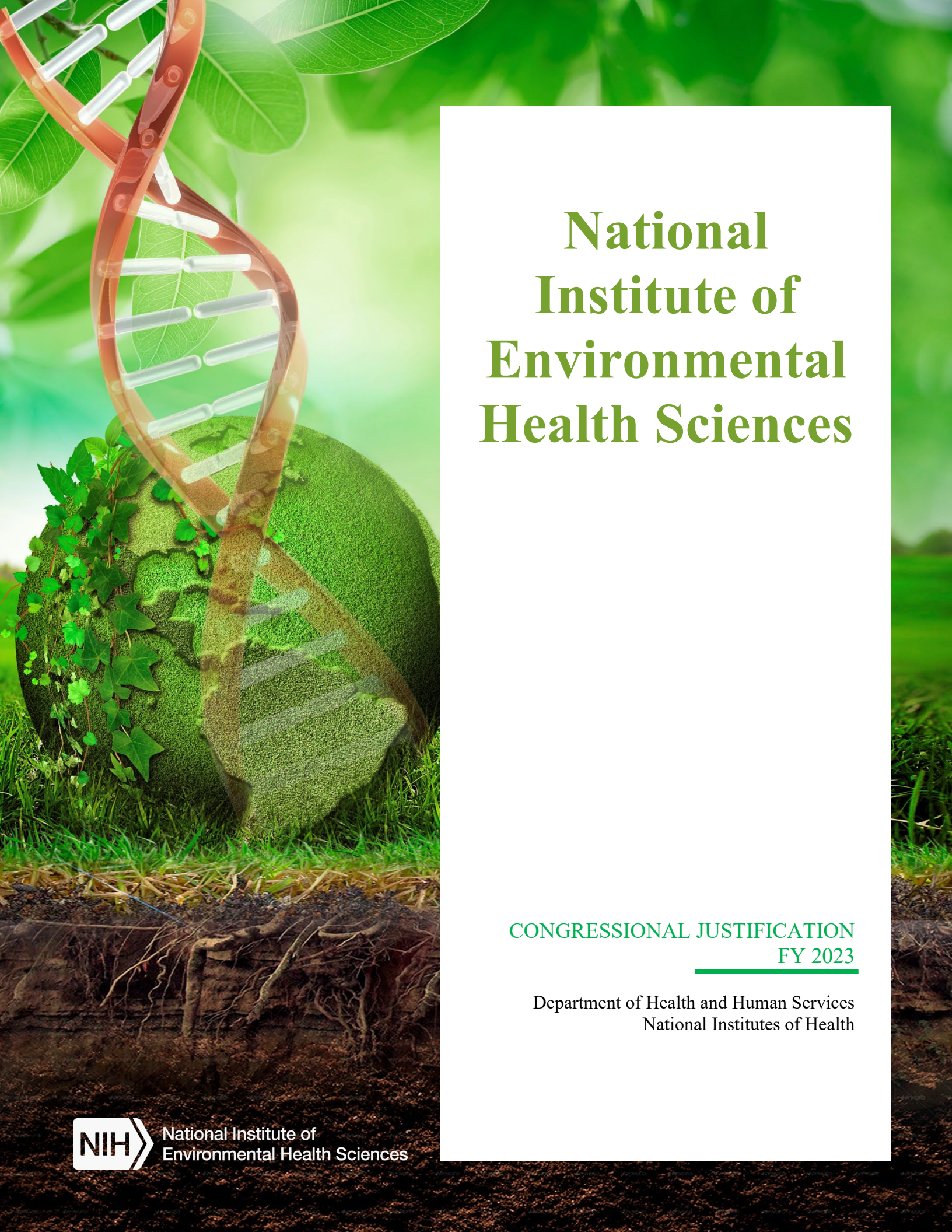

National Institute of Environmental Health Sciences

CONGRESSIONAL JUSTIFICATION
FY 2023

Department of Health and Human Services
National Institutes of Health

NIH National Institute of Environmental Health Sciences

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DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Institute of Environmental Health Sciences (NIEHS)

FY 2023 Budget Table of Contents

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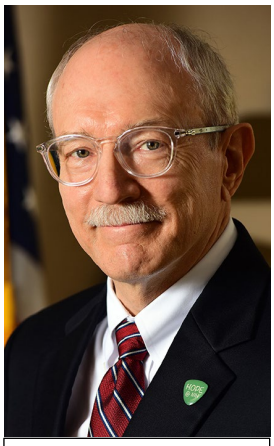
Director's Overview

Responding to a Changing World: NIEHS Science to Enhance Human Health



Richard P. Woychik
NIEHS Director

Mission

The mission of the National Institute of Environmental Health Sciences (NIEHS) is to discover how the environment affects people in order to promote healthier lives.

Mobilizing to Meet Unprecedented Challenges

From its beginnings, the field of environmental health sciences has existed at the point where the study of the basic biology of individuals converges with the study of the exposure of populations in the effort to understand the impact of the world around us on our health and well-being. For more than half a century, NIEHS has led the world in the pursuit of knowledge at this intersection. Recent global health events, including the COVID-19 pandemic and worsening climate change, point urgently to the need for the continued integration and application of environmental health sciences with other disciplines and fields of study to meet the complex health challenges of a rapidly and constantly changing world. NIEHS is responding to this need with research that combines insight into the very makeup of humans as individuals, from genetics to biological processes, with characterization of the constantly shifting "exposome"—the sum of our chemical, dietary, psychosocial, and other exposures—to generate breakthroughs that will protect and promote our health, most especially those among us who are likeliest to be affected and least able to respond. To this end, we have prioritized NIEHS engagement in efforts including the NIH *All of Us* Program to empower precision medicine and leadership of a new NIH Climate Change and Health Initiative. As NIEHS Director, I have restated and recommitted us to our Institute's core values: Workforce Diversity, Innovation, Collaboration, Communication, and Distributive Leadership. As we move forward, these five values will provide the framework by which we prioritize our efforts and engage with our sister NIH Institutes and the broader scientific and stakeholder communities, always mindful that our efforts are conducted in support of the overarching NIH goal of achieving health equity for all.

In the past two years, the world has seen the emergence of public and environmental health threats that have dwarfed past disease outbreaks and hazards in the sheer complexity and scope of their immediate and long-term effects. The emergence and spread of the SARS-CoV-2 virus and its variants and the consequences of COVID-19 for health brought into sharp relief the underlying vulnerabilities of so many communities and populations within our global society, as well as concurrent inequities in the provision of health care and maintenance of public health. NIEHS has worked from the outset of the pandemic, alongside our sister Institutes and other science organizations around the world, to apply our research capacities to understanding the impacts of the coronavirus, particularly how it manifests in the highest risk populations. NIEHS-supported scientists were among the first to quantify which U.S. populations would be most at risk of severe COVID-19-related illness due to health disparities, including African-American and other minority populations, those in low-income households, and those working in round-the-clock industries. Understanding the influence and extent of these factors was important in determining how best to allocate resources to fight the pandemic. NIEHS also helped to stand up a major component of NIH's Rapid Acceleration of Diagnostics (RADx) response through infrastructure support for RADx-UP, which is focused on understanding and alleviating barriers to COVID-19 testing across the nation, especially among Underserved Populations (UP). The program now comprises 88 community-based participatory projects in 56 States, Territories, and the District of

Columbia, reducing health disparities by increasing COVID-19 testing. As of August 2021, more than 2 million tests had been administered through the program.

Early on in the pandemic, NIEHS supported evaluations of the first known children infected with the coronavirus. This groundwork helped create a baseline understanding of children's susceptibility and how COVID-19 presents in children. This information has gained importance as the numbers of children affected has surged worldwide. Other projects are looking at potential interactions between exposure to toxic chemicals and the risk of COVID-19 infection and outcomes, including a study that will monitor a cohort of firefighters, who are known to have increased exposures to per- and polyfluoroalkyl substances (PFAS) in fire suppression foam, assessing infection severity.[1] To facilitate ongoing pandemic-related research, NIEHS created the COVID-19 Collection of the newly launched Disaster Research Response (DR2) Resources Portal, a curated set of more than 150 data collection and research support tools that scientists can quickly access and use or adapt for their COVID-related research projects.[2]

Climate change is the companion crisis to COVID that continues to emerge as an increasingly urgent global threat to human health. Health concerns influenced by climate changes or actions to mitigate them include asthma, respiratory allergies and airway diseases, cancers, cardiovascular disease and stroke, foodborne diseases and decreased nutrition, heat-related morbidity and mortality, developmental effects, mental health and neurological disorders, vectorborne and zoonotic diseases, waterborne diseases, and extreme weather-related injuries, diseases, and deaths. Evidence indicates that the exposures, risks, and harms associated with climate change disproportionately affect communities subject to heightened threats due to socioeconomic, behavioral, and environmental vulnerabilities. These include under-resourced and health disparate populations, especially communities of color, many rural populations, children, older adults, pregnant women, and persons with disabilities, among others. NIEHS continues to support research on climate change-related exposures, resulting in recent advances such as: a proposed set of strategies to mitigate the global proliferation of harmful algal blooms (HABs) caused by a combination of increasing temperatures, more extreme rainfall, and protracted droughts,[3] and a non-invasive wearable sensor that measures clinical indicators of heat exposure and stress in real-time that can be immediately communicated to a health care provider.[4] The ability to monitor heat exposures with such mobile systems could be used to protect the health of groups, including athletes; older persons, especially those who live alone; and military personnel. In 2020, we launched a major public resource to facilitate research and policymaking on the effects of climate change on human health. The updated Climate Change and Human Health Literature Portal[5] provides a searchable bibliography of more than 12,000 peer-reviewed research articles and reports curated from both the biomedical and geosciences.

NIEHS recognizes the urgency of increasing our understanding of climate change threats to populations. To this end, we have launched the NIH Climate Change and Health Initiative, which will focus a broad range of scientific disciplines on achieving such understanding. Consistent with the Administration's whole-of-government approach, this Initiative will catalyze research and translation of climate change effects on human health across NIH Institutes and the federal and global scientific communities. The Initiative's goals are to reduce health threats posed by climate change across the lifespan, including

[1] reporter.nih.gov/search/22lPjSSzd0CoknnyAc_8pw/project-details/10151777
[2] tools.niehs.nih.gov/dr2/index.cfm/main/related
[3] pubmed.ncbi.nlm.nih.gov/32041097/
[4] pubmed.ncbi.nlm.nih.gov/32041097/
[5] tools.niehs.nih.gov/cchhl/index.cfm

improving the health equity of people who are at increased risk from or disparately affected by climate change impacts, and to build health resilience among individuals, communities, and nations around the world.

Maintaining Our Focus on Discovery

A host of other environmental health challenges confront us in our daily lives, and NIEHS continues our efforts to identify and understand them. For example, a recent study added to our knowledge of how exposure to phthalate plasticizers during pregnancy can interfere with development of the heart. Using a mouse model, researchers identified hundreds of sex-specific genes that were differentially methylated. Comparison to existing literature showed that many of these corresponded to similarly methylated genes in human heart failure patients. The study highlights both the role of DNA methylation in phthalate-induced cardiac effects and the importance of considering sex-specific variables in environmental health studies.[6] Other research is peeling back the covers on the role of sleep and circadian rhythms in maintaining health and contributing to disease. Researchers examined multiple, objectively measured sleep dimensions in a cohort of the Multi-Ethnic Study of Atherosclerosis mixed by age, sex, and race/ethnicity. They found that two metrics in particular, sleep apnea associated hypoxia (lack of oxygen) and very short sleep (less than 5 hours per night), were associated with higher prevalence of moderate-to-severe chronic kidney disease (CKD).[7] CKD affects nearly 15 percent of U.S. adults. Another recent study validated the measurement of DNA methylation, a biomarker of air pollution exposure, in umbilical cord blood as an approach to predict prenatal exposure to certain air pollutants (NO_x and $PM_{2.5}$). Distinguishing newborns at elevated risk of toxic prenatal exposures acts as an early warning system, allowing doctors and parents to intervene to prevent or lessen developmental disorders and illnesses.[8] NIEHS is expanding support for similar work in a cohort of African-American mothers and children in Atlanta through studies that will profile prenatal exposure to toxic chemicals (including mixtures) and sociological factors associated with health disparities, using high-resolution metabolomics, epigenomics, and other analytical approaches, to assess potential health effects.[9]

NIEHS is seeking to facilitate discoveries in an area of emerging health threat with enormous potential for harm: chemicals used as weapons of terrorism or war. We are participating in a funding opportunity of the NIH program on Countermeasures Against Chemical Threats (CounterAct), seeking to apply decades of knowledge of molecular and genetic toxicology to the development of medical countermeasures that can reduce the acute effects of chemical agents that harm the lungs and the eyes.[10]

Maximizing Research Benefits for Health

For NIEHS, it is not enough to generate understanding of how the environment interacts with genetic and other biological systems to influence our health—we must also work to translate this knowledge into effective solutions to environmental health challenges. We do this through investment in translational research fields including risk communication, dissemination and implementation, behavioral and social sciences, innovative technologies such as machine learning/artificial intelligence, biomonitoring and sensors, and systems approaches to data integration, among others.

The establishment of six new Collaborative Centers in Children's Environmental Health Research and Translation will turn research results into tangible tools, strategies, interventions, messages, and

[6] www.ncbi.nlm.nih.gov/pmc/articles/PMC7430087/
[7] pubmed.ncbi.nlm.nih.gov/33277428/
[8] www.tandfonline.com/doi/full/10.1080/15592294.2021.1872926
[9] reporter.nih.gov/search/b2hh2Jk2eE6UGRtgYepHBA/project-details/9998551#publications
[10] grants.nih.gov/grants/guide/rfa-files/RFA-ES-21-006.html

materials to protect children from harmful environmental exposures and improve health and health equity. An example of this kind of work is a recent study in which NIEHS researchers looked at management of type 1 diabetes; specifically, whether family and neighborhood attributes influence the glycemic control (HbA1c level) of young Black adolescents. This study considered social determinants of health including family conflict over diabetes management (the added stress of chronic disease has been shown to produce family conflict) and neighborhood adversity (an index score of indicators such as population density, percent of housing units vacant, percent of people in poverty, less than high school education, percent female-headed households, and others) as measured through objective and self-reported data. Findings showed that diabetes-related family conflict and neighborhood adversity both had significant, independent effects on glycemic control even after controlling for confounders such as child age, family income, and type of insulin management regimen. This suggests that health care providers should screen for socioenvironmental factors in addition to individual factors among Black adolescents with diabetes to determine effective disease management strategies.[11]

The importance of effective communication and translation of research has been demonstrated in the COVID-19 pandemic. Advances in data sharing and integration enabled the rapid research response to characterize the threat of COVID-19 and develop vaccines to prevent it in record time. NIEHS is spearheading an effort aimed at enabling similar rapid discoveries. The Environmental Health Language Collaborative[12] will apply a harmonized language to environmental health data, thereby enhancing its value for discovery by enabling consistent classification of data, interoperability of databases, and data sharing, reuse, and reanalysis. The pandemic also demonstrated the devastating consequences of ineffective research communication, which contributed to misunderstanding and mistrust of COVID-19 prevention messages. A recent NIEHS-supported analysis of research communications on tobacco, coal, sugar, pesticides, and climate change identified 28 tactics used to manufacture doubt among the public about scientific evidence, with adverse consequences for environmental and public health.[13] Understanding the cognitive, sociobehavioral, and linguistic tools used to attack scientific evidence is critical to effectively translating research and combatting misinformation to protect people's health.

Conclusion

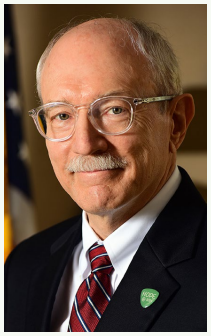
Our rapidly changing world requires that we seek innovative, integrated, and truly collaborative approaches to understanding the health challenges we face and devising timely, effective responses. NIEHS will continue to bring our deep and ever-expanding knowledge of environmental health, our diverse and dedicated workforce, and our commitment to engaging with all those focused on these challenges to the work of improving the lives of people around the world.

[11] onlinelibrary.wiley.com/doi/10.1111/pedi.13176
[12] www.niehs.nih.gov/research/programs/ehlc/index.cfm
[13] www.ncbi.nlm.nih.gov/pmc/articles/PMC7996119/

National Institute of Environmental Health Sciences

Meeting the Challenges of Yesterday, Today, and Tomorrow

For over 50 years, NIEHS has responded to the needs and concerns of the American people related to factors in the environment that might affect their health. Never has this mission been more relevant than now, as problems including climate change, global pandemics, and growing inequities threaten the health of individuals and communities. NIEHS supports research, translation, training, and workforce development aimed at preventing environmentally related disease and promoting health and brings a long history of leadership on issues of environmental justice and health disparities to the search for solutions. NIEHS research is working at the core of these and other environmental health issues to: unravel the complex science of how exposures and genetics combine to cause disease; inform policies to protect the nation's health, including those most at risk; and empower people in the United States and around the world to live healthier, more productive lives.

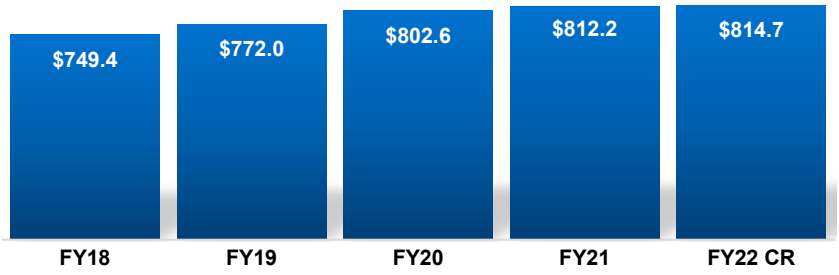


Director Richard P. Woychik, Ph.D., seeks to implement transformative science across the NIEHS enterprise, emphasizing the core values of Workforce Diversity, Innovation, Collaboration, Communication, and Distributive Leadership.

A priority of his vision is to integrate environmental health sciences into relevant NIH programs, including *All of Us* and Precision Medicine.

Funding History

(Data in millions)



FY2023 President's Budget: $932.1 million

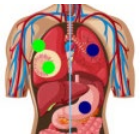
Facts and Figures FY18-FY21

- **652** Full-time Equivalents (FTEs) (avg/year)
- **656** Research Project Grants (RPGs) awarded (competing)
- **850** Principal Investigators (PIs) funded
- **79** Early Stage Investigators (ESIs) funded
- **177** Small Business Innovation Research/Small Business Technology Transfer Research (SBIR/STTR) grants awarded

Research Highlights

- **Cancer.** Scientists identified a new class of compounds, Select Modulators of AhR-regulated Transcription (SMAhRTs), that kill liver and breast cancer cells.
- **e-Cigaretttes.** A clinical trial using mucous cells in the nose found that e-cigarette use decreased the immune response to influenza. Responses affected by e-cigarettes were different from those affected in smokers.
- **Indoor Air.** California commutes of more than 20 minutes create exposure risk exceeding 100 percent of the daily reference dose of Prop-65 chemicals benzene and formaldehyde in air inside vehicles.
- **Sun Exposure.** Researchers, parents, and children co-designed SunSmart, a digital intervention against sun exposure targeted at Hispanic and underserved populations, who are likely to underestimate their risk for skin cancer.
- **Diet & Obesity.** A high-fat diet increases brain activity associated with hunger and food reward and suppresses the ability of healthier foods to offset these effects, even after abstinence from high-fat food.
- **Parkinson's Disease.** A new method detects a protein biomarker for Parkinson's disease in skin with 96 percent sensitivity, enabling development of a non-invasive diagnostic tool.
- **Air Pollution & Dementia.** A study of 63 million older U.S. adults found air pollution is significantly associated with increased risk of hospital admissions for Parkinson's disease, Alzheimer's disease, and dementia.

Recent Accomplishments: Tools to Move Science Forward



Tox21 BodyMap
This interactive, online research tool enables users to identify target organs in the human body for more than 10,000 chemicals. Users can apply filters related to chemical activity and use multiple data visualization options to gain an overall picture of a chemical's bioactivity.

Disaster Research Response (DR2) Resources Portal
The time during and immediately after a disaster or public health emergency is critical for collecting data on people's exposures and other relevant information. This online portal gives users access to more than 500 scientist-created surveys, protocols, common data elements, and other tools to enable a rapid research response in the field. Tools are tagged by population, type of event, exposure, health outcome, and other keywords, allowing fast identification of ready to use resources. The portal includes access to the COVID Collection, a group of more than 120 highly relevant research tools to help fight the pandemic.

Climate Change and Human Health Literature Portal
This webtool combines in one place access to biomedical, ecological, and geoscience peer-reviewed research publications and reports from around the world on the impacts of climate change on human health. Tagging with more than 250 keywords related to events (e.g., hurricanes, wildfires), exposures (e.g., heat, HABs), health impacts (e.g, injury, stress, infectious disease), geographic data, population, social determinants of health, and others empowers users to find the state of the science on their impact of interest.

Current Activities

NIEHS Research Intensive Short Courses and Educational Opportunities (NIEHS RISE) are enriching the research workforce through curricula including the Environmental Health Research Institute for Nurse and Clinician Scientists, Endocrine-Disrupting Chemicals: Hazards and Opportunities, and Frontiers in Environmental Science and Health.

The **Environmental Health Language Collaborative** is an initiative to harmonize how scientists describe environmental health research and data, which enables consistent data classification and integration, and promotes data sharing, reuse, and reanalysis to catalyze discovery.

NIEHS is contributing research on environmental stressors to NIH efforts on **maternal health and mortality**. A recent paper highlights the impacts of agents such as air pollutants, endocrine-disrupting chemicals, and metals on pregnant women. Another project is investigating environmental exposures during pregnancy and postpartum risk of heart attack or stroke in rural women.

People encounter thousands of **chemicals in the personal care and household products** they use. As companies do not have to reveal their products' ingredients, measuring exposures can be hard. An NIEHS-EPA study is comparing how well current surveys and models measure such exposures.

Future Initiatives

Scientists and world leaders alike have identified global climate change as the greatest existential threat to all inhabitants of planet Earth. No longer is this threat part of a distant, potential scenario — events such as steadily rising global heat and increasingly frequent and severe storms have made the first waves of impacts on human health a current reality. For decades NIEHS has been a leader on efforts to predict and understand climate impacts and is continuing this role with renewed urgency through leadership of the NIH Climate Change and Health Work Group, which is working to develop an agency-wide research program. NIH's scientific mission, expertise, and capacities uniquely position the agency to conduct and support critical research to identify and address the challenges posed by climate change to the health of the world's people. NIEHS brings to this effort not only its deep knowledge of environmental health sciences, but also a long history of consideration of the environmental injustice, health inequities, and increased health risks historically faced by poor and disadvantaged communities and other high-risk populations. Humanity dictates that such issues must be prioritized in determining how to respond to the climate crisis. NIEHS also will continue to lead highly relevant multidisciplinary efforts to integrate geospatial and geoscience data with biomedical and population data to generate solutions to complex global health problems. Working collaboratively across NIH's institutes and centers, NIEHS will ensure that the strongest workforce is developed to conduct the best science and to translate the knowledge gained from that science into the most effective actions for preventing and mitigating climate change impacts on health.

Major Changes in the Budget Request

Major changes by budget mechanism and/or budget activity are briefly described below. The FY 2023 President's Budget for NIEHS is $932.1 million, which is $117.4 million above the FY 2022 CR level. The increase includes $100 million to expand research on the human health impacts of climate change, the majority of which has been applied to research project grants.

Research Project Grants (RPGs) (+$96.7 million; total $370.9 million):
NIEHS plans to support a total of 745 RPG awards in FY 2023, excluding SBIR/STTR awards. Noncompeting RPGs will decrease by 55 awards and -$13.0 million from the FY 2022 CR level. The number of competing RPG awards will increase by 230 awards from the FY 2022 CR levels while the amount allocated will increase by $105.2 million. NIEHS will continue to support new investigators in FY 2023.

Intramural Research (+$12.1 million; total $246.4 million):
Intramural fnding will increase by $12.1 million, or 5.2 percent, to cover expected pay and benefit increases for onboard intramural staff. The increase also supports a planned increase in IR staff associated with the climate change and human health initiative.

Research Management and Support (RMS) (+$5.7 million; total $36.7 million):
Funding for research management and support will increase by $5.7 million, or 18.2 percent, to accommodate a planned increase in RMS staff and supporting management of funding for research on human health impacts of climate change.

Budget Mechanism Table

NATIONAL INSTITUTES OF HEALTH

National Institute of Environmental Health Sciences

Budget Mechanism*

(Dollars in Thousands)

Mechanism	FY 2021 Final		FY 2022 CR		FY 2023 President's Budget		FY 2023 +/- FY 2022	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount
Research Projects:								
Noncompeting	455	$209,935	458	$219,570	403	$206,591	-55	-$12,979
Administrative Supplements	*(51)*	$7,044	*(35)*	$3,655	*(38)*	$4,000	3	$345
Competing:								
Renewal	7	$3,571	15	$6,878	19	$8,912	4	$2,034
New	136	$62,383	97	$44,376	323	$147,498	226	$103,122
Supplements	1	$75	0	$0	0	$0	0	$0
Subtotal, Competing	**144**	**$66,029**	**112**	**$51,254**	**342**	**$156,410**	**230**	**$105,156**
Subtotal, RPGs	599	$283,008	570	$274,478	745	$367,001	175	$92,523
SBIR/STTR	38	$19,803	38	$19,798	46	$23,942	8	$4,145
Research Project Grants	637	$302,811	608	$294,276	791	$390,943	183	$96,667
Research Centers								
Specialized/Comprehensive	23	$37,220	24	$38,257	25	$39,099	1	$842
Clinical Research	0	$0	0	$0	0	$0	0	$0
Biotechnology	0	$0	0	$0	0	$0	0	$0
Comparative Medicine	0	$0	0	$0	0	$0	0	$0
Research Centers in Minority Institutions	0	$0	0	$0	0	$0	0	$0
Research Centers	**23**	**$37,220**	**24**	**$38,257**	**25**	**$39,099**	**1**	**$842**
Other Research:								
Research Careers	46	$6,495	53	$8,241	54	$8,423	1	$181
Cancer Education	0	$0	0	$0	0	$0	0	$0
Cooperative Clinical Research	0	$0	0	$0	0	$0	0	$0
Biomedical Research Support	0	$0	0	$0	0	$0	0	$0
Minority Biomedical Research Support	0	$400	0	$390	0	$385	0	-$5
Other	66	$21,516	73	$26,977	75	$27,571	2	$594
Other Research	**112**	**$28,411**	**126**	**$35,609**	**129**	**$36,378**	**3**	**$770**
Total Research Grants	772	$368,441	758	$368,142	945	$466,420	187	$98,279
Ruth L Kirschstein Training Awards:	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	50	$2,082	50	$2,111	50	$2,151	0	$40
Institutional Awards	377	$19,306	377	$19,576	377	$19,948	0	$372
Total Research Training	**427**	**$21,387**	**427**	**$21,687**	**427**	**$22,099**	**0**	**$412**
Research & Develop. Contracts	66	$159,258	67	$159,499	67	$160,446	0	$947
SBIR/STTR (non-add)	*(0)*	*($237)*	*(0)*	*($238)*	*(0)*	*($243)*	*(0)*	*($5)*
Intramural Research	511	$233,576	517	$234,310	524	$246,391	7	$12,081
Res. Management & Support	131	$29,560	155	$31,038	161	$36,700	6	$5,662
SBIR Admin. (non-add)	*(0)*	*($217)*	*(0)*	*($218)*	*(0)*	*($223)*	*(0)*	*($5)*
Construction		$0		$0		$0		$0
Buildings and Facilities		$0		$0		$0		$0
Total, NIEHS	**642**	**$812,222**	**672**	**$814,675**	**685**	**$932,056**	**13**	**$117,381**

* All items in italics and brackets are non-add entries.

Appropriations Language

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

For carrying out section 301 and title IV of the PHS Act with respect to environmental health sciences, $932,056,000.

Summary of Changes

NATIONAL INSTITUTES OF HEALTH
National Institute of Environmental Health Sciences

Summary of Changes
(Dollars in Thousands)

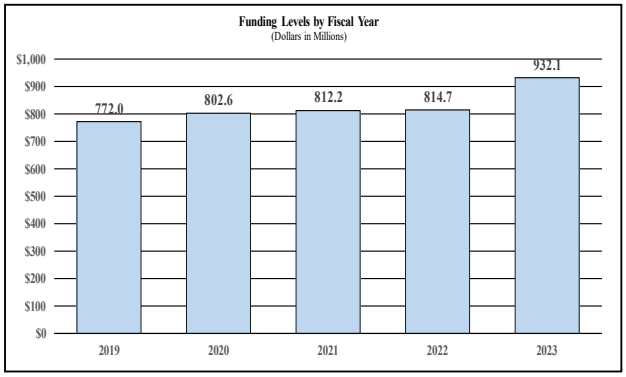
FY 2022 CR	$814,675
FY 2023 President's Budget	$932,056
Net change	$117,381

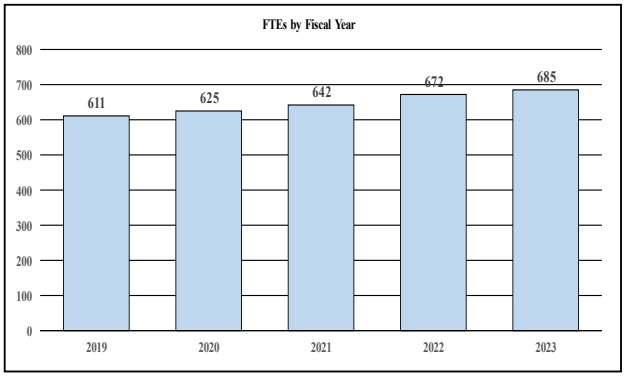
CHANGES	FY 2022 CR FTEs	FY 2022 CR Budget Authority	FY 2023 President's Budget FTEs	FY 2023 President's Budget Budget Authority	Built-In Change from FY 2022 CR FTEs	Built-In Change from FY 2022 CR Budget Authority
A. Built-in:						
1. Intramural Research:						
a. Annualization of January 2022 pay increase & benefits		$96,432		$100,965		$639
b. January FY 2023 pay increase & benefits		$96,432		$100,965		$3,262
c. Paid days adjustment		$96,432		$100,965		-$366
d. Differences attributable to change in FTE		$96,432		$100,965		$1,311
e. Payment for centrally furnished services		$29,682		$30,276		$594
f. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		$108,195		$115,150		$2,130
Subtotal						$7,569
2. Research Management and Support:						
a. Annualization of January 2022 pay increase & benefits		$20,639		$22,304		$137
b. January FY 2023 pay increase & benefits		$20,639		$22,304		$697
c. Paid days adjustment		$20,639		$22,304		-$78
d. Differences attributable to change in FTE		$20,639		$22,304		$809
e. Payment for centrally furnished services		$2,777		$2,832		$56
f. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		$7,623		$11,564		$164
Subtotal						$1,784
Subtotal, Built-in						$9,353

CHANGES	FY 2022 CR No.	FY 2022 CR Amount	FY 2023 President's Budget No.	FY 2023 President's Budget Amount	Program Change from FY 2022 CR No.	Program Change from FY 2022 CR Amount
B. Program:						
1. Research Project Grants:						
a. Noncompeting	458	$223,224	403	$210,591	-55	-$12,634
b. Competing	112	$51,254	342	$156,410	230	$105,156
c. SBIR/STTR	38	$19,798	46	$23,942	8	$4,145
Subtotal, RPGs	608	$294,276	791	$390,943	183	$96,667
2. Research Centers	24	$38,257	25	$39,099	1	$842
3. Other Research	126	$35,609	129	$36,378	3	$770
4. Research Training	427	$21,687	427	$22,099	0	$412
5. Research and development contracts	67	$159,499	67	$160,446	0	$947
Subtotal, Extramural		$549,327		$648,965		$99,638
6. Intramural Research	517	$234,310	524	$246,391	7	$4,512
7. Research Management and Support	155	$31,038	161	$36,700	6	$3,877
8. Construction		$0		$0		$0
9. Buildings and Facilities		$0		$0		$0
Subtotal, Program	672	$814,675	685	$932,056	13	$108,028
Total built-in and program changes						$117,381

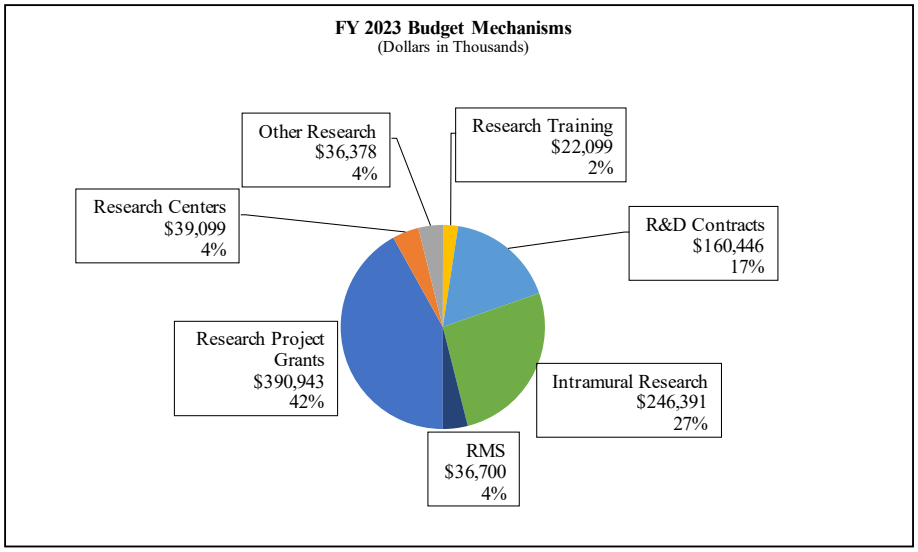
Budget Graphs

History of Budget Authority and FTEs:

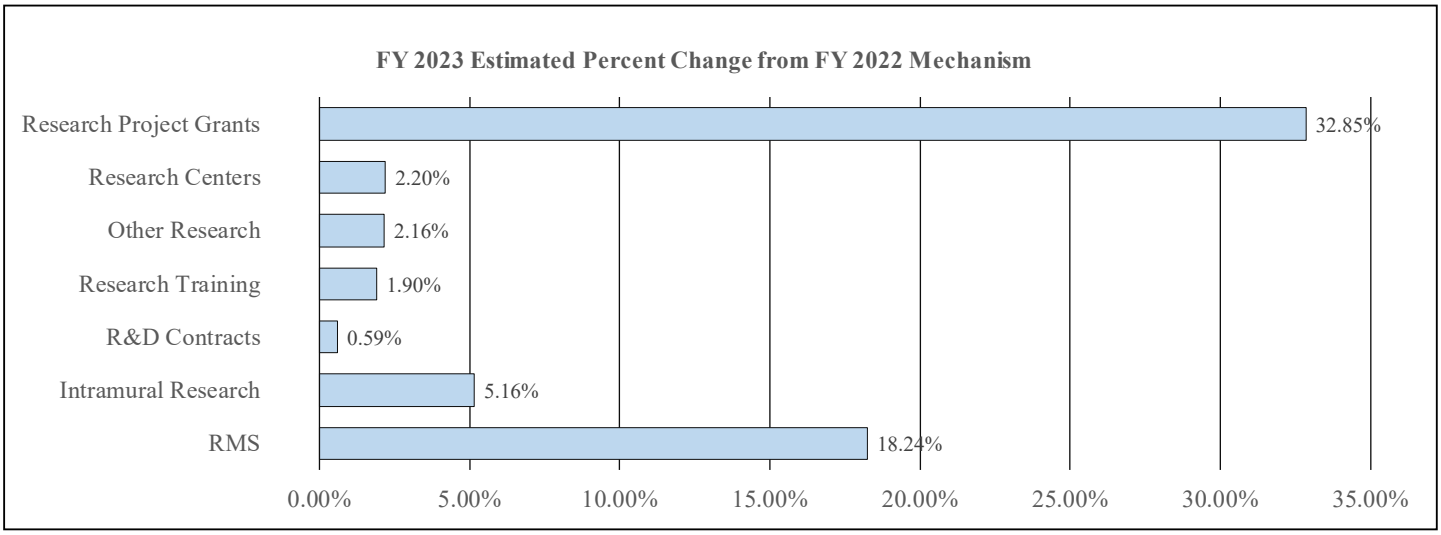




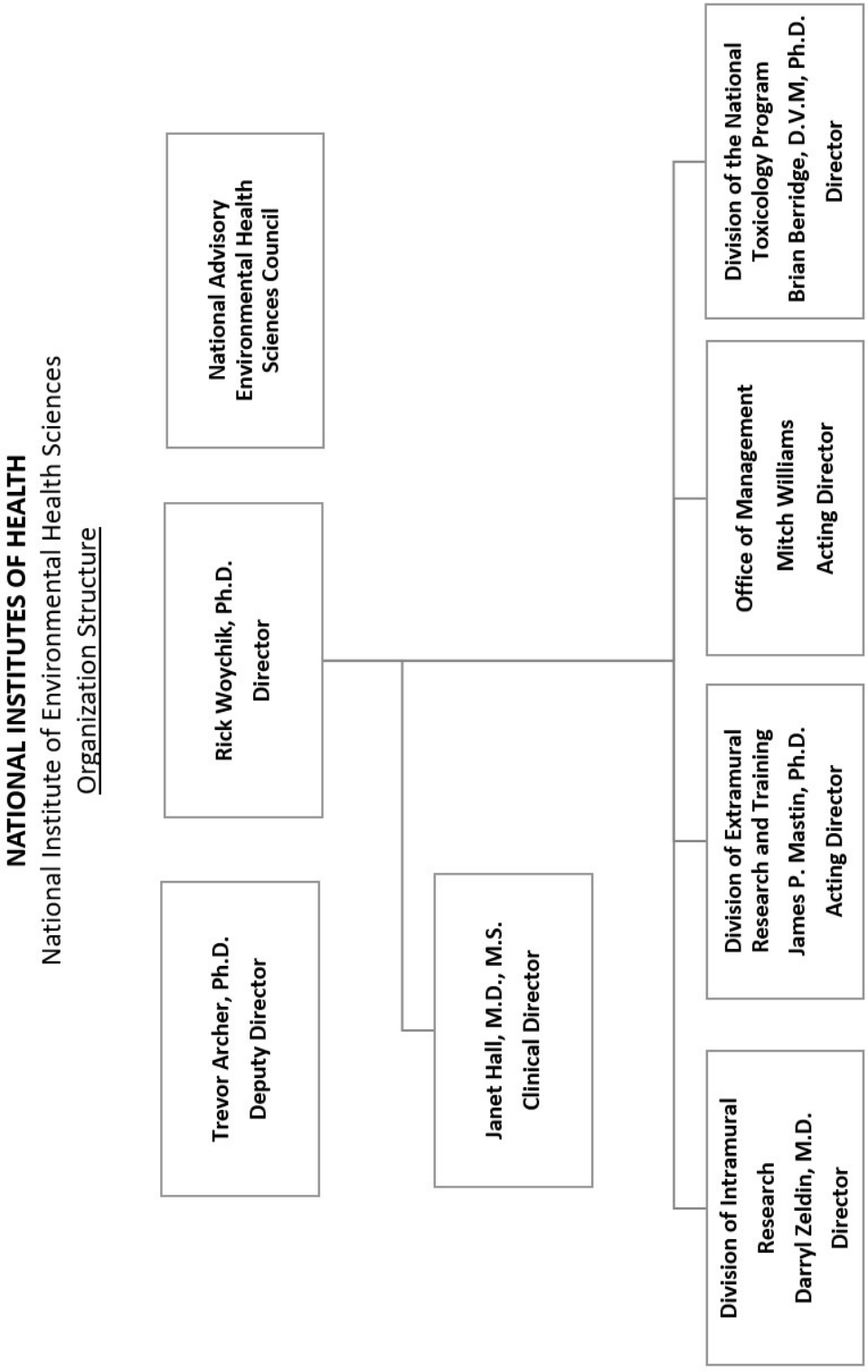
Distribution by Mechanism:



Change by Selected Mechanisms:



Organization Chart



Budget Authority by Activity Table

NATIONAL INSTITUTES OF HEALTH
National Institute of Environmental Health Sciences

Budget Authority by Activity*
(Dollars in Thousands)

	FY 2021 Final		FY 2022 CR		FY 2023 President's Budget		FY 2023 +/- FY 2022 Enacted	
Extramural Research	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**
Detail								
Fundamental Research		$203,232		$199,751		$204,804		$5,053
Exposure Research		$121,131		$123,243		$124,461		$1,218
Translational Research and Special Populations		$99,199		$99,460		$101,158		$1,698
Human Health Impacts of Climate Change		$0		$0		$90,000		$90,000
Predictive Toxicology		$90,542		$89,991		$91,224		$1,233
Training and Education		$34,981		$36,881		$37,318		$436
Subtotal, Extramural		**$549,086**		**$549,327**		**$648,965**		**$99,638**
Intramural Research	**511**	**$233,576**	**517**	**$234,310**	**524**	**$246,391**	**7**	**$12,081**
Research Management & Support	**131**	**$29,560**	**155**	**$31,038**	**161**	**$36,700**	**6**	**$5,662**
TOTAL	**642**	**$812,222**	**672**	**$814,675**	**685**	**$932,056**	**13**	**$117,381**

* Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

Justification of Budget Request

National Institute of Environmental Health Sciences

Authorizing Legislation: Section 301 and title IV of the Public Health Service Act, as amended

Budget Authority (BA):

	FY 2021 Final	FY 2022 CR	FY 2023 President's Budget	FY 2023 +/- FY 2022
BA	$812,222,000	$814,675,000	$932,056,000	+$117,381,000
FTE	642	672	685	+13

Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

Overall Budget Policy: The FY 2023 President's Budget request for NIEHS is $932.1 million, an increase of $117.4 million or 14.4 percent compared with the FY 2022 CR level.

Program Descriptions

Fundamental Research

Research in this program investigates the basic biological processes of how our bodies function, and the pathways and systems that are susceptible to the effects of environmental stressors. Fundamental research addresses all levels of biological organization—molecular, biochemical pathway, cellular, tissue, organ, model organism, human, and population; and uses new tools and techniques to explore complex questions and build the knowledge base on the effects of the environment on biological systems.

Over the course of the COVID-19 pandemic, NIEHS has sought to leverage existing environmental health research projects for insight into the SARS-CoV-2 virus and potential interventions against its health consequences. One such project is using a human heart tissue model originally developed to help understand the role of genes associated with cardiac function to investigate cardiac damage caused by the virus.

COVID-19 causes cardiac dysfunction in up to 25 percent of cases. However, the mechanism by which this occurs is unclear. Pathological studies of patient autopsy samples have been hindered by biosafety concerns; human cell-based models enable such studies. NIEHS-supported researchers exposed human induced pluripotent stem cell (iPSC)-derived heart cells to SARS-CoV-2 and studied the damage to the cells resulting from infection. Results showed that the virus most profoundly affected cardiomyocytes (CM), causing a distinct pattern of damage to the

Progress on Parkinson's Disease

NIEHS-supported scientists continue to make exciting progress on Parkinson's disease (PD), with new discoveries helping to explain, diagnose, and present new treatment targets for this devastating illness that affects more than a million people in the United States every day.

Although drinking well water has long been held to be a factor in development of PD, researchers who conducted a nationwide, case-control study of all PD cases in people age 66-90 receiving Medicare found no correlation between well water and PD incidence, either nationally or at state levels. These results suggest that PD may be related to exposures more common in urban or suburban areas.

Pesticides, metals, and other chemicals are being investigated as potentially relevant exposures. Millions of people worldwide are exposed to manganese, a known neurotoxicant, through the burning of fossil fuels. A study of South African residents compared measures of parkinsonism among those living near a manganese smelter with controls in non-exposed settlements. Results confirmed the expectation that manganese-associated motor dysfunction would be significantly higher in the environmentally exposed settlements. The study has particular relevance, however, as the levels of airborne manganese at which deficits occurred is lower than the current allowable occupational exposure levels in the United States, suggesting that that these levels may not be protective against PD.

In addition to helping to explain causation, other studies are helping to determine why certain neurons are resilient against exposures that contribute to PD. One such study used a model based on exposure to the pesticide rotenone, which contributes to dopamine loss, a key feature of PD. The study found that midbrain neurons with a gene called vesicular glutamate transporter 2 (VGLUT2) are particularly resilient to rotenone-induced dopamine loss, suggesting a new target for intervention against neurodegeneration.

NIEHS neurobiologists are studying the activity of dopamine in the brain in order to more accurately diagnose PD, as well as to intervene to slow the disease's progression and attenuate its effects, including negative impacts on motor skills. A recent study improves on a method for identifying a biomarker of PD in human skin tissue, providing 96 percent sensitivity and specificity each, and offering an extremely accurate while non-invasive means of diagnosing PD.

myofibrillar structure and cardiac contractile machinery that would lead to functional collapse. These effects were independent of viral replication, and closely resembled damage seen in myocardial specimens of people who had died of COVID-19. The ability of iPSC-CMs to accurately model effects of SARS-CoV-2 infection offers targets for improved screening and therapies for cardiac outcomes from COVID-19 and other pathogens.

Budget Policy: The FY 2023 President's Budget request for Fundamental Research is $204.8 million, an increase of $5.1 million or 2.5 percent compared with the FY 2022 CR level.

Exposure Research

Research in this program focuses on identifying and studying the exposome—the totality of exposures experienced over an individual's lifespan—and how those exposures affect health. Exposures to mixtures of chemical and non-chemical environmental pollution, diet, and other external agents impact the microbiome and other biological systems within the body. The program goals are to develop improved methods for detecting and measuring the totality of exposures in humans or other organisms, generate data on such measures using state of the art methods and technologies such as biomarkers, personal exposure sensors, and new complex analytical methods, and mine this data using new statistical and informatics tools and approaches to inform prevention and interventions of disease.

NIEHS-supported researchers are combining traditional exposure models with data from geospatial technologies to quantify environmental and behavioral health risks with greater precision to inform regulatory standards and individual-level interventions to protect health. A recent study examined the potential for increased exposure to air pollutants during wildfire events. The majority of adults spend about 90 percent of their time indoors and the primary health recommendation during wildfires is to stay indoors. However, this recommendation is based on measurements of particulate matter. Scientists decided to measure potential exposure levels of constituents of smoke called polycyclic aromatic hydrocarbons (PAHs), which are known to contribute to respiratory diseases and cancer. As a subset of PAHs, called gas-phase PAHs, have been found to contribute up to 86 percent of the cancer-causing toxicity of these chemicals. The researchers collected data during a week-long wildfire event in Oregon using passive air samplers and satellite geospatial models of smoke intensity. A total of 31 out of the 63 PAHs measured were detected, with more detected in indoor air than outdoors. Measures also showed that indoor concentrations of gas-phase PAHs were consistently equal or higher than those outdoors. These findings indicate that health policy recommendations during wildfire events need to take into account the potential risks of gas-phase pollutants.

Tim Gray / Shutterstock.com

Geospatial measures are being applied by NIEHS-supported researchers to gain more granular data on the effects of the built environment on people's ability and desire to exercise, a key behavioral intervention for preventing disease and promoting health. Scientists outfitted a sample of nearly 300 participants that varied by age, sex, gender, income, education, and other measures with accelerometers and GPS. Over a two-week period, they measured people's physical activity wherever it occurred and compared it to eight built environment characteristics, including NDVI (a measure of vegetation indicative of greenspace), blue space (lakes, rivers, coasts), parks, walkability, pedestrian intersection density, total population density, traffic-related air pollution, and transportation noise. Most physical activity studies measure only what occurs in home or work settings. The findings showed that the first six built environment factors were associated with increased odds of light-to-moderate-to-vigorous and moderate-to-vigorous physical activity, with the natural elements most strongly associated. Traffic-related air pollution and traffic noise were strongly associated with decreased odds of exercise. Understanding such barriers and facilitators to physical activity can help to inform strategies to increase people's willingness to engage in healthy behaviors.

Additionally, new measurement technologies are being applied inside the body to determine how composition of a person's microbiome, which can be highly sensitive to environmental exposures, affects long-term health. Researchers applied genetic sequencing technology to stool samples of more than 7,200 adults in a Finnish cohort to generate gut microbiome profiles, then compared these with electronic health records and death certificates of cohort members to look for associations in a 15-year follow up. They found that the abundance of the Enterobacteriaceae

family of microbes was strongly linked to all-cause mortality risk, and this association was stronger than systolic blood pressure, the leading cause of global burden of disease. Associations were strongest with deaths due to gastrointestinal and respiratory causes. Although Enterobacteriaceae are part of a normal gut microbiome, they can also cause infection in the gut and other parts of the body. Further, the levels of association were not changed by factors such as eating a healthy diet or a lack of antibiotic use six months prior, which might have been expected to reduce Enterobacteriaceae abundance. This study provides further evidence of the role of the microbiome in development of disease.

Budget Policy: The FY 2023 President's Budget request for Exposure Research is $124.5 million, an increase of $1.2 million or 1.0 percent compared with the FY 2022 CR level.

Translational Research and Special Populations

This program includes a wide range of research activities that encourage the integration of clinical, population, and community-based research and translation of findings into improved public health practice and disease prevention strategies. These activities include research investments targeted at understanding environmental risks to special populations (e.g., older people, children, and underserved populations) with the goal of understanding environmental health and health disparities in real-world settings, and developing solutions that consider social determinants of health.

Children are not just small adults, particularly when it comes to the effects of environmental exposures on their health, which can occur even before they are born. For decades, NIEHS has prioritized research on children as a uniquely vulnerable population, through both individual research projects, as well as through joint support with the U.S. Environmental Protection Administration (EPA) of a network of university-based, multidisciplinary Children's Environmental Health Centers. Over the more than 20 years the Centers were active, they investigated children's exposures to agents including air pollution; BPA, phthalates, and other ingredients in consumer products; lead and other metals; pesticides; and secondhand tobacco smoke. These investigations produced groundbreaking research insights into the environmental contributions to diseases and conditions in children including asthma, autism and neurodevelopmental disorders, cancer, obesity, birth outcomes, reproductive effects, and more.

Capitalizing on this knowledge base, NIEHS is establishing six new Collaborative Centers in Children's Environmental Health Research and Translation. The centers will use an integrated research model to translate research results into tangible tools, strategies, interventions, messages, and materials to protect children from harmful environmental exposures and improve health and health equity. The Centers will serve as resources for both the scientific community and stakeholder partners such as children's health advocacy groups, and will work to prioritize and integrate their concerns into goals and activities of the Centers. The Centers will also act as a robust pipeline for new investigators to stimulate new science and mobilize prompt responses to emerging environmental health issues.

Budget Policy: The FY 2023 President's Budget request for Translational Research and Special Populations is $101.2 million, an increase of $1.7 million or 1.7 percent compared with the FY 2022 CR level.

Climate Change and Health

Climate change affects health outcomes through extreme weather events such as extreme heat, wildfires, droughts, and storms, as well as through a series of exposure pathways including air and water quality, food quality, infectious diseases, and mental stress. These pathways are themselves influenced by environmental contexts related to energy use, infrastructure, and agriculture, as well as socioeconomic conditions such as poverty, discrimination, and access to care, which increase the risk of harm and reduce individual and community resilience. Physiological factors such as life stage, gender, pregnancy, and disabilities can also increase a person's vulnerability to climate threats.

As the leading environmental health sciences organization in the world, NIEHS has supported research for decades on the health impacts of exposures most likely to be influenced by global climate change. Some of these include the effects of air pollution on respiratory health, the impact on incidence of diseases like Lyme Disease and malaria from changes in the range of ticks and mosquitos, the risks of cancer from toxic chemical runoff into drinking water caused by increasing rainfall, the impacts of extreme heat on pre-term birth, and many others. A recent study looking at the threats of harmful algal blooms (HABs) has shown that toxins from cyanobacteria can make their way into freshwater lake spray aerosols at levels far above EPA's recommended "do not drink" levels. Other NIEHS-supported HABs researchers have proposed a set of strategies to mitigate the global proliferation of cyanoHABs caused by a combination of increasing temperatures, more extreme rainfall, and protracted droughts.

New emphasis on understanding climate change and intervening in health impacts, conveyed through Executive Orders and direct Congressional appropriations, has provided the impetus for an NIH Climate Change and Health Initiative, which is led by NIEHS in collaboration with other NIH Institutes. This Initiative will greatly expand research efforts in this area, empowering scientific discovery and innovative solutions to the existential threat of climate change threat to human health. A Strategic Framework for the Initiative has been developed to guide initial funding and activities. This framework is focused around four core elements — Health Effects Research, Intervention Science, Training and Capacity Building, and Health Equity — and prioritizes research focused on individuals and communities that are most at risk from climate change impacts and often least able to respond.

Budget Policy: The FY 2023 President's Budget request for Climate Change Impacts on Human Health is $90.0 million, an increase of $90.0 million compared with the FY 2022 CR level. The

remaining $10.0 million of the $100.0 million climate change research initiative is included in the Intramural Research and Research Management and Support programs below to support this initiative.

Predictive Toxicology

NIEHS works to develop and apply improved test methods and models of toxicity that can be used to predict cancer risk and other adverse health outcomes resulting from environmental exposures. Some of these activities support the interagency National Toxicology Program (NTP), which is headquartered administratively at the NIEHS in the Division of the NTP.

In 2021, the DNTP undertook a structural reorganization to better execute a strategic framework focused on three objectives: accelerate progress in becoming a more predictive science through the deliberate application of translational toxicology capabilities, provide an evidence-based approach to identifying and understanding potential environmental contributors to contemporary and common diseases, and improve the ability to carry out substance-based hazard evaluations that are more translational, innovative, and responsive.

Advancing the development of microphysiological systems (MPS) is one way in which NIEHS is implementing these objectives. MPS, often referred to as "tissue chip" or "organ on a chip" are human cell-based platforms that enable the study both of normal organ function and adverse effects on organ function of toxicants or pathogens. NIEHS is working with international scientific collaborators to facilitate the use of MPS in research on SARS-CoV-2 and development of drug treatments for COVID-19.

Budget Policy: The FY 2023 President's Budget request for Predictive Toxicology is $91.2 million, an increase of $1.2 million or 1.4 percent compared with the FY 2022 CR level.

Pediatric and Reproductive Environmental Health Scholars Program

The many interactions—biological, psychological, social, and cultural—that occur between pregnant women, new mothers, and children and their environments are unique and require specialized scientific and medical attention to understand. A new collaborative program to train Pediatric and Reproductive Environmental Health Scholars (PREHS) is aimed at developing this critical expertise.

The PREHS Program will build off the longstanding shared interests and collaborations of the Pediatric Environmental Health Specialty Units (PEHSUs), a national network of experts in the prevention, diagnosis, management, and treatment of health issues that arise from environmental exposures from preconception through adolescence. The university based PEHSUs, which are jointly funded by the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR) and the Environmental Protection Agency (EPA), provide a natural setting for bringing together environmental health scientists with pediatric healthcare providers, obstetricians/gynecologists, nurses, and other interested healthcare professionals to engage in activities that bridge research and clinical practice, as well as in community engagement and teaching.

With this newly acquired knowledge, scholars will be better equipped to assess and manage pediatric health conditions related to exposures in the mother's and child's environment. Such conditions include those arising from health inequities and the emerging threat of climate change, both of which are priorities of the PEHSUs and present particular challenges for pediatric and reproductive health.

Training and Education

NIEHS seeks to attract the best students and scientists into the field of environmental health sciences and to provide state of the science training to enable the interdisciplinary research necessary to solve complex environmental health problems. This program includes opportunities for laboratory-based training at the undergraduate levels, institutional training grants and individual fellowships at the graduate level, and support for early career investigators at the postgraduate level.

The NIEHS Breast Cancer and the Environment Program, a multidisciplinary consortium of researchers and community partners, continues to yield important insights into effective education and communication methods that can help to save women's lives, including women of color who are often at higher risk of delayed diagnosis, reduced access to care, and poor outcomes of breast cancer. Three recent studies worked to tease apart the complex factors that influence women's understanding of their breast cancer risk, including from environmental exposures, and uptake of related health information.

African-American women are at higher risk of dying from breast cancer than women of other races, in part due to confusion around factors that impact this risk. A community-based participatory research project of researchers and African-American women in the southeastern United States designed and evaluated the use of a visual, culturally sensitive tool inclusive of a range of health literacy levels that women could use to communicate environmental breast cancer risks with friends and family members. Results showed that the tool worked as a conversation starter to allow women to broach the previously undiscussed topic of breast cancer risks and to correct related misperceptions among their closely connected communities. A second study also engaged racially and ethnically diverse women to capture the challeges of cross-culture communication about breast cancer to inform future risk messaging. The researchers teamed with mommy-bloggers (women who write blogs about their experiences as mothers) and their readers to evaluate cross-culture and culture-specific factors that should be considered and challenges mothers encounter when sharing breast cancer information with family and community members. The study identified five practices for ensuring cultural appropriateness of messaging, including: incorporation of diverse images, inclusion of specific environmental and cultural risks, emphasis on the message of "it's a family affair," suggestion that behavioral changes be feasible, and use of less text and more visuals.

Evidence shows that environmental exposures during childhood and puberty can increase a girl's risk of getting breast cancer later in life, so creating awareness among children's health care providers and helping them to talk to patients and parents early is an important prevention strategy. Researchers from four universities worked together to create a set of Continuing Medical Education modules on environmental risks for breast cancer aimed at pediatricians and pediatric nurse practitioners, tested them in a sample of such caregivers, and measured the knowledge gained by individuals in the group and level of intention to act on it. Results showed an increase in understanding of the potential for chemical exposures during puberty to cause

breast cancer, and a strong intention of doctors and nurses to integrate the course's information and communication strategies into well-child visits with patients at this life stage.

Budget Policy: The FY 2023 President's Budget request for Training and Education is $37.3 million, an increase of $0.4 million or 1.2 percent compared with the FY 2022 CR level.

Intramural Research

The NIEHS intramural research program provides an arena for high-caliber science with potential for high-impact breakthroughs. Intramural research studies are often conducted over the long term and among large cohorts, including epidemiological studies of environmentally associated diseases, as well as intervention and prevention studies to reduce the effects of exposures to environmental hazards. NIEHS clinical research studies provide opportunities for clinical and basic scientists to collaborate.

Intramural epidemiological studies at NIEHS include the SELF (Study of Environment, Lifestyle & Fibroids), an ongoing prospective cohort study of 1,693 African-American women designed to identify risk factors for fibroid incidence and growth. A recent high-profile publication from SELF data reported an association between use of an injectable contraceptive (DMPA, or depot medroxyprogesterone acetate) and increased blood lead levels, possibly due to increased bone resorption that mobilizes the lead that may have been previously stored in bone. If these findings are upheld by further study, it will have major implications for public health policy around prevention of lead exposure not only to adult women but to their offspring (in the case of DMPA use by postpartum breastfeeding mothers).

A report from the NIEHS Immunity, Inflammation and Disease Laboratory, in collaboration with extramural colleagues, follows up on previous findings connecting mitochondrial abnormalities with autoimmune diseases such as lupus. Studies in mice have shown that defects in intracellular processes important for clearing cellular waste products may have impacts on immune function. In this report, a specific gene in mice related to this clearance and breakdown process was identified as a major suppressor of autoinflammation due to accumulation of mitochondrial DNA – this gene and its associated protein prevent induction of type I interferon by making sure that mitochondria are appropriately cleared. This clearance process may be playing a fundamental role in immune function.

Another set of researchers from the same laboratory, working on a mouse model of asthma, observed that a nucleotide sugar, UDP-glucose, is released into the airways of allergen-sensitized mice if they are subsequently challenged with same allergen. These researchers showed that in this asthma model, mice lacking a specific receptor for UDP-glucose (called $P2Y_{14}R$) had decreased airway hyperresponsiveness following allergen challenge compared to mice with the receptor. Moreover, a small molecule inhibitor of $P2Y_{14}R$ was able to suppress inflammation in vivo. These findings reveal a pathway that may be targeted to treat asthma exacerbations in some patients who are not good candidates for inhaled or oral glucocorticoid treatment.

Budget Policy: The FY 2023 President's Budget request for Intramural Research is $246.4 million, an increase of $12.1 million or 5.2 percent compared with the FY 2022 CR level.

Research Management and Support

Efforts under Research Management and Support (RMS) include administrative, budgetary, logistical, and scientific support in the reviewing, awarding, and monitoring of research grants and training awards. Other RMS functions include strategic planning, coordination, and evaluation of NIEHS programs; facilities administration and maintenance; regulatory and ethics training and compliance; and liaising with other Federal agencies, Congress, stakeholders, and the general public.

The Program Analysis Branch (PAB) of the NIEHS Division of Extramural Research and Training characterizes the Institute's grant investments to communicate scientific achievements and impacts. These functions provide a vital component of the NIEHS strategy to build evidence for funding-related decisions, as called for under the Stewardship theme of the NIEHS Strategic Plan and the Evidence-Based Policymaking Act of 2018, which calls for advances in federal data and evidence-building activities. In keeping with the NIEHS mission, its grant portfolio includes projects covering a broad range of scientific disciplines, research methods, disease and disorder topics, and populations of interest. PAB staff apply both manual and machine learning approaches to categorizing applications and funded grants, then conduct analyses to inform science planning and strategic prioritization.

Major recent analyses have looked at the Children's Health Exposure Analysis Resource (CHEAR), use of the Time-Sensitive funding mechanism in disasters, and, most notably, tracking of the portfolio against the goals of the NIEHS Strategic Plan. PAB is engaged in the NIH Climate Change and Health Working Group to conduct an analysis of NIH's portfolio to inform the allocation of newly expanded funding for this critical research.

Budget Policy: The FY 2023 President's Budget request for Research Management and Support is $36.7 million, an increase of $5.7 million or 18.2 percent compared with the FY 2022 CR level.

NATIONAL INSTITUTES OF HEALTH
National Institute of Environmental Health Sciences

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2014	$691,348,000		$686,753,000	$665,439,000
Rescission				$0
2015	$665,080,000			$667,502,000
Rescission				$0
2016	$681,782,000	$675,783,000	$695,900,000	$693,702,000
Rescission				$0
2017 [1]	$693,533,000	$710,387,000	$722,301,000	$714,261,000
Rescission				$0
2018	$533,537,000	$725,387,000	$737,727,000	$751,143,000
Rescission				$0
2019	$693,199,000	$760,113,000	$775,115,000	$774,707,000
Rescission				$0
2020	$666,854,000	$812,570,000	$815,729,000	$802,598,000
Rescission				$0
2021	$730,147,000	$809,501,000	$828,733,000	$814,675,000
Rescission				$0
2022	$937,107,000	$941,799,000	$936,271,000	$814,675,000
Rescission				$0
2023	$932,056,000			

[1] Budget Estimate to Congress includes mandatory financing.

Authorizing Legislation

National Institute of Environmental Health Sciences

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2022 Amount Authorized	FY 2022 CR	2023 Amount Authorized	FY 2023 President's Budget
Research and Investigation	Section 301	42§241	Indefinite	$814,675,000	Indefinite	$932,056,000
National Institute of Environmental Health Sciences	Section 401(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				$814,675,000		$932,056,000

NATIONAL INSTITUTES OF HEALTH

National Institute of Environmental Health Sciences

Amounts Available for Obligation [1]

(Dollars in Thousands)

Source of Funding	FY 2021 Final	FY 2022 CR	FY 2023 President's Budget
Appropriation	$814,675	$814,675	$932,056
Secretary's Transfer	-$2,446	$0	$0
Subtotal, adjusted appropriation	$812,229	$814,675	$932,056
OAR HIV/AIDS Transfers	-$7	$0	$0
Subtotal, adjusted budget authority	$812,222	$814,675	$932,056
Unobligated balance, start of year	$0	$0	$0
Unobligated balance, end of year (carryover)	$0	$0	$0
Subtotal, adjusted budget authority	**$812,222**	**$814,675**	**$932,056**
Unobligated balance lapsing	-$189	$0	$0
Total obligations	$812,033	$814,675	$932,056

[1] Excludes the following amounts (in thousands) for reimbursable activities carried out by this account:
FY 2021 - $9,150 FY 2022 - $12,000 FY 2023 - $12,000

Budget Authority by Object Class

NATIONAL INSTITUTES OF HEALTH
National Institute of Environmental Health Sciences

Budget Authority by Object Class[1]
(Dollars in Thousands)

		FY 2022 CR	FY 2023 President's Budget	FY 2023 +/- FY 2022
Total compensable workyears:				
	Full-time equivalent	672	685	13
	Full-time equivalent of overtime and holiday hours	1	1	0
	Average ES salary	$202	$210	$8
	Average GM/GS grade	12.0	12.0	0.0
	Average GM/GS salary	$106	$111	$4
	Average salary, Commissioned Corps (42 U.S.C. 207)	$102	$106	$4
	Average salary of ungraded positions	$160	$166	$7
	OBJECT CLASSES	**FY 2022 CR**	**FY 2023 President's Budget**	**FY 2023 +/- FY 2022**
	Personnel Compensation			
11.1	Full-Time Permanent	$49,454	$52,732	$3,278
11.3	Other Than Full-Time Permanent	$25,679	$26,640	$961
11.5	Other Personnel Compensation	$1,974	$2,048	$74
11.7	Military Personnel	$548	$569	$21
11.8	Special Personnel Services Payments	$9,590	$9,949	$359
11.9	**Subtotal Personnel Compensation**	**$87,245**	**$91,938**	**$4,692**
12.1	Civilian Personnel Benefits	$29,561	$31,057	$1,496
12.2	Military Personnel Benefits	$264	$274	$10
13.0	Benefits to Former Personnel	$0	$0	$0
	Subtotal Pay Costs	**$117,071**	**$123,269**	**$6,198**
21.0	Travel & Transportation of Persons	$33	$38	$5
22.0	Transportation of Things	$400	$434	$34
23.1	Rental Payments to GSA	$0	$0	$0
23.2	Rental Payments to Others	$3	$3	$0
23.3	Communications, Utilities & Misc. Charges	$409	$418	$9
24.0	Printing & Reproduction	$27	$28	$1
25.1	Consulting Services	$41,887	$43,249	$1,362
25.2	Other Services	$32,525	$37,644	$5,119
25.3	Purchase of Goods and Services from Government Accounts	$86,986	$87,485	$499
25.4	Operation & Maintenance of Facilities	$9,075	$9,075	$0
25.5	R&D Contracts	$112,467	$114,942	$2,474
25.6	Medical Care	$872	$906	$34
25.7	Operation & Maintenance of Equipment	$8,237	$9,639	$1,402
25.8	Subsistence & Support of Persons	$4	$4	$0
25.0	**Subtotal Other Contractual Services**	**$292,052**	**$302,943**	**$10,891**
26.0	Supplies & Materials	$11,924	$12,186	$262
31.0	Equipment	$8,419	$9,563	$1,144
32.0	Land and Structures	$324	$331	$7
33.0	Investments & Loans	$0	$0	$0
41.0	Grants, Subsidies & Contributions	$384,012	$482,843	$98,831
42.0	Insurance Claims & Indemnities	$0	$0	$0
43.0	Interest & Dividends	$1	$1	$0
44.0	Refunds	$0	$0	$0
	Subtotal Non-Pay Costs	**$697,604**	**$808,787**	**$111,183**
	Total Budget Authority by Object Class	**$814,675**	**$932,056**	**$117,381**

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

NATIONAL INSTITUTES OF HEALTH
National Institute of Environmental Health Sciences

Salaries and Expenses
(Dollars in Thousands)

Object Classes	FY 2022 CR	FY 2023 President's Budget	FY 2023 +/- FY 2022
Personnel Compensation			
Full-Time Permanent (11.1)	$49,454	$52,732	$3,278
Other Than Full-Time Permanent (11.3)	$25,679	$26,640	$961
Other Personnel Compensation (11.5)	$1,974	$2,048	$74
Military Personnel (11.7)	$548	$569	$21
Special Personnel Services Payments (11.8)	$9,590	$9,949	$359
Subtotal, Personnel Compensation (11.9)	**$87,245**	**$91,938**	**$4,692**
Civilian Personnel Benefits (12.1)	$29,561	$31,057	$1,496
Military Personnel Benefits (12.2)	$264	$274	$10
Benefits to Former Personnel (13.0)	$0	$0	$0
Subtotal Pay Costs	**$117,071**	**$123,269**	**$6,198**
Travel & Transportation of Persons (21.0)	$33	$38	$5
Transportation of Things (22.0)	$400	$434	$34
Rental Payments to Others (23.2)	$3	$3	$0
Communications, Utilities & Misc. Charges (23.3)	$409	$418	$9
Printing & Reproduction (24.0)	$27	$28	$1
Other Contractual Services			
Consultant Services (25.1)	$41,887	$43,249	$1,362
Other Services (25.2)	$32,525	$37,644	$5,119
Purchase of Goods and Services from Government Accounts (25.3)	$53,285	$54,541	$1,255
Operation & Maintenance of Facilities (25.4)	$9,075	$9,075	$0
Operation & Maintenance of Equipment (25.7)	$8,237	$9,639	$1,402
Subsistence & Support of Persons (25.8)	$4	$4	$0
Subtotal Other Contractual Services	**$145,013**	**$154,151**	**$9,138**
Supplies & Materials (26.0)	$11,924	$12,186	$262
Subtotal Non-Pay Costs	**$157,809**	**$167,258**	**$9,449**
Total Administrative Costs	**$274,880**	**$290,527**	**$15,647**

Detail of Full-Time Equivalent Employment (FTE)

NATIONAL INSTITUTES OF HEALTH
National Institute of Environmental Health Sciences

Detail of Full-Time Equivalent Employment (FTE)

Office	FY 2021 Final			FY 2022 CR			FY 2023 President's Budget		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Division of Intramural Research									
Direct:	314	1	315	313	1	314	315	1	316
Reimbursable:	2	-	2	2	-	2	2	-	2
Total:	316	1	317	315	1	316	317	1	318
Office of the Director									
Direct:	63	1	64	80	1	81	84	1	85
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	63	1	64	80	1	81	84	1	85
Division of National Toxicology Program									
Direct:	107	1	108	106	1	107	107	1	108
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	107	1	108	106	1	107	107	1	108
Division of Extramural Research									
Direct:	74	-	74	84	-	84	89	-	89
Reimbursable:	2	-	2	2	-	2	2	-	2
Total:	76	-	76	86	-	86	91	-	91
Office of Management									
Direct:	76	1	77	80	2	82	81	2	83
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	76	1	77	80	2	82	81	2	83
Total	638	4	642	667	5	672	680	5	685
Includes FTEs whose payroll obligations are supported by the NIH Common Fund.									
FTEs supported by funds from Cooperative Research and Development Agreements.	0	0	0	0	0	0	0	0	0

FISCAL YEAR	Average GS Grade
2019	12.0
2020	12.1
2021	12.0
2022	12.0
2023	12.0

Detail of Positions

NATIONAL INSTITUTES OF HEALTH
National Institute of Environmental Health Sciences

Detail of Positions[1]

GRADE	FY 2021 Final	FY 2022 CR	FY 2023 President's Budget
Total, ES Positions	0	1	1
Total, ES Salary	$0	$201,798	$210,122
General Schedule			
GM/GS-15	39	41	42
GM/GS-14	65	68	69
GM/GS-13	125	131	134
GS-12	122	128	130
GS-11	72	75	77
GS-10	0	0	0
GS-9	37	39	40
GS-8	8	8	8
GS-7	15	16	16
GS-6	0	0	0
GS-5	0	0	0
GS-4	0	0	0
GS-3	0	0	0
GS-2	0	0	0
GS-1	0	0	0
Subtotal	483	506	516
Commissioned Corps (42 U.S.C. 207)			
Assistant Surgeon General	0	0	0
Director Grade	0	1	1
Senior Grade	2	2	2
Full Grade	1	2	2
Senior Assistant Grade	0	0	0
Assistant Grade	0	0	0
Subtotal	3	5	5
Ungraded	174	182	185
Total permanent positions	485	508	518
Total positions, end of year	660	694	707
Total full-time equivalent (FTE) employment, end of year	642	672	685
Average ES salary	$0	$201,798	$210,122
Average GM/GS grade	12.0	12.0	12.0
Average GM/GS salary	$104,101	$106,475	$110,867

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.