Climate Change and Health Initiative & Strategic Framework

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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)

GCRP Climate Health Assessment, 2016
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
Climate Change and Health Initiative: Data Inputs
Portfolio of Existing Grants Across NIH ICs

Distribution of Grants across NIH ICs (FY2011-2020)

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

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

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<th>US Government Agencies</th>
<th>Coordination</th>
<th>Climate and health-focused</th>
<th>Relevant to health</th>
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RFI Responses (184)

- Academic institution: 108
- Professional association: 23
- Government agency: 16
- NGO: 14
- Other: 10
- N/A: 9
- Health care system: 7
- Industry: 6

Priority Area
- Innovative research
- Translation and dissemination
- Diverse workforce
- Partnerships to address EJ and resilience
- Rapid research response capacity
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
• 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).

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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*

Ticks: https://doppleronline.ca/huntsville/west-nile-virus-and-lyme-disease-reducing-your-risks/
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
“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
Thank You
We look forward to the Panel Discussion

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https://reporter.nih.gov/matchmaker
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
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
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- Flora Katz, FIC
- Megan Kinnane, NIMH
- Ivan Navarro, NIMHD
- Louise Rosenbaum, NINR
- Claudia Thompson, NIEHS
- Larry Fine, NHLBI
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- Abee Boyles, NIEHS
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- Trisha Castranio, NIEHS
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- 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

- **Executive Committee Formed**
  - Summer 2021
- **RFI Closed**
  - 17 September
- **Webinar Series Launch**
  - 16 August
- **Whiteboard Session**
  - 28 September
- **Presentation to NIH ICD’s, Drs. Collins & Tabak**
  - 18 November
- **Concept Clearance at Special NAEHS Council**
  - 29 November
- **Implementation & Scale Up**
  - FY 22 and beyond

**Strategic Framework**
- CCH RFI
- NIH Portfolio Analysis & Data Call
- NIH-wide Input Meeting
- Evaluaton of NIH program Models
- National Reports & Peer Reviewed Literature
- Landscape Analysis - HHS & Interagency Partners

**NIH**
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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.

Adapted from: EPA Strategic Plan FY 22-26.
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

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
"Code Red for Humanity"

UN Secretary General on IPCC 2021 report