

Concept Clearance

Council: November 2021

Concept Title: NIH Climate Change and Health Initiative

Introduction

For some time, the alarm has sounded by international scientific consensus that climate change poses an existential threat to human health. In September of this year, more than two hundred medical journals issued an unprecedented joint statement that urges world leaders to cut heat-trapping emissions to avoid “catastrophic harm to health that will be impossible to reverse.” President Biden, early in his administration, issued an Executive Order that directed HHS to identify, understand, and address impacts of climate change on people’s health, with emphasis on creating greater health equity among populations of concern. The President’s Budget included language specifically designating the National Institute of Environmental Health Sciences (NIEHS) as the lead for a NIH-wide initiative in climate and health. To meet this call to action, an Executive Committee, comprised of the Directors of seven Institutes and Centers (ICs), including NIEHS, Fogarty International Center (FIC), National Institute of Minority Health and Health Disparities (NIMHD), National Institute of Mental Health (NIMH), National Institute of Nursing Research (NINR), *Eunice Kennedy Shriver* National Institute of Child Health and Development (NICHD), and National Heart, Lung and Blood Institute (NHLBI), has committed to providing leadership and oversight to a NIH Climate Change and Health (CCH) Initiative.

Launching a Climate Change and Health Initiative at the NIH recognizes that the complex set of known and unknown factors contributing to the health impacts of climate change touches upon the mission areas of potentially every Institute, Center and Office at NIH. It is important to create an initiative with a range of opportunities and creative partnerships to support innovative and outstanding translatable science that will inform public health solutions and address health equity to protect all communities now and in the future. NIH has a long history supporting work in the climate change and health sector. Between 2011-2020 there was a modest NIH investment in research grants of around \$10 million per year. NIEHS and NIAID supported the greatest portion of these investments, but a recent portfolio analysis demonstrated that 21 other NIH ICs have funded at least one or more relevant projects. Most of the work to date has focused on understanding the health consequences of extreme-weather events, variation of temperature, and other climate factors on selected health endpoints. This work has also addressed how aspects of climate impact the environment (such as air pollution, mold, and water quality) directly and indirectly, especially in communities with a history of environmental justice concerns and health disparities.

Beyond the investment in research, the NIH staff have also contributed to the public’s awareness and the understanding of climate change and health. They have engaged at national and global levels, beginning with the first Intergovernmental Panel on Climate Change (IPCC) created in 1988. In 1993, the NIEHS-funded journal *Environmental Health Perspectives* was among the first global biomedical publications to explore the topic of climate change impacts on human health. In 2010, NIH co-led, with CDC and EPA, the creation of the first Federal climate change and health research needs assessment, *A Human Health Perspective on Climate Change*. NIH staff have represented DHHS on the U.S. Global Climate Research Program and led the writing team for the Climate Change and Health chapter of the 4th National Climate Assessment, which has become an authoritative report on the state of the science and needs for the future.

The complexity of climate change impacts on health are enormous. Climate drivers affect health outcomes directly through weather events such as extreme heat, wildfires, droughts, storm surges, and floods, but also indirectly through a series of exposure pathways such as air and water quality, food quality, infectious diseases, and massive population displacement events. These pathways are themselves influenced by environmental contexts related to land use, geography, infrastructure, and agriculture, as well as social, behavioral, and economic contexts that create vulnerabilities associated with life stage, gender, poverty, discrimination, and access to care.

It is clear that climate change greatly elevates threats to human health across a wide range of illnesses and injuries that include asthma, respiratory allergies and airway diseases, cancers, cardiovascular disease and stroke, foodborne diseases and decreased nutrition, heat-related illness and deaths, reproductive, birth outcome, and developmental effects, mental health and neurological disorders, vector-borne and zoonotic diseases, waterborne diseases, and extreme weather-related

morbidity and mortality. Therefore, it makes the most sense that an initiative on CCH be an NIH-wide effort. While all people may be affected, climate change and climate change related events are known to disproportionately and adversely affect communities that experience socioeconomic, behavioral, and environmental vulnerabilities. Such communities include underserved and health-disparate populations, especially communities of color, rural populations, and those unduly burdened by exposure to environmental pollution. In the global community, those living in extreme poverty and with poor access to health and economic services experience a higher risk of other consequences. In addition, as with many diseases and disorders, populations including children, older adults, women and pregnant women, and persons with disabilities, among others, may also be disproportionately at risk.

Research Goals and Scope

The goals of the Initiative are to reduce health threats across the lifespan and build health resilience in individuals, communities, and nations around the world, especially among those at increased risk from, or disproportionately affected by, the impacts of climate change. These goals will be accomplished through the following initial 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

Informing the strategic vision for this initiative has included gathering input from many sources across academic, community, industry, professional and governmental organizations. These inputs included but were not limited to:

- Recommendations collected, analyzed, and synthesized from the NIH Request for Information (RFI): Climate Change and Health that focused on the approaches NIH can take to enhance research on the health implications of climate change in the United States and globally. The RFI yielded 184 responses from a wide range of organizations and individuals.
- Initial characterization of the NIH-wide portfolio of 350 funded awards on climate change and health research from 2011-2020.
- A data call to all NIH ICOs to identify current and/or planned programs and activities potentially relevant to climate change and health research.
- A whiteboard workshop with staff from across the NIH to identify research needs and approaches for advancing impactful climate and health research
- A landscape review characterizing Federal and International Climate Change and Health Research

The culmination of these inputs and discussions has shaped our vision for this new NIH CCH Initiative that calls for bold action utilizing trans-disciplinary approaches. The NIH CCH Initiative is global in scope and cross-sectoral in nature and involves interagency and community partnerships. The program will be structured around four core tenets:

Health Effects Research: Scientific investigation of the influences of climate change on health outcomes, including spatial and temporal scales, pathways, and mechanisms, and the risks at specific times of vulnerability across the lifespan, as well as to special populations including children, older adults, women, pregnant women, differently abled persons, and others.

Health Equity: Recognizing and responding to the needs of populations most at risk of climate change impacts to their health. Health equity requires elevation of the concerns and rights of under-resourced and historically disadvantaged communities, underserved and health disparate populations, and communities burdened by environmental injustice, including communities of color. Bringing focused attention to the lived experiences of the most affected individuals and communities will ensure that the benefits of scientific discovery will create greater health equity.

Intervention Research: Science that provides the evidence base for the development and implementation of timely, effective strategies to prevent disease and disability and promote health and resiliency. Intervention research uses experimental, modeling, and evaluative methods to study interventions to improve health, including engineered solutions, institutional and infrastructure changes, and clinical, social, behavioral, and communication tools that influence beneficial decision making.

Training and Capacity Building: Developing research skills and innovative supporting technologies, as well as translating findings to facilitate understanding of, and adaptation to, the growing threat of climate change on health. Training will be directed to scientists and community members to facilitate their active participation in research design and implementation through community-scientist partnerships; efforts should include training and education on climate change and health at all curriculum levels, as well as for allied professions including law, media, economics, and others.

Examples of supporting fields of science and investigative approaches to implement the core tenets of this initiative include: Adaptation Research; Basic and Mechanistic Research; Behavioral and Social Sciences Research; Data Integration; Disaster Research Response; Dissemination and Implementation Science; Epidemiology and Predictive Modeling; Exposure and Risk Assessment; and Systems Science.

Mechanism and Justification

The full complement of NIH research and training mechanisms will be employed as NIH develops a sustainable model to support a pipeline of climate change and health research that embraces community-engaged partnerships, that empowers transdisciplinary solutions, and that promotes synergies through collaboration with other federal agencies and research organizations. Our first goal is to increase the number of CCH grant applications that are submitted to NIH. In the first year, it is proposed that the anticipated NIH appropriation be used as a catalyst to implement the NIH-wide CCH Initiative through use of Notices of Special Interest (NOSI) and Funding Opportunity Announcements (FOA) that focus on building the pipeline for investigator-initiated research and the capacity for transdisciplinary research efforts. These NOSIs will broadly advertise NIH's intent to expand the NIH CCH portfolio based on the approaches and goals outlined in this Concept. In preparation for a future Centers of Excellence program that fosters team science across disciplines with extensive community engagement, we will develop ways to bring together scientists and practitioners across many disciplines including climate scientists, biomedical researchers, and community partners to develop the research infrastructure and working relationships that will be needed to propel future initiatives. With an expected increase to the NIEHS base budget, we propose to create NIH-wide opportunities for Small Businesses through the Small Business Innovative Research (SBIR)/Small Business Technology Transfer (STTR) programs. We envision the development or enhancement of practical technologies for capturing the effects of climate change and extreme weather events on human health and to reduce the health threats posed by climate change across the lifespan.

Governance:

Programmatic oversight and governance of the NIH CCH Initiative will be led by NIEHS through the recently formed CCH Executive Committee (EC) that is comprised of seven Institute and Center directors (NIEHS, FIC, NIMHD, NIMH, NINR, NHLBI, NICHD). In addition, a steering committee (SC) with representatives from these seven ICs has been formed to provide strategic planning and coordination across the NIH. A recently revitalized NIH working group (WG) with representatives from across most of the ICs at the NIH (currently more than 120 members) is meeting monthly. The WG will oversee the formation of writing and other task teams to advance the goals of the Initiative and represent IC specific interests. NIH staff will continue to do strategic and implementation planning going forward and will formulate a series of workshops on key topics to explore and build our understanding of the needs and opportunities that are ripe for further study. In this context, a process is being developed for the prioritization, development, and approval of FOAs that will

ultimately be approved by the EC. The EC will also be involved in reviewing funding plans each year for the FOAs.

Summary:

NIH has an opportunity to expand its leadership role on climate change and health through the strategies outlined above to develop a strong sustainable research initiative that will enable rapid translation of our findings with multiple stakeholders (i.e., health care providers, policy makers, public). Strategies that take advantage of the expertise across the NIH can bring together the best minds to collaborate on generating biomedical breakthroughs and creating innovative tools, technologies, methodologies, and approaches for translating such breakthroughs to address the global health challenges associated with climate change. These strategies will be targeted to support research that includes mechanistic work on the cellular and molecular level, population related effects on a global scale, and impacts at the local and regional level. The proposed strategies will support research that embraces community engagement as a critical component to further health equity globally. Through a holistic approach, the NIH CCH program will focus on strategies to expand scientific knowledge and implement solutions-based action on the current and emerging effects of climate change on health.