DEPARTMENT OF HEALTH AND HUMAN SERVICES

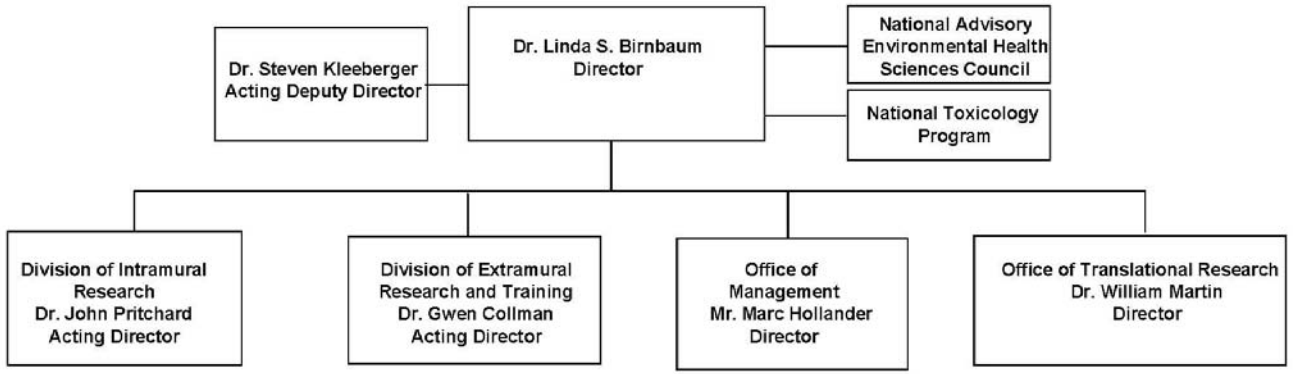
NATIONAL INSTITUTES OF HEALTH

National Institute of Environmental Health Sciences (NIEHS)

NATIONAL INSTITUTES OF HEALTH

National Institute of Environmental Health Sciences

Organization Structure



## NATIONAL INSTITUTES OF HEALTH

National Institute of Environmental Health Sciences

For carrying out section 301 and 311 and title IV of the Public Health Services Act with respect to environmental health sciences [$662,820,000] *$684,257,000* (Department of Health and Human Services Appropriation Act, 2009).

**National Institutes of Health**
**National Institute of Environmental Health Sciences**

**Amounts Available for Obligation 1/**

| Source of Funding | FY 2008 Actual | FY 2009 Estimate | FY 2010 PB |
|---|---|---|---|
| Appropriation | $653,673,000 | $662,820,000 | $684,257,000 |
| Rescission | -11,420,000 | --- | --- |
| Supplemental | 3,416,000 | --- | --- |
| Subtotal, adjusted appropriation | 645,669,000 | 662,820,000 | 684,257,000 |
| Real transfer under Director's one-percent transfer authority (GEI) | 5,941,000 | --- | --- |
| Comparative transfer under Director's one-percent transfer authority (GEI) | -5,941,000 | --- | --- |
| Subtotal, adjusted budget authority | 645,669,000 | 662,820,000 | 684,257,000 |
| Subtotal, adjusted budget authority | 645,669,000 | 662,820,000 | 684,257,000 |
| Unobligated balance lapsing | -53,000 | --- | --- |
| Total obligations | 645,616,000 | 662,820,000 | 684,257,000 |

1/ Excludes the following amounts for reimbursable activities carried out by this account:
FY 2008 - $1,439,000 FY 2009 - $1,439,000 FY 2010 - $1,439,000
Excludes $238,117 in FY 2009 and $187,499 in FY 2010 for royalties.

**NATIONAL INSTITUTES OF HEALTH**

**National Institute of Environmental Health Sciences**

(Dollars in Thousands)

Budget Mechanism - Total

| MECHANISM | FY 2008 Actual | | FY 2009 Estimate | | FY 2010 PB | | Change | |
|---|---|---|---|---|---|---|---|---|
| Research Grants: | No. | Amount | No. | Amount | No. | Amount | No. | Amount |
| Research Projects: | | | | | | | | |
| Noncompeting | 412 | $172,174 | 423 | $187,641 | 414 | $184,302 | (9) | ($3,339) |
| Administrative supplements | (40) | 3,018 | (13) | 1,000 | (13) | 1,000 | 0 | 0 |
| Competing: | | | | | | | | |
| Renewal | 26 | 13,471 | 28 | 11,209 | 40 | 16,180 | 12 | 4,971 |
| New | 99 | 35,173 | 81 | 32,697 | 114 | 47,196 | 33 | 14,499 |
| Supplements | 2 | 802 | 2 | 667 | 3 | 963 | 1 | 296 |
| Subtotal, competing | 127 | 49,446 | 111 | 44,573 | 157 | 64,339 | 46 | 19,766 |
| Subtotal, RPGs | 539 | 224,638 | 534 | 233,214 | 571 | 249,641 | 37 | 16,427 |
| SBIR/STTR | 41 | 11,265 | 39 | 11,200 | 40 | 11,700 | 1 | 500 |
| Subtotal, RPGs | 580 | 235,903 | 573 | 244,414 | 611 | 261,341 | 38 | 16,927 |
| Research Centers: | | | | | | | | |
| Specialized/comprehensive | 29 | 37,863 | 24 | 39,075 | 26 | 39,075 | 2 | 0 |
| 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 |
| Subtotal, Centers | 29 | 37,863 | 24 | 39,075 | 26 | 39,075 | 2 | 0 |
| Other Research: | | | | | | | | |
| Research careers | 49 | 6,427 | 44 | 6,335 | 44 | 6,430 | 0 | 95 |
| 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 | 3 | 2,431 | 3 | 2,143 | 2 | 1,231 | (1) | (912) |
| Other | 35 | 3,313 | 22 | 1,935 | 23 | 1,964 | 1 | 29 |
| Subtotal, Other Research | 87 | 12,171 | 69 | 10,413 | 69 | 9,625 | 0 | (788) |
| Total Research Grants | 696 | 285,937 | 666 | 293,902 | 706 | 310,041 | 40 | 16,139 |
| Research Training: | FTTPs | | FTTPs | | FTTPs | | | |
| Individual awards | 56 | 2,197 | 54 | 2,105 | 48 | 2,105 | (6) | 0 |
| Institutional awards | 419 | 16,665 | 422 | 16,757 | 430 | 16,757 | 8 | 0 |
| Total, Training | 475 | 18,862 | 476 | 18,862 | 478 | 18,862 | 2 | 0 |
| Research & development contracts | 91 | 149,515 | 94 | 154,299 | 96 | 156,613 | 2 | 2,314 |
| (SBIR/STTR) | (6) | (1,366) | (6) | (1,366) | (6) | (1,366) | 0 | 0 |
| | FTEs | | FTEs | | FTEs | | FTEs | |
| Intramural research | 545 | 172,468 | 539 | 176,435 | 551 | 179,082 | 12 | 2,647 |
| Research management and support | 99 | 18,887 | 99 | 19,322 | 100 | 19,659 | 1 | 337 |
| Construction | | 0 | | 0 | | 0 | | 0 |
| Buildings and Facilities | | 0 | | 0 | | 0 | | 0 |
| Total, NIEHS | 644 | 645,669 | 638 | 662,820 | 651 | 684,257 | 13 | 21,437 |

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research

**NATIONAL INSTITUTES OF HEALTH**
**National Institute of Environmental Health Sciences**
**BA by Program**
(Dollars in thousands)

| | FY 2006 Actual | | FY 2007 Actual | | FY 2008 Actual | | FY 2008 Comparable | | FY 2009 Estimate | | FY 2010 PB | | Change | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Extramural Research** | FTEs | Amount | FTEs | Amount | FTEs | Amount | FTEs | Amount | FTEs | Amount | FTEs | Amount | FTEs | Amount |
| Detail: | | | | | | | | | | | | | | |
| Linkage of Exposure to Clinical Expressions of Disease | | $43,106 | | $60,281 | | $64,699 | | $64,699 | | $60,295 | | $61,477 | | $1,182 |
| Basic Mechanisms in Human Biology | | 249,888 | | 253,446 | | 253,009 | | 253,009 | | 253,919 | | 258,955 | | 5,036 |
| Interdisciplinary, Integrated Research | | 60,490 | | 58,728 | | 62,007 | | 62,007 | | 63,295 | | 64,683 | | 1,388 |
| Community-Linked & Global Environmental Health Research | | 45,105 | | 31,808 | | 32,747 | | 32,747 | | 37,330 | | 38,134 | | 804 |
| Exposure Biology/Exposure Measurement | | 20,356 | | 29,096 | | 16,176 | | 10,523 | | 20,044 | | 29,473 | | 9,429 |
| Pathways for Future Environmental Health Scientists | | 27,714 | | 29,492 | | 31,329 | | 31,329 | | 32,180 | | 32,794 | | 614 |
| **Subtotal, Extramural** | | 446,659 | | 462,851 | | 459,967 | | 454,314 | | 467,063 | | 485,516 | | 18,453 |
| **Intramural research** | 571 | 167,084 | 558 | 167,002 | 545 | 172,454 | 545 | 172,468 | 539 | 176,435 | 551 | 179,082 | 12 | 2,647 |
| **Res. management & support** | 93 | 16,739 | 98 | 17,389 | 99 | 19,136 | 99 | 18,887 | 99 | 19,322 | 100 | 19,659 | 1 | 337 |
| **TOTAL** | 664 | 630,482 | 656 | 647,242 | 644 | 651,557 | 644 | 645,669 | 638 | 662,820 | 651 | 684,257 | 13 | 21,437 |

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research

## Major Changes in the Fiscal Year 2010 Budget Request

Major changes by budget mechanism and/or budget program detail are briefly described below. Note that there may be overlap between budget mechanism and activity detail and these highlights will not sum to the total change for the FY 2010 budget request for NIEHS, which is $21.437 million more than the FY 2009 Omnibus level, for a total of $684.257 million.

Research Project Grants (RPGs) (+$16.927 million; total $261.341 million): NIEHS will support a total of 611 RPG awards in FY 2010. Noncompeting RPGs will decrease by 9 awards and $3.339 million. Competing RPGs will increase by 46 awards and $19.766 million. The NIH Budget policy for RPGs in FY 2010 is 2 percent inflationary increases for noncompeting awards and 2 percent increases in average cost for competing RPGs. NIEHS will continue to support new investigators in FY 2010.

Basic Mechanisms in Human Biology (+$5.036 million; total $258.955 million): Additional funds in this area will be used to provide state-of-the-art scientific tools to help define the mechanisms that cells, tissues and organisms use to respond to physiological and environmental stimuli. This work includes studies of receptor action and signal transduction; epigenetic effects and control of gene expression; pathways of oxidative stress and immune function; cellular machinery for cell cycle control; DNA mutagenesis and repair and many others.

Exposure Biology/Exposure Measurement (+$9.429 million; total $29.473 million): The additional funds will be used to support expanded nanotechnology-related research efforts aimed at improving the understanding of potential human health and safety impacts of nano-enabled products.

Intramural research (+$2.647 million; total $179.082 million): The additional funds will be used for scientific recruitments to broaden the intramural research scientific base with expertise consistent with the NIEHS strategic plan. Funds will also be used for expenses associated with the pay increase and for laboratory supplies, materials and other expenses.

**NATIONAL INSTITUTES OF HEALTH**
**National Institute of Environmental Health Sciences**
**Summary of Changes**

| | | | | |
|---|---|---|---|---|
| FY 2009 estimate | | | | $662,820,000 |
| FY 2010 estimated budget authority | | | | 684,257,000 |
| Net change | | | | 21,437,000 |
| | 2009 Current Estimate Base | | Change from Base | |
| CHANGES | FTEs | Budget Authority | FTEs | Budget Authority |
| A. Built-in: | | | | |
| 1. Intramural research: | | | | |
| a. Annualization of January 2009 pay increase | | $74,869,000 | | $895,000 |
| b. January FY 2010 pay increase | | 74,869,000 | | 1,123,000 |
| c. Zero less days of pay | | 74,869,000 | | 0 |
| d. Payment for centrally furnished services | | 22,514,000 | | 450,000 |
| e. Increased cost of laboratory supplies, materials, and other expenses | | 79,052,000 | | 1,375,000 |
| Subtotal | | | | 3,843,000 |
| 2. Research management and support: | | | | |
| a. Annualization of January 2009 pay increase | | $12,232,000 | | $146,000 |
| b. January FY 2010 pay increase | | 12,232,000 | | 183,000 |
| c. Zero less days of pay | | 12,232,000 | | 0 |
| d. Payment for centrally furnished services | | 2,806,000 | | 56,000 |
| e. Increased cost of laboratory supplies, materials, and other expenses | | 4,284,000 | | 73,000 |
| Subtotal | | | | 458,000 |
| Subtotal, Built-in | | | | 4,301,000 |

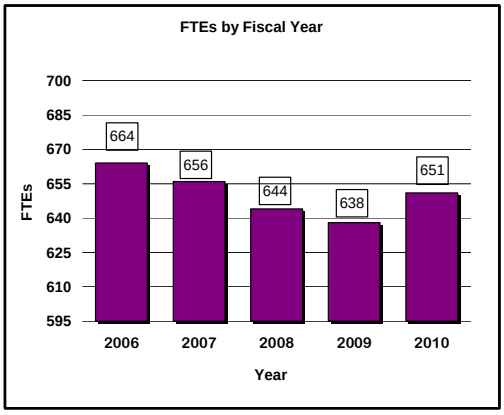
**NATIONAL INSTITUTES OF HEALTH**
**National Institute of Environmental Health Sciences**

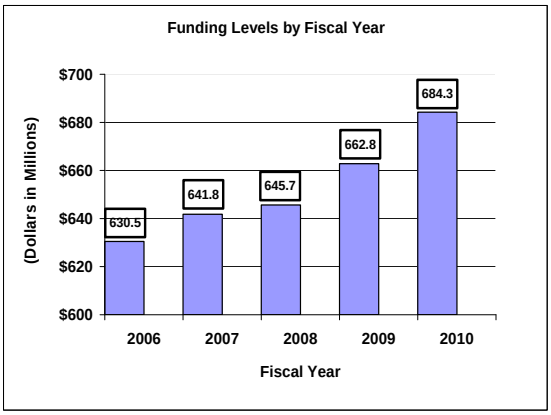
**Summary of Changes--continued**

| CHANGES | 2009 Current Estimate Base | | Change from Base | |
|---|---|---|---|---|
| | No. | Amount | No. | Amount |
| B. Program: | | | | |
| 1. Research project grants: | | | | |
| a. Noncompeting | 423 | $188,641,000 | (9) | ($3,339,000) |
| b. Competing | 111 | 44,573,000 | 46 | 19,766,000 |
| c. SBIR/STTR | 39 | 11,200,000 | 1 | 500,000 |
| Total | 573 | 244,414,000 | 38 | 16,927,000 |
| 2. Research centers | 24 | 39,075,000 | 2 | 0 |
| 3. Other research | 69 | 10,413,000 | 0 | (788,000) |
| 4. Research training | 476 | 18,862,000 | 2 | 0 |
| 5. Research and development contracts | 94 | 154,299,000 | 2 | 2,314,000 |
| Subtotal, extramural | | | | 18,453,000 |
| | FTEs | | FTEs | |
| 6. Intramural research | 539 | 176,435,000 | 12 | (1,196,000) |
| 7. Research management and support | 99 | 19,322,000 | 1 | (121,000) |
| 8. Construction | | 0 | | 0 |
| 9. Buildings and Facilities | | 0 | | 0 |
| Subtotal, program | | 662,820,000 | | 17,136,000 |
| Total changes | 638 | | 13 | 21,437,000 |

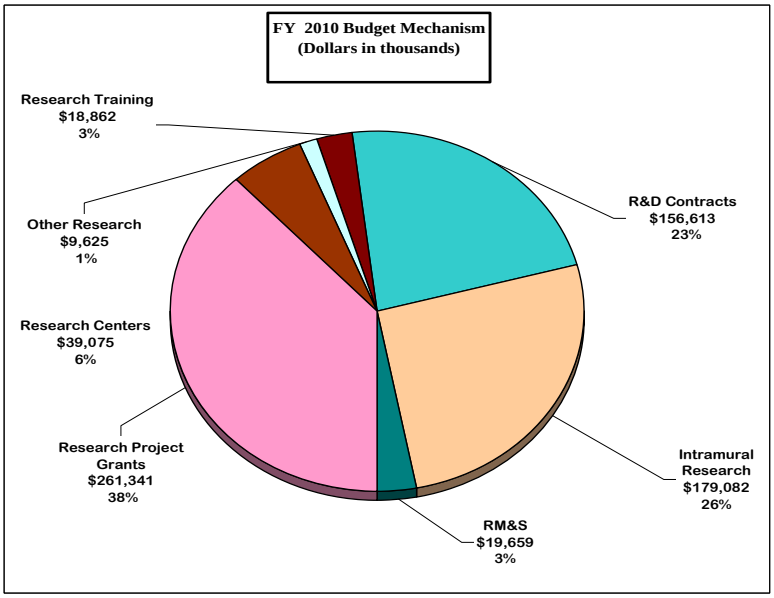
# FY 2009 Budget Graphs

## History of Budget Authority and FTEs:

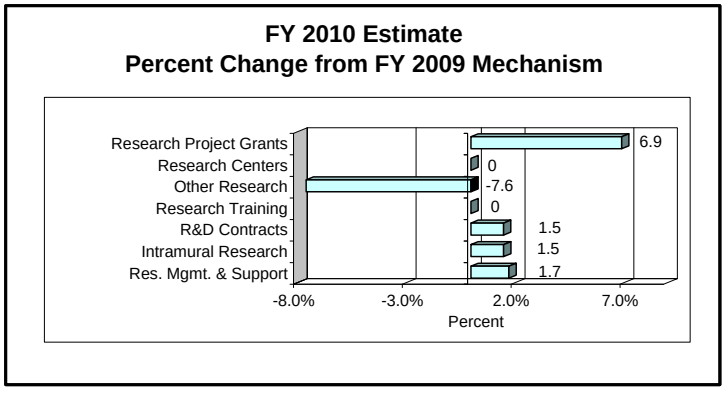



## Distribution by Mechanism:




## Change by Selected Mechanism:



## 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:

| | FY 2008 Appropriation | FY 2009 Omnibus | FY 2009 Recovery Act | FY 2010 President's Budget | FY 2010 +/- 2009 Omnibus |
|---|---|---|---|---|---|
| BA | $645,669,000 | $662,820,000 | $168,057,000 | $684,257,000 | $21,437,000 |
| FTE | 644 | 638 | 0 | 651 | 13 |

This document provides justification for the Fiscal Year (FY) 2010 activities of the National Institute of Environmental Health Sciences (NIEHS), including HIV/AIDS activities. Details of the FY 2010 HIV/AIDS activities are in the "Office of AIDS Research (OAR) Section of the Overview. Details on the Common Fund are located in the Overview, Volume One. Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

In FY 2009, a total of $168,057,000 American Recovery and Reinvestment Act (ARRA) funds were transferred from the Office of the Director. These funds will be used to support scientific research opportunities that help support the goals of the ARRA. The ARRA allows NIH to execute these funds via any NIH funding mechanism. Funds are available until September 30, 2010. These funds are not included in the FY 2009 Omnibus amounts reflected in this document.

### DIRECTOR'S OVERVIEW

Increasing the impact of environmental health research is the goal that drives NIEHS to fulfill its mission to prevent human disease and improve human health. No other entity is as well positioned as NIEHS to produce high quality information designed to inform regulatory and public health decisions – decisions that are reflected in prudent, well-considered regulatory and public health measures that reduce the expense of preventable environmental illnesses and result in the reduction of the pain and suffering caused by environment-related diseases.

For NIEHS, "high quality" information refers to outstanding science that increases the knowledge required to make sound decisions about human health, while inspiring further scientific discovery. High quality information provides an integrated perspective utilizing many, or all, of the scientific disciplines applicable to a human health question

and can be understood by all public health stakeholders – the scientific community, policy makers, health providers and the general community. High quality information also yields high quality decisions that lead to efficacious policy and practice, prevent unnecessary or unnecessarily expensive regulation and indicate clear, understandable choices for protecting human health.

NIEHS research has identified human health risks from a variety of substances in the environment. For example, NIEHS-supported research led to the identification and understanding of polyhalogenated hydrocarbons (PHHCs), a class of common environmental pollutants which were once widely distributed in the industrialized world. However, while they have been banned for most uses for many years, both the compounds and the effects can still be detected in our current environment. Perhaps the most omnipresent PHHCs are polychlorinated biphenyls (PCBs), which were used in vast quantities as a coolant in electrical transformers. The transport of this compound across land, rivers and oceans, along with careless disposal in cities and waterways, has made it almost ubiquitous in all living creatures, including humans. Research on PHHCs through NIEHS grants and within the NIEHS intramural program defined the serious health threat presented by these compounds and made prompt regulation, public health action and legislation possible to remediate many of these health hazards and prevent exposure and disease.

Another example of an environmental pollutant hazardous to humans is ozone at the Earth's surface, created by combustion in the engines of vehicles and in the generation of electricity. Ozone has been identified as a public health hazard, better understood, and to some degree controlled, through knowledge gained by NIEHS-funded researchers. NIEHS studies have shown that young, talented athletes could barely breathe beyond gasping when exposed to ozone in exposure booth experiments. The knowledge gained through this type of research resulted in public policy responses such as the current system of ozone warnings and air quality standards under the Clean Air Act. These measures protect millions of vulnerable people from this unseen but powerful pollutant.

NIEHS intramural researchers are also studying Bisphenol A (BPA) to determine its level of risk to public health. BPA is produced in large quantities for mass use in the production of polycarbonate plastics and epoxy resins. BPA is found in a variety of consumer goods, such as clear plastic baby bottles, water bottles and the inside layers of cans containing food and beverages. The National Toxicology Program Center for the Evaluation of Risks to Human Reproduction (NTP-CERHR) at NIEHS conducted an evaluation of the current research on the health effects of BPA. In its Monograph on BPA, NTP-CERHR noted "some concern" for effects on the brain, behavior and prostate gland in fetuses, infants and children at current human levels of exposure, indicating the need for follow-up and additional research. The report findings were in general agreement with an earlier panel of outside experts convened by NIEHS' Division of Extramural Research and Training. These findings will guide consumer lifestyle choices, state and federal agencies' regulatory decisions and future research on the effects of BPA on human health.

NIEHS is poised to respond to recently released reports from the Institute of Medicine, the Intergovernmental Panel on Climate Change, and the U.S. Climate Change Science Program that outline many changes that are likely to occur in our climate, weather, ecosystems, water supply and other aspects of our physical environment as a result of global warming. Examples of issues that can be addressed by NIEHS research are health effects of changes in air, soil and water quality, and distribution of toxicants; effects of new mixtures of pollutants formed by changing temperatures and humidity as well as unanticipated effects of mitigation strategies such as increased use of biofuels; and climate driven changes in allergic diseases.

NIEHS is committed to pursuing research in areas where the environment is likely to have a significant impact on human health, such as cancer and autism. New investments will identify biological markers and technologies for biosensor capability to measure exposure to environmental agents that cause cancer. NIEHS, in collaboration with the National Cancer Institute (NCI), will implement the Breast Cancer and Environmental Research Act, opening new opportunities for research contributions as a result. NIEHS will also enhance its support for cellular and molecular studies using in vitro methods and nonhuman models to understand how environmental exposures might impact the biologic pathways and processes that are implicated in autism.

These examples of NIEHS research impact stand in for a much longer list of similar success stories, including investigations into the effects of lead exposure and lowering the acceptable standard of blood lead levels in children; asbestos, a widely used flame retardant material; and phenolphthalein, a long-time ingredient in over-the-counter laxatives which was voluntarily removed by producers as a result of publication of NIEHS/NTP data. NIEHS will be working with outside scientists and stakeholders to identify gaps in our current knowledge and design the research agenda we need in order to overcome them.

## JUSTIFICATION OF THE FY 2010 BUDGET BY ACTIVITY DETAIL

### Overall Budget Policy

NIEHS will continue to support new investigators and to maintain an adequate number of competing RPGs. NIEHS is providing a 2 percent inflationary increase for non-competing grants and a 2 percent increase in the average cost for competing grants. In addition, NIEHS has targeted a portion of the funds available for competing research project grants to support high priority projects outside of the payline, including awards to new investigators and early stage investigators. The Institute also seeks to maintain a balance between solicitations issued to the extramural community in areas that need stimulation and funding made available to support investigator-initiated projects. Intramural Research and Research Management and Support receive modest increases to help offset the cost of pay and other increases.

### Program Descriptions and Accomplishments

**Linkage of Exposures to Clinical Expression of Disease**: This program encourages partnerships between clinical investigators and environmental health science

researchers to increase our understanding of environmental causes of common, complex diseases. Clinical insight into the environmental underpinnings of degenerative diseases, cardiovascular diseases, reproductive disorders, breast cancer and lung diseases can be incorporated into new and/or revised clinical guidelines and prevention strategies for those most at risk for environmentally-induced disease. A recent NIEHS-sponsored study revealed links between traffic and non-traffic sources of air pollution and clinical-based biomarkers of heart function. Evidence of heart function changes were found in Boston-area coronary artery disease patients, suggesting that air pollution exposures may pose a risk in the early weeks of post-heart attack recovery.

Budget Policy: The FY 2010 budget estimate for this program is $61.477 million, an increase of $1.182 million, or 2.0 percent over the FY 2009 estimate. Resources will be used to continue activities critical to the long-term success of the program, such as identifying windows of susceptibility to breast cancer development from the prenatal period to adulthood and continuation of the Sister Study, which studies sisters of women diagnosed with breast cancer to target environmental and genetic causes of this disease. In addition, NIEHS will continue funding a cohort study of 6,000 children from 12 communities in Southern California, examining genetics, air pollution, and children's respiratory health, with a goal of identifying environmental and host factors, and examining the genetic variation in oxidative stress pathways that modulate response to air pollution.

**Basic Mechanisms in Human Biology:** This program employs environmental toxicants as laboratory probes to study the complex molecular pathways that lead to chronic disease. Environmental toxicants can interrupt normal biological processes and initiate events leading to disease. This program helps to identify methods to diagnose these diseases before they are clinically evident and develop early interventions to prevent progression to end-stage disease. A recent NIEHS-sponsored study found that the offspring of pregnant rats exposed to vinclozolin, a fungicide, or methoxychor, a pesticide, reduced sperm counts and infertility in adulthood, an effect spanning four generations. These effects represent examples of how environmental determinants of our health are at work even during past generations, and these findings suggest the need for further research on epigenetic mechanisms underlying disease.

Budget Policy: The FY 2010 budget estimate for this program is $258.955 million, an increase of $5.036 million, or 2.0 percent over the FY 2009 estimate. Resources will be directed towards continuing NIEHS' investment in areas of research that provide the critical understanding necessary for advances in public health and clinical practice. For example, NIEHS plans to augment the Phase II Roadmap program in Epigenomics to support research that focuses on how these processes, which we are only beginning to understand, play a role in mediating the links between environmental exposure and human health and disease. NIEHS will also be enhancing its support for cellular and molecular studies using in vitro methods and nonhuman models to understand how environmental exposures might impact the biologic pathways and processes that are implicated in autism.

**Interdisciplinary, Integrative Research:** This program's purpose is to coordinate and integrate scientific contributions from all levels of investigators in diverse scientific fields,

such as epidemiology, toxicology, molecular and cellular biology, bioinformatics and clinical medicine. Fostering such broad-based, collaborative research increases the relevance of basic scientific discoveries in environmental health sciences to human disease with a more rapid and effective translation into clinical and public health applications, ultimately improving human health. Interdisciplinary approaches are critical for understanding environmental contributions to diseases such as cancer. For example, a pilot study conducted by the NIEHS/NCI-sponsored Breast Cancer and the Environment Research Centers determined baseline levels for chemical contaminants in blood and urine samples and found detectable levels of endocrine disrupting chemicals, including high levels of enterolactone, a phytoestrogen, among all girls in the study cohort. As a result, new animal studies were started to explore the effect of this dietary component on hormone receptor activity. In addition, NIEHS-sponsored researchers examining the relationship between clinical data on breast development and exposures to phthlates, a plasticizer commonly used in toys and consumer products, determined that girls who have high body mass index (a measure of obesity) and high levels of phthalates may have the highest risk of earlier breast development, which has been associated with a higher risk of breast cancer later in life. Additional funding will be allocated to this program in FY 2010 to support more robust coordination and management of data across the Centers.

Budget Policy: The FY 2010 budget estimate for this program is $64.683 million, an increase of $1.388 million, or 2.2 percent over the FY 2009 estimate. Resources will be directed towards ongoing high priority projects that foster collaborations across teams of scientists with complementary skills and areas of expertise. This would include support for the Centers for Children's Environmental Health and Disease Prevention Research and grants awarded under an RFA, *Centers for Neurodegeneration Science* that NIEHS is funding in conjunction with the National Institute of Aging. NIEHS will continue to design and implement new models that integrate clinical, epidemiological, and toxicological research with basic mechanistic studies to address disease cause, development, susceptibility and progression.

**Portrait of a Program: Children's Environmental Health and Disease Prevention Research Centers (CEHCs)**

| | |
|---|---|
| FY 2009 Level | $7.000 million |
| FY 2010 Level | $7.000 million |
| Change | $0.000 million |

This program, jointly funded by NIEHS and the Environmental Protection Agency, has been examining the interaction between environmental exposures and child health outcomes for 10 years. Support will continue to (1) identify the influences of environmental exposures on normal physiological function of organs and systems of the fetus/child during gestation and/or early childhood; (2) determine the mechanisms of vulnerability to environmental stressors of the developing fetus and young child at all stages of early development; and (3) understand the impact of the complex environment on children's health, including chemicals, diet and nutrition, physical activity and psychosocial factors, from birth through young adulthood.

In FY 2009, grant applications will be solicited for "Children's Environmental Health and Disease Prevention Research Centers: Formative Centers," to foster and stimulate new research ideas in children's environmental health in the early phase of scientific inquiry. This will allow development of new research teams, connections with communities and other stakeholders, and development of preliminary data on childhood diseases and disorders where the evidence of an environmental contribution has yet to be fully established In FY2010, an initiative will be released for Centers similar to those that have been funded in the past.

**Community-linked and Global Environmental Health Research:** This program seeks to better understand how differences in the environment contribute to the excess burden of disease in minority and disadvantaged communities, creating health disparities in the U.S. and around the world. This program explores evidence that low socioeconomic groups and minorities are disproportionately exposed to hazardous substances such as metals, pesticides, wood dusts, and air pollutants, which can lead to shorter life expectancies, higher cancer rates, more birth defects, greater infant mortality, and higher incidences of asthma, diabetes, and cardiovascular disease. In Richmond, California and Cape Cod, Massachusetts an ongoing NIEHS-supported study comparing exposures to chemicals in communities that differ by socioeconomic status in distinct geographic regions is being conducted. Richmond has a disproportionate number of industrial plants, oil refineries, and densely traveled highways and rail lines. Polybrominated diphenyl ethers (PBDEs), chemicals used as flame retardants) were found in extremely high levels in the Richmond dust samples. This finding has drawn renewed attention to the use of PBDEs in furniture foam as a measure for fire safety. Cape Cod lacks heavy industrial sites, but has Superfund sites associated with past active military instillations. Higher than expected PCB levels were found in Cape Cod, although PCBs have been banned for over 30 years. It is apparent that PCBs applied in the past may still be causing effects.

Budget Policy: The FY 2010 budget estimate for this program is $38.134 million, an increase of $.804 million, or 2.2 percent over the FY 2009 estimate. Resources will be directed towards high priority research, outreach and education activities designed to prevent, reduce or eliminate environmental exposures that may lead to adverse health outcomes, such as the "Partnerships for Environmental Public Health" program.

**Portrait of a Program: Partnerships in Environmental Public Health (PEHP)**

| | |
|---|---|
| FY 2009 Level | $2.000 million |
| FY 2010 Level | $4.000 million |
| Change | $2.000 million |

This new program will provide a unified structure to coordinate and support a variety of activities, including research, communication and dissemination, training and education, coordination and evaluation.

A FY 2010 initiative will develop strategies to disseminate and communicate science-based environmental health information and resources to environmental public health and clinical practice communities. This initiative will address how information about

health promotion is created, packaged, transmitted, and interpreted among a variety of important stakeholder groups. Teams with diverse expertise, including scientists, communication specialists, social scientists, community organizations, and/or health care professionals, will develop and test dissemination and communication strategies that are appropriate for reaching a variety of populations, target sites (e.g. rural, urban, school, community, national, state, tribal, clinic), and cultures.

NIEHS will develop an Environmental Public Health Resource Center clearinghouse to collect, organize, synthesize, evaluate, and disseminate environmental public health and science materials developed by NIEHS-funded grantees. This will foster interaction among grantees to facilitate learning from each other, raise the general public's awareness of environmental public health issues, and provide science-based information to address concerns and questions.

**Exposure Biology/Exposure Measurement:** This program seeks to develop improved methods to detect and measure environmental exposures sustained by humans or other organisms. NIEHS-sponsored researchers are developing a handheld device with a wireless connection to a cell phone that can measure multiple toxic chemicals in the air, which will permit researchers to link these data to biological markers of exposure and effect. A prototype of this device has been used to detect toxic hydrocarbons in real-time and in a real-world setting. Other NIEHS-sponsored investigators have found gene expression signatures in cells obtained from the noses of smokers and nonsmokers to be very similar to gene expression signatures detected in lung cells. Thus, detecting gene response patterns in easily obtained nasal samples will allow investigators to understand why individuals respond differently to tobacco smoke exposure. In addition to our ongoing research in this area, new investments will be made to identify biological markers and technologies for biosensor capability to measure exposure to environmental agents that cause cancer.

Budget Policy: The FY 2010 budget estimate for this program is $29.473 million, an increase of $9.429 million, or 47.0 percent over the FY 2009 estimate. Resources will be used to continue high priority projects, including the development of biomarkers that would be accurate for the relevant exposure timeframes, be mechanistically linked to diseases of interest and serve to link environmental exposures with biological effects. Research areas with a critical need for specific biomarkers include common biological responses (inflammation, oxidative stress, apoptosis and DNA damage), markers of gene and protein expression and markers of organ dysfunction.

**Portrait of a Program: Human Health Impact of Nanotechnology**

| | |
|---|---|
| FY 2009 Level | $14.833 million |
| FY 2010 Level | $23.833 million |
| Change | $ 9.000 million |

Engineered nanoscale materials display novel physical, chemical, and biological properties that make nano-enabled products useful for drug delivery systems, tissue engineering, biological and environmental sensor technology, and environmental remediation. By 2015, the global nanotechnology market is projected to exceed $15 billion. Nanotechnology, like all emerging technologies, should create innovation while minimizing risk of adverse health effects, and health effects of exposure should be assessed prior to extensive use. The diversity of materials used to synthesize nanoparticles, as well as the diversity of the physical and chemical properties that emerge at the nanoscale, suggest that safety assessment will be challenging. Through a combination of grants and contracts, NIEHS supports research that explores the impact of size and size-dependent properties of nanomaterials on biological response at the systemic, cellular, and molecular levels. Because the physical and chemical properties of nanoscale materials may change across experimental timelines, or through the life cycle of a product, the studies include evaluation of the physical and chemical characteristics of nanoscale materials at multiple points in the exposure model and link these measurements to biological effects. This research is contributing to a body of knowledge that has begun to demonstrate trends in the relationship of physical and chemical properties to biological response. NIEHS is now poised to lead expanding research efforts to improve the understanding of potential health impacts of nano-enabled products to ensure the safety of an increasingly exposed human population.

**Pathways for Future Environmental Health Scientists:** This program's goal is to attract the brightest young students and scientists into the environmental health sciences field to have the right cadre to conduct the interdisciplinary research demanded. This program includes efforts at the high school and undergraduate levels (opportunities for laboratory-based training), the graduate level (institutional and individual training grants including a new training initiative designed to prepare individuals to study environment and genetic factors in disease etiology), and the faculty level (grants for young investigators and short term sabbatical awards). NIEHS partnered with the National Human Genome Research Institute (NHGRI) to fund three new programs supporting graduate training leading to the Ph.D. degree and training at the postdoctoral level for students who are preparing for research careers in the new field of Human Genes and the Environment. The training programs focus on problems of human health, complex human diseases and human biology, and combine research advances in human genetics with measures of exposure to explain how the two factors combine to cause disease. The programs will produce graduate researchers who can better address these areas of research than could individuals who have experience in only one of the two areas.

Budget Policy: The FY 2010 budget estimate for this program is $32.794 million, an increase of $614 thousand, or 1.9 percent over the FY 2009 estimate. Resources will

be used to continue high priority projects such as 1) the ONES program, an R01 program for new independent investigators, 2) the NIEHS training grant program to increase participation of physician-scientists in environmental sciences research, 3) the NIEHS MD/PhD program, 4) the joint training program in environmental genetics and genomics, co-sponsored with NHGRI, 5) the NIH Pathway to Independence program and 6) the Short Term Educational Experiences for Research in Environmental Health (STEER) program designed to attract talented high school students and undergraduates to summer research opportunities in the environmental health sciences.

**Intramural Research:** This program's mission is to investigate the role of environmental agents in human disease and dysfunction and define the important biological and chemical processes that these agents act upon. NIEHS' intramural research studies are often longitudinal and high-risk in nature with unique components, such as NIEHS' contribution to the National Toxicology Program (NTP), epidemiological studies of environmentally associated diseases, and intervention and prevention studies in humans to reduce the effects of exposures to hazardous environments. The recent opening of NIEHS' new Clinical Research Unit provides new opportunities for intramural clinical and basic science investigators to work together to learn how environmental exposures influence human health and disease. NIEHS intramural investigators recently discovered that nearly 20 percent of genes, including many genes that react to environmental or developmental signals, are regulated differently than traditional models would predict. These genes were shown to be pre-loaded with many of the factors necessary for gene activation, even in the inactive state. For these genes, the key enzyme responsible for messenger RNA synthesis is recruited to and held near the gene promoter before induction, and then rapidly released into the gene when the activating signal is received. This method of gene regulation is proposed to poise certain genes for rapid and fine-tune responses to dynamic environmental and developmental cues.

Budget Policy**:** The FY 2010 budget estimate for this program is $179.082 million, an increase of $2.647 million, or 1.5 percent over the FY 2009 estimate. Resources will be directed to high priority research programs designed to understand human disease and improve human health, such as bioinformatics, reproductive epidemiology and structural biology.

**Research Management and Support (RMS):** The RMS program provides administrative, budgetary, logistical and scientific support in the review, award, and monitoring of research grants and training awards. NIEHS currently oversees approximately 670 research grants and centers. In addition, RMS provides administrative support for the Intramural Research program. Other RMS functions include strategic planning, coordination, and evaluation of NIEHS programs, regulatory compliance, international coordination, and liaison with other federal agencies, Congress, and the public.

Budget Policy: The FY 2010 budget estimate for RMS is $19.659 million, an increase of $337 thousand, or 1.7 percent over the FY 2009 estimate. This increase reflects NIH policy for FY 2010 and will be used to cover increases for pay costs, centrally furnished services and supplies and materials. Resources will be used to continue funding the

important RMS activities mentioned above which support the infrastructure that allows NIEHS to pursue and achieve its mission.

**NIH Common Fund**

NIEHS is the lead institute for the Roadmap Epigenomics Program supported through the NIH Common Fund, which will continue in FY 2010.

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**Budget Authority by Object**

| | FY 2009 Estimate | FY 2010 PB | Increase or Decrease |
|---|---|---|---|
| Total compensable workyears: | | | |
| Full-time employment | 638 | 651 | 13 |
| Full-time equivalent of overtime and holiday hours | 1 | 1 | 0.0 |
| Average ES salary | $176,023 | $179,543 | $3,520 |
| Average GM/GS grade | 11.3 | 11.3 | 0.0 |
| Average GM/GS salary | $82,640 | $85,781 | $3,141 |
| Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207) | $131,301 | $136,290 | $4,989 |
| Average salary of ungraded positions | 125,573 | 130,345 | 4,772 |

| OBJECT CLASSES | | FY 2009 Estimate | FY 2010 Estimate | Increase or Decrease |
|---|---|---|---|---|
| | Personnel Compensation: | | | |
| 11.1 | Full-time permanent | $39,092,000 | $40,914,000 | $1,822,000 |
| 11.3 | Other than full-time permanent | 18,815,000 | 19,728,000 | 913,000 |
| 11.5 | Other personnel compensation | 814,000 | 852,000 | 38,000 |
| 11.7 | Military personnel | 876,000 | 919,000 | 43,000 |
| 11.8 | Special personnel services payments | 10,607,000 | 11,129,000 | 522,000 |
| | **Total, Personnel Compensation** | 70,204,000 | 73,542,000 | 3,338,000 |
| 12.0 | Personnel benefits | 16,438,000 | 17,218,000 | 780,000 |
| 12.2 | Military personnel benefits | 459,000 | 482,000 | 23,000 |
| 13.0 | Benefits for former personnel | 0 | 0 | 0 |
| | **Subtotal, Pay Costs** | **87,101,000** | **91,242,000** | **4,141,000** |
| 21.0 | Travel and transportation of persons | 2,134,000 | 2,177,000 | 43,000 |
| 22.0 | Transportation of things | 432,000 | 421,000 | (11,000) |
| 23.1 | Rental payments to GSA | 1,000 | 1,000 | 0 |
| 23.2 | Rental payments to others | 61,000 | 60,000 | (1,000) |
| 23.3 | Communications, utilities and miscellaneous charges | 1,143,000 | 1,166,000 | 23,000 |
| 24.0 | Printing and reproduction | 62,000 | 59,000 | (3,000) |
| 25.1 | Consulting services | 416,000 | 395,000 | (21,000) |
| 25.2 | Other services | 36,455,000 | 34,922,000 | (1,533,000) |
| 25.3 | Purchase of goods and services from government accounts | 96,824,000 | 98,009,000 | 1,185,000 |
| 25.4 | Operation and maintenance of facilities | 855,000 | 836,000 | (19,000) |
| 25.5 | Research and development contracts | 105,529,000 | 107,422,000 | 1,893,000 |
| 25.6 | Medical care | 49,000 | 48,000 | (1,000) |
| 25.7 | Operation and maintenance of equipment | 2,294,000 | 2,243,000 | (51,000) |
| 25.8 | Subsistence and support of persons | 0 | 0 | 0 |
| **25.0** | **Subtotal, Other Contractual Services** | **242,422,000** | **243,875,000** | **1,453,000** |
| 26.0 | Supplies and materials | 14,945,000 | 14,939,000 | (6,000) |
| 31.0 | Equipment | 6,582,000 | 6,431,000 | (151,000) |
| 32.0 | Land and structures | 0 | 0 | 0 |
| 33.0 | Investments and loans | 0 | 0 | 0 |
| 41.0 | Grants, subsidies and contributions | 307,927,000 | 323,876,000 | 15,949,000 |
| 42.0 | Insurance claims and indemnities | 0 | 0 | 0 |
| 43.0 | Interest and dividends | 10,000 | 10,000 | 0 |
| 44.0 | Refunds | 0 | 0 | 0 |
| | **Subtotal, Non-Pay Costs** | **575,719,000** | **593,015,000** | **17,296,000** |
| | **Total Budget Authority by Object** | **662,820,000** | **684,257,000** | **21,437,000** |

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research

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**Salaries and Expenses**

| OBJECT CLASSES | FY 2009 Estimate | FY 2010 PB | Increase or Decrease |
|---|---|---|---|
| **Personnel Compensation:** | | | |
| Full-time permanent (11.1) | $39,092,000 | $40,914,000 | $1,822,000 |
| Other than full-time permanent (11.3) | 18,815,000 | 19,728,000 | 913,000 |
| Other personnel compensation (11.5) | 814,000 | 852,000 | 38,000 |
| Military personnel (11.7) | 876,000 | 919,000 | 43,000 |
| Special personnel services payments (11.8) | 10,607,000 | 11,129,000 | 522,000 |
| **Total Personnel Compensation (11.9)** | **70,204,000** | **73,542,000** | **3,338,000** |
| Civilian personnel benefits (12.1) | 16,438,000 | 17,218,000 | 780,000 |
| Military personnel benefits (12.2) | 459,000 | 482,000 | 23,000 |
| Benefits to former personnel (13.0) | 0 | 0 | 0 |
| **Subtotal, Pay Costs** | **87,101,000** | **91,242,000** | **4,141,000** |
| Travel (21.0) | 2,134,000 | 2,177,000 | 43,000 |
| Transportation of things (22.0) | 432,000 | 421,000 | (11,000) |
| Rental payments to others (23.2) | 61,000 | 60,000 | (1,000) |
| Communications, utilities and miscellaneous charges (23.3) | 1,143,000 | 1,166,000 | 23,000 |
| Printing and reproduction (24.0) | 62,000 | 59,000 | (3,000) |
| **Other Contractual Services:** | | | |
| Advisory and assistance services (25.1) | 416,000 | 395,000 | (21,000) |
| Other services (25.2) | 36,455,000 | 34,922,000 | (1,533,000) |
| Purchases from government accounts (25.3) | 61,713,000 | 62,610,000 | 897,000 |
| Operation and maintenance of facilities (25.4) | 855,000 | 836,000 | (19,000) |
| Operation and maintenance of equipment (25.7 | 2,294,000 | 2,243,000 | (51,000) |
| Subsistence and support of persons (25.8) | 0 | 0 | 0 |
| **Subtotal Other Contractual Services** | **101,733,000** | **101,006,000** | **(727,000)** |
| Supplies and materials (26.0) | 14,942,000 | 14,936,000 | (6,000) |
| **Subtotal, Non-Pay Costs** | 120,507,000 | 119,825,000 | (682,000) |
| **Total, Administrative Costs** | **207,608,000** | **211,067,000** | **3,459,000** |

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**Authorizing Legislation**

| | PHS Act/ Other Citation | U.S. Code Citation | 2009 Amount Authorized | FY 2009 Estimate | 2010 Amount Authorized | FY 2010 PB |
|---|---|---|---|---|---|---|
| Research and Investigation | Section 301 | 42§241 | Indefinite | $662,820,000 | Indefinite | $684,257,000 |
| | Section 402(a) | 42§281 | Indefinite | | Indefinite | |
| National Institute of Environmental Health Sciences | | | | | | |
| Total, Budget Authority | | | | 662,820,000 | | 684,257,000 |

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**Appropriations History**

| Fiscal Year | Budget Estimate to Congress | House Allowance | Senate Allowance | Appropriation |
|---|---|---|---|---|
| 2001 | $460,971,000 2/ | $506,730,000 | $508,263,000 | $502,549,000 |
| Rescission | | | | (495,000) |
| 2002 | 561,570,000 | 557,435,000 | 585,946,000 | 566,639,000 |
| Rescission | | | | (1,942,000) |
| 2003 | 609,705,000 | 609,705,000 | 617,258,000 | 618,258,000 |
| Rescission | | | | (4,019,000) |
| 2004 | 630,774,000 | 630,774,000 | 637,074,000 | 636,974,000 |
| Rescission | | | | (4,582,000) |
| 2005 | 650,027,000 | 650,027,000 | 655,100,000 | 650,027,000 |
| Rescission | | | | (5,522,000) |
| 2006 | 647,608,000 | 647,608,000 | 667,372,000 | 647,608,000 |
| Rescission | | | | (6,476,000) |
| 2007 | 637,323,000 | 637,323,000 | 641,292,000 | 642,002,000 |
| Rescission | | | | 0 |
| 2008 | 637,406,000 | 652,303,000 | 656,176,000 | 653,673,000 |
| Rescission | | | | (11,420,000) |
| Supplemental | | | | 3,416,000 |
| 2009 | 642,875,000 | 664,980,000 | 660,767,000 | 662,820,000 |
| Rescission | | | | --- |
| 2010 | 684,257,000 | | | |

1/ Reflects enacted supplementals, rescissions, and reappropriations.
2/ Excludes funds for HIV/AIDS research activities consolidated in the NIH Office of AIDS Research.

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**Details of Full-Time Equivalent Employment (FTEs)**

| OFFICE/DIVISION | FY 2008 Actual | FY 2009 Estimate | FY 2010 PB |
|---|---|---|---|
| Office of the Director | 42 | 41 | 42 |
| Division of Intramural Research | 430 | 427 | 436 |
| Division of Extramural Research and Training | 50 | 50 | 51 |
| Office of Management | 108 | 107 | 108 |
| Office of Translational Research | 14 | 13 | 14 |
| Total | 644 | 638 | 651 |
| Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research | | | |
| FTEs supported by funds from Cooperative Research and Development Agreements | (0) | (0) | (0) |

| FISCAL YEAR | Average GM/GS Grade |
|---|---|
| 2006 | 11.2 |
| 2007 | 11.2 |
| 2008 | 11.3 |
| 2009 | 11.3 |
| 2010 | 11.3 |

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**Detail of Positions**

| GRADE | FY 2008 Actual | FY 2009 Estimate | FY 2010 PB |
|---|---|---|---|
| Total, ES Positions | 1 | 1 | 1 |
| Total, ES Salary | 167,641 | 176,023 | 179,543 |
| GM/GS-15 | 38 | 37 | 38 |
| GM/GS-14 | 61 | 61 | 61 |
| GM/GS-13 | 76 | 75 | 76 |
| GS-12 | 79 | 78 | 79 |
| GS-11 | 107 | 108 | 109 |
| GS-10 | 3 | 3 | 3 |
| GS-9 | 65 | 63 | 65 |
| GS-8 | 18 | 19 | 20 |
| GS-7 | 25 | 24 | 25 |
| GS-6 | 5 | 5 | 5 |
| GS-5 | 2 | 1 | 2 |
| GS-4 | 6 | 7 | 7 |
| GS-3 | 4 | 4 | 4 |
| GS-2 | 1 | 1 | 1 |
| GS-1 | | | |
| Subtotal | 490 | 486 | 495 |
| Grades established by Act of July 1, 1944 (42 U.S.C. 207): | | | |
| Assistant Surgeon General | | | |
| Director Grade | 1 | 1 | 1 |
| Senior Grade | 5 | 5 | 5 |
| Full Grade | | | |
| Senior Assistant Grade | 1 | 1 | 1 |
| Assistant Grade | | | |
| Subtotal | 7 | 7 | 7 |
| Ungraded | 167 | 165 | 169 |
| Total permanent positions | 485 | 483 | 490 |
| Total positions, end of year | 665 | 662 | 670 |
| Total full-time equivalent (FTE) employment, end of year | 644 | 638 | 651 |
| Average ES salary | 167,641 | 176,023 | 179,543 |
| Average GM/GS grade | 11.3 | 11.3 | 11.3 |
| Average GM/GS salary | 78,563 | 82,640 | 85,781 |

Includes FTEs which are reimbursed from the NIH Roadmap for Medical Research.

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**New Positions Requested**

| | FY 2010 | | |
|---|---|---|---|
| | Grade | Number | Annual Salary |
| Senior Investigator | Title 42 | 1 | $145,000 |
| Tenure Track Investigator | Title 42 | 4 | 110,000 |
| Staff Scientist | Title 42 | 2 | 88,000 |
| Biologist | GS-11 | 5 | 60,000 |
| Health Scientist Administrator | GS-15 | 1 | 145,000 |
| Total Requested | | 13 | |