The National Institute of Environmental Health Sciences

The National Institute of Environmental Health Sciences (NIEHS), in Research Triangle Park, North Carolina, is part of the National Institutes of Health (NIH) within the U.S. Department of Health and Human Services.

What Is NIEHS Doing?

The NIEHS mission is to discover how the environment affects people in order to promote healthier lives. NIEHS scientists and research grant recipients do studies to learn how exposures to different environmental factors can affect human biology and, in turn, health or disease.

Environmental factors can be external to your body, such as pollutants, mold, and chemicals in everyday products, or internal, such as diet, metabolism, and stress. In addition to analyzing chemicals in the air you breathe, the water you drink, and the things you touch, environmental health scientists consider what happens inside your body as chemicals are processed.

NIEHS research covers all stages of life. This research underscores the benefits of reducing exposure to contaminants and leads to better ways to promote health and to prevent disease and disability.

For more than 50 years, NIEHS has been a global leader in the field of environmental health sciences.

Public Health Impact

As part of NIH, NIEHS research is unique because it offers hope for preventing disease and disability.

Among many pioneering research findings at NIEHS, scientists:

- Discovered evidence for developmental impairment in children exposed to lead.
- Found associations between asbestos and lung disease and cancer.
- Played a lead role in discovering the first breast cancer susceptibility gene, BRCA1.
- Uncovered that exposure to air pollution is associated with many health effects, including respiratory, cardiovascular, and neurodegenerative diseases, cancers, and adverse pregnancy outcomes.
- Discovered evidence that exposure to high levels of radio frequency radiation, used in 2G and 3G cellphones, resulted in tumors in the hearts of male rats.
- Determined autoimmunity may be increasing in the U.S. — a condition in which the body's immune system reacts with its own cells.
- Found women had an increased chance of preterm birth when exposed to phthalates, hormone-disrupting chemicals commonly used in some personal care and household products.
- Associated sleeping with artificial light at night to weight gain or obesity in women.
- Developed a sophisticated biosensor that can help characterize contaminants and health risks in the aftermath of natural disasters.

PO Box 12233 • Research Triangle Park, NC 27709
Phone: 919-541-3345 • **https://niehs.nih.gov**

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Tackling Current Scientific and Public Health Challenges

NIEHS develops targeted research programs, innovative technologies, robust community partnerships, and timely funding opportunities. The areas below align with the institute's strategic plan and help prioritize research efforts. They also provide an organizational frame under which NIEHS staff collaborate internally and with partners in other government agencies, academia, nonprofits, and private organizations.

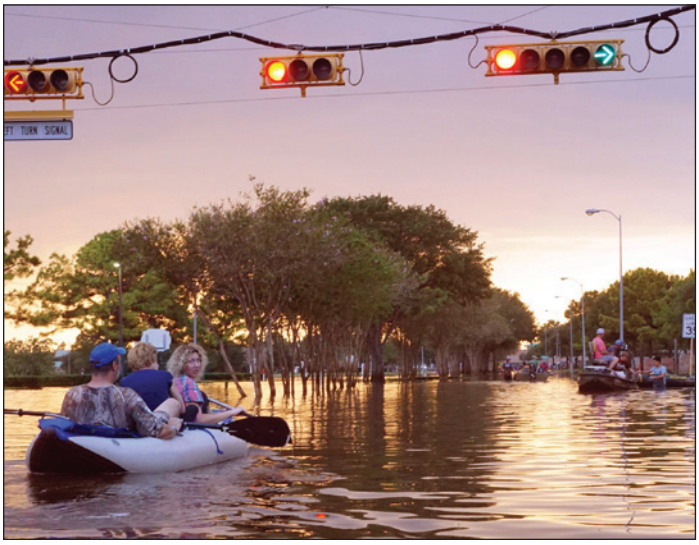
Climate Change and Health

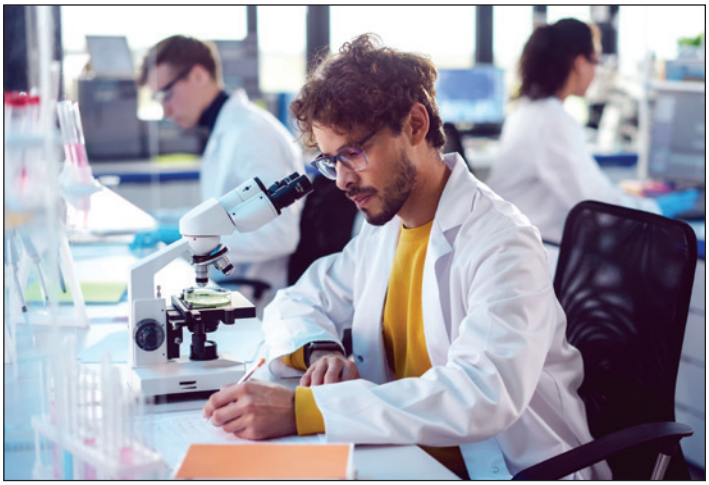
As the climate continues to change, and weather-related events such as floods, heat waves, hurricanes, tornados, and wildfires become more extreme, the risk to human health grows. Here and abroad, climate-related disasters can affect air, water, and food quality, alter the spread of infectious diseases, and increase mental stress.

For decades, NIEHS has supported research on climate change-related exposures. Examples are the health effects of wildfire smoke, toxic chemical runoff into drinking water caused by increased rainfall, and extreme heat.

The NIH Climate Change and Health Initiative — led by NIEHS in collaboration with other NIH institutes and centers — seeks to expand research to reduce threats to human health from climate change. Research investments focus on strengthening disaster resiliency at home and globally through science-based interventions, with an emphasis on health equity and community-engaged research.

NIEHS also leads the NIH Disaster Research Response (DR2) Program, which enables timely data collection in response to natural disasters, many of which are wrought by climate change.





Computational Biology and Data Science

Massive data sets generated by environmental health research can create analytic challenges. NIEHS has devoted resources to building a robust data science infrastructure, helping researchers turn their data into knowledge. Staff lead planning and development of the informatics and information technology strategy, provide critical training and resources, and develop computational tools to solve data sharing and analysis issues.

Environmental Justice and Health Disparities

Some places where people live, work, learn, and play are burdened by social inequities and health disparities. Environmental health disparities exist when communities exposed to a combination of poor environmental quality and social inequities have more bad health and disease than others. NIEHS has long worked to reduce environmental health disparities and promote environmental justice — the fair treatment and meaningful involvement of all people in environmental laws and policies regardless of race, nationality, or income.

NIEHS co-funded the Centers of Excellence on Environmental Health Disparities Research. These centers have generated useful results, such as a method for mapping the risk of contamination from abandoned uranium mines on the Navajo Nation.

Partnerships for Environmental Public Health (PEPH) is a collaborative network of scientists, community members, educators, health care providers, public health officials, and policymakers who put NIEHS research findings into action at local, regional, and national levels.

The NIEHS Environmental Career Worker Training Program provides opportunities for individuals from disadvantaged and underserved communities to obtain careers in environmental restoration, construction, hazardous waste removal, and emergency response.

What Is Gene and Environment Interaction?

Most diseases are complex and arise from an interaction between your genes and your environment. Subtle differences in genes can cause one person to respond differently to the same environmental exposure as another person. You may develop bad health after being exposed to something in the environment while others may not.

Mechanistic and Translational Toxicology

NIEHS seeks to better predict human health outcomes of environmental exposures by developing scientific approaches that are more efficient, cost-effective, translationally relevant, and less dependent on animal studies. A broad portfolio of research includes:

- Devising techniques to assess the hazards of real-world mixtures of chemicals.
- Modeling non-chemical stressors that contribute to health disparities in underserved communities.
- Developing new approaches to evaluating broad classes of chemicals like flame retardants and PFAS chemicals.
- Searching for biomarkers of health effects in military personnel with unique service-related exposures.

Precision Environmental Health and the Exposome

Understanding how personal health risks are associated with environmental exposures, also known as precision environmental health, is a priority for many NIEHS scientists and grant recipients. This effort involves study of the exposome, known as the totality of an individual's environmental exposures from birth to death.

NIEHS is advancing research in this area. For example, the NIEHS Personalized Environment and Genes Study (PEGS) has collected data from 20,000 people to learn more about genetic and environmental risk factors for many health conditions. In addition, NIEHS grant recipients in the Pan-Cancer Project created "genetic fingerprints" of various cancers. These data provide insight into how cancer develops and potential therapies.

NIEHS at Work

NIEHS research is conducted within three divisions.

Division of Extramural Research and Training

This division assesses, plans, directs, awards, and evaluates the institute's grant-based research program. Recipients of NIEHS grants across the country conduct basic laboratory research, applied research, and population-based studies. Some also engage communities in their research efforts. Through its grantees, NIEHS also provides educational opportunities and environmental health training.

Division of Intramural Research

In-house research conducted by this division includes biostatistics, epidemiology, molecular carcinogenesis, molecular genetics, reproductive and developmental toxicology, respiratory biology, signal transduction, translational toxicology, and other areas.

Another aspect of intramural activity is the Clinical Research Unit, in which NIEHS and North Carolina universities collaborate to move laboratory science toward disease prevention and treatment. There are studies on asthma, reproductive disorders, puberty, and other topics. Learn more at joinastudy.niehs.nih.gov.

Division of Translational Toxicology

This division focuses on producing data, capabilities, methods, and products that are efficient, cost-effective, human health-relevant, and less dependent on animal studies. Much of their work is carried out by multidisciplinary teams in support of the National Toxicology Program (see box).

National Toxicology Program

NIEHS is the administrative home to the National Toxicology Program (NTP). It is a federal, interagency partnership of the Food and Drug Administration, National Institute for Occupational Safety and Health of the Centers for Disease Control and Prevention, and NIEHS, all within the U.S. Department of Health and Human Services. The mission is to build knowledge and advance toxicological sciences to protect and promote public health.

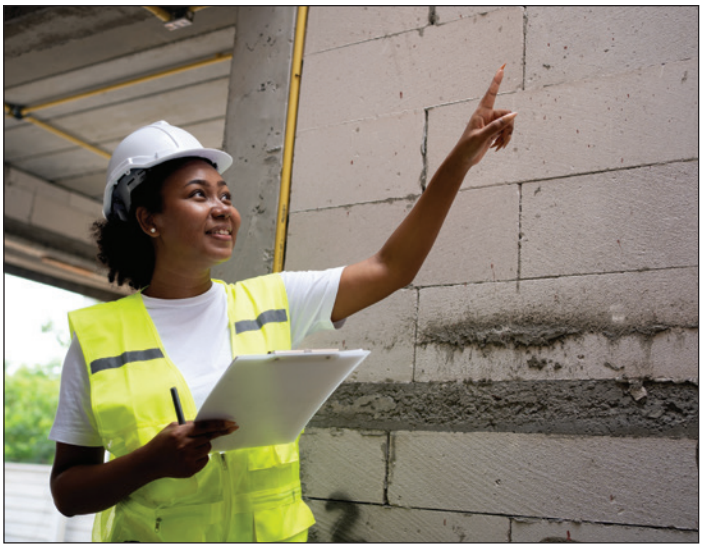
Congressionally Authorized Programs at NIEHS

Superfund Research Program

Created by the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Superfund Research Program conducts research to discover practical solutions for protecting the public from hazardous substances, such as arsenic, PFAS, and mercury. It funds university-based and small business grants that aid the reuse of water and land in communities, formation of scientific partnerships, and creation of innovative environmental cleanup technologies.

Worker Training Program

The Worker Training Program, also established by SARA, funds a network of nonprofit organizations that conduct safety and health training for hazardous waste workers and emergency responders across the country. In many types of jobs, hazards that workers may encounter include solvents and other products made with toxic chemicals or heavy metals, mold, and physical risks, such as loud noises, vibrations, and dangerous machinery.



Communication

NIEHS shares information about how the environment may affect health with the public, other scientists, health professionals, and decision-makers.

Visit our website (https://niehs.nih.gov) to find news, events, program descriptions, grant funding information, and our strategic plan.

In the "Health & Education" section of the website, there are informative materials on many different environmental health topics that you can download or order. See how our research is helping improve public health and prevent disease and disability.

Digital Publications

The NIEHS **Environmental Factor**, a monthly award-winning newsletter, is available online or by email subscription. NIEHS also offers other special interest newsletters.

Environmental Health Perspectives (https://ehp.niehs.nih.gov) is an open-access, peer-reviewed journal supported by NIEHS. This journal publishes original research, reviews, and commentaries on the relationship between the environment and human health. It uses a continuous publication schedule to distribute content to readers as quickly as possible.

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Leadership Values

Core values guide NIEHS by providing a framework for engagement within the institute, across NIH, and with the broader scientific community.

- **Collaboration:** A tradition of teamwork that encourages transparent and respectful partnerships to drive ambitious projects aligned with a common mission.
- **Communication:** A transparent, two-way exchange of information between the institute and the public built on mutual trust, respect, and inclusion.
- **Distributive Leadership:** A culture that inspires and empowers the entire workforce to use their talents, strengths, and expertise to assume leadership responsibilities and accountability.
- **Innovation:** An environment where forward-thinking, cutting-edge, and diverse ideas are fostered and applied to solve current and emerging challenges.
- **Workforce:** An inclusive, diverse, and well-equipped pipeline of scientists, staff, and other stakeholders whose perspectives are respected and valued.

Richard Woychik, Ph.D.
Director of NIEHS and NTP

Find his bio and monthly Director's Corner columns here: https://niehs.nih.gov/about/od/director

For more information on the National Institute of Environmental Health Sciences, visit **https://niehs.nih.gov**.