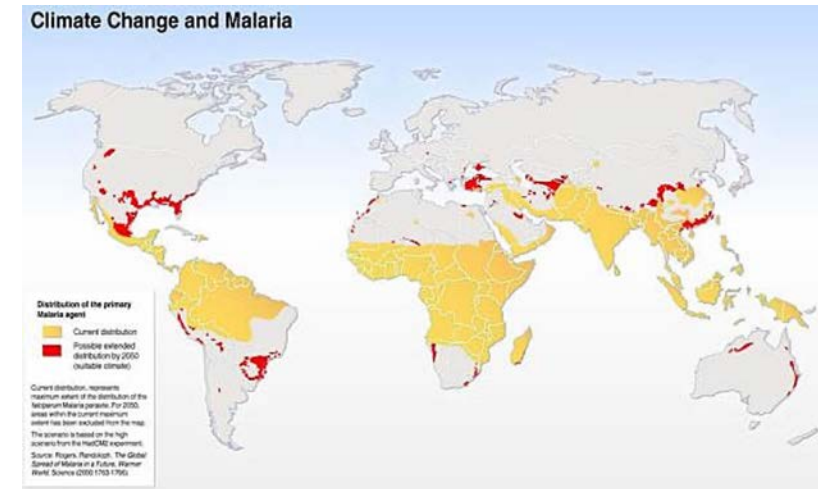
*14 March 2022*

## Infectious Diseases Examples

- Changing *distribution* of vector borne diseases (e.g., Lyme, West Nile) in relation to temperature and rainfall changes
- *Frequency* of malaria, dengue, food and water-borne infections globally
- *Emergence* of zoonotic viruses with climate associated changes in wildlife and agricultural animals

### Example Projects:

- *Computational modeling network to predict outbreaks of vector borne diseases following high rainfall events*
- *Training LMIC researchers to respond to climate influenced emerging infectious diseases*



Mosquito: <https://news.delaware.gov/2018/08/09/sussex-county-man-tests-positive-west-nile-virus/>  
Ticks: <https://doppleronline.ca/huntsville/west-nile-virus-and-lyme-disease-reducing-your-risks/>



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Adaptation  
Research

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# First Steps: Implementing a Climate Change and Health Research Agenda

## Proposed Steps to Catalyze Development of an NIH-Wide CCH Initiative

- **Expand funding for grants across NIH ecosystem** to create a sustainable portfolio of CCH research
- **Support conferences and workshops** that dive deeper into areas of need for the field
- **Explore ways to build CCH capacity in the Intramural Research Program**



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***“There is perhaps no greater opportunity for NIH to fulfill its mission than by providing global leadership in the response to the burgeoning climate change and health crisis.”***

*~NIH Climate Change and Health Initiative Framework Document*

**Learn more: <https://www.nih.gov/climateandhealth>**



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# Thank You

## We look forward to the Panel Discussion

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<https://reporter.nih.gov/matchmaker>





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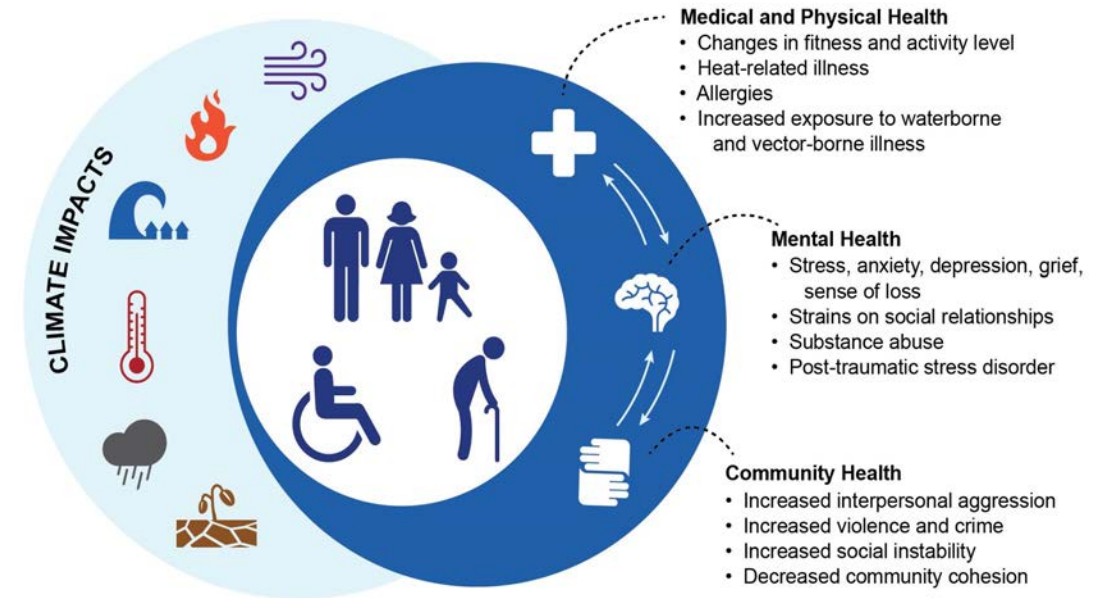
## Mental Health Examples

- Lingering anxiety and depression, alcoholism, drug abuse following natural disasters
- Behavior change, violence, poorer learning associated with heat exposures
- Loss of cultural identity (esp. for Indigenous peoples), “solastalgia” or contemplation of impaired future

### Example Projects:

- *Climate Change and Depression: Reducing the Incidence of Suicide in Indigenous Groups*
- *Implementation science to ensure health equity*

Impact of Climate Change on Physical, Mental, and Community Health



GCRP Climate Health Assessment, 2016

## Participants

### Executive Committee

- Rick Woychik, NIEHS – Chair
- Roger Glass, FIC
- Josh Gordon, NIMH
- Shannon Zenk, NINR
- Eliseo Pérez-Stable, NIMHD
- Diana Bianchi, NICHD
- Gary Gibbons, NHLBI

### Co-chairs and Advisor

- Joshua Rosenthal, FIC
- Aubrey Miller, NIEHS
- Gwen Collman, NIEHS –  
*Strategic Advisor*

### CCH Steering Committee

- Regina Bures, NICHD
- Flora Katz, FIC
- Megan Kinnane, NIMH
- Ivan Navarro, NIMHD
- Louise Rosenbaum, NINR
- Claudia Thompson, NIEHS
- Larry Fine, NHLBI
- Lee Hall, NIAID

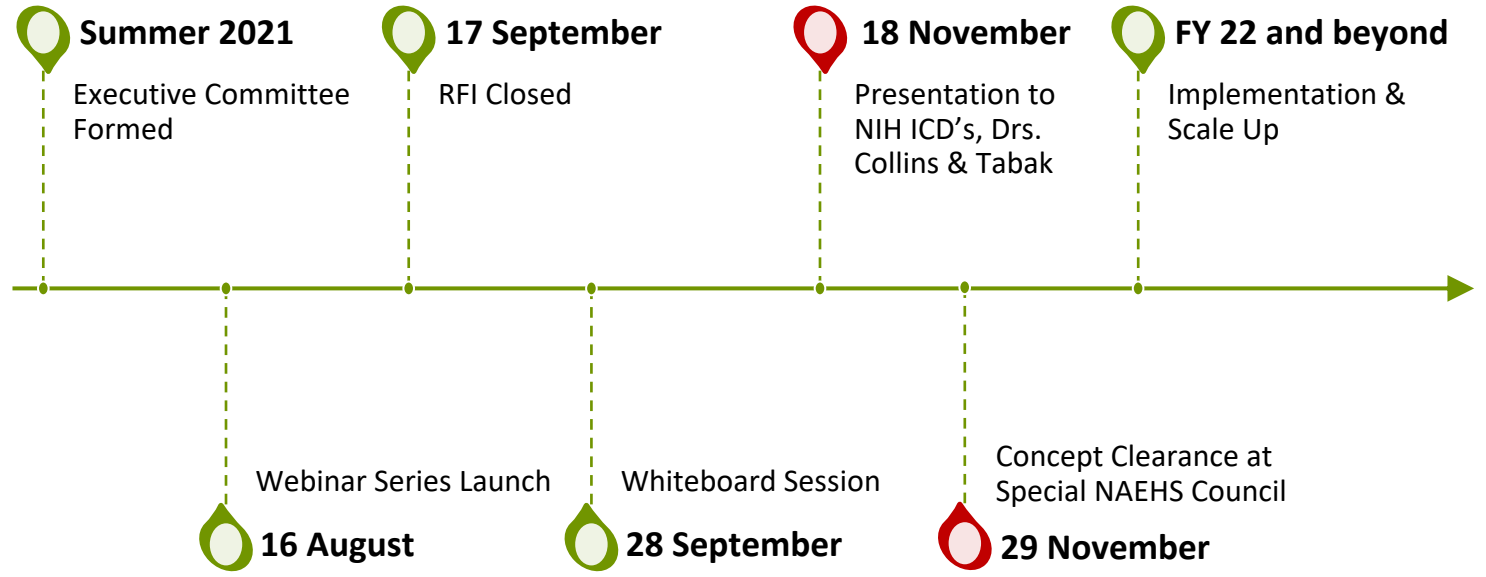
### Critical Contributors

- Abee Boyles, NIEHS
- Amit Mistry, FIC
- Kimberly Thigpen Tart, NIEHS
- Trisha Castranio, NIEHS
- Ann Liu, NIEHS (c)
- Betsy Eagin Galluzzo, NIEHS (c)
- Stasia Widerynski (c)
- Rachel Scheinert, NIMH
- Liz Perruccio, NINR
- Andrew Liang, NINR
- Christe Drew, NIEHS
- Nishadi Rajapakse, NHLBI
- Plus many others...





# Timeline for Strategic Framework and Concept Clearance





## Relevant Definitions

- **Climate change:** refers to changes in global or regional climate patterns attributed largely to human-caused increased levels of atmospheric greenhouse gases.
- **Climate change adaptation or climate adaptation:** means taking action to prepare for and adjust to both the current and projected impacts of climate change.
- **Climate change mitigation:** refers to actions limiting the magnitude and rate of future climate change by reducing greenhouse gas emissions and/or advancing nature-based solutions.
- **Adaptive capacity:** is the ability of a human or natural system to adjust to climate change (including climate variability and extremes) by moderating potential damages, taking advantage of opportunities, or coping with the consequences.
- **Climate resilience:** can be generally defined as the capacity of a system to maintain function in the face of stresses imposed by climate change and to adapt the system to be better prepared for future climate impacts.

## RePORTER and Matchmaker

- About the Information Available in RePORTER
- Results, RePORTER system, is an electronic tool that allows users to search a repository of both intramural and extramural NIH-funded research projects from the past 25 years and access publications since 1980, and patents resulting from NIH funding.

RePORTER includes information on research projects funded by the NIH as well as the Centers for Disease Control and Prevention (CDC), Agency for Healthcare Research and Quality (AHRQ), Health Resources and Services Administration (HRSA), Administration for Children and Family (ACF), and U.S. Department of Veterans Affairs (VA).



## RFI Summary: Common Themes

CCH RFI

### Diverse Workforce to Address Human Health and Climate Change:

- Importance of multidisciplinary and **transdisciplinary** efforts for education, training, research, outreach, and communication.
- Fostering **partnerships between R1 universities and Minority Serving Institutions** toward reaching more levels of the health workforce and establishing better pipelines for drawing more diverse students into the health sciences.

### Rapid Research Response Capacity to Address Human Health and Climate Change:

- Collection of **baseline health data** in areas with high probability of extreme weather events.
- **Near-real-time analysis** of impacts of climate-related hazards on the functioning of health systems, including emergency and acute care systems.

## RFI Summary: Common Themes

### Innovative Research:

- Affirmation of ideas outlined in RFI, with specific strategies to address the priorities and gaps, or additional topic areas to research provided.
- Research needed on the **direct**, and particularly the **indirect, impacts** of climate change on human health; the effects of **adaptation and mitigation strategies** on health, from the mechanistic level to the population level.
- Research evaluating **co-benefits** of climate change mitigation, adaptation, policies, and interventions.

### Scientific Infrastructure to Address Human Health and Climate Change:

- NIH leadership in collecting, managing, and sharing data available from **national repositories**.
- Creating **structure for data** in terms of availability, usability, and access as well as physical infrastructure needs and forming **networks of resources**.





## RFI Summary: Common Themes



### Research and Community Partnerships to Address Environmental Injustice and Foster Resilience:

- **Climate equity and justice** frequently identified as an important concept to be incorporated.
- Cultivating domestic and international **partnerships** with reciprocal engagement in terms of effort, resources, and outcomes.
- **Community involvement** as an integral part of research, education, and outreach activities.

### Translation and Dissemination of Research Findings and Health Protective Strategies:

- Need for improving the **communication and dissemination** of research findings to various stakeholders and development of sound, evidence-based policies and interventions.
- Support research — and **research-to-practice partnerships** — focused on effectively communicating to the public, policymakers, and other priority audiences.
- Provide transparent and inclusive process to ensure **equitable engagement** by experts from academia, those with lived experience, nonprofit and philanthropic organizations, and the private sector.

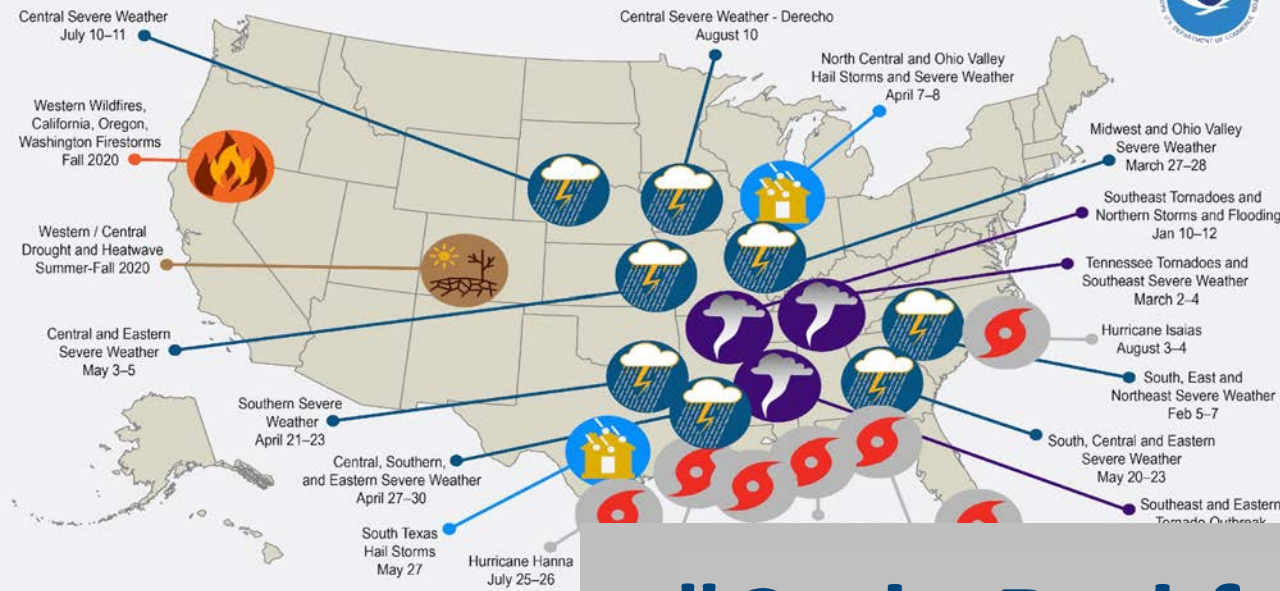
**“Climate change exacerbates chronic and contagious disease, worsens food and water shortages, increases the risk of pandemics, and aggravates mass displacement.**

**What’s clear now is that the health effects are worse than anticipated — and that they’re already being felt. ”**

— Tedros Adhanom Ghebreyesus, Ph.D.  
Director-General, World Health Organization



# U.S. 2020 Billion-Dollar Weather and Climate Disasters



**"Code Red for Humanity"**  
UN Secretary General on IPCC 2021 report

