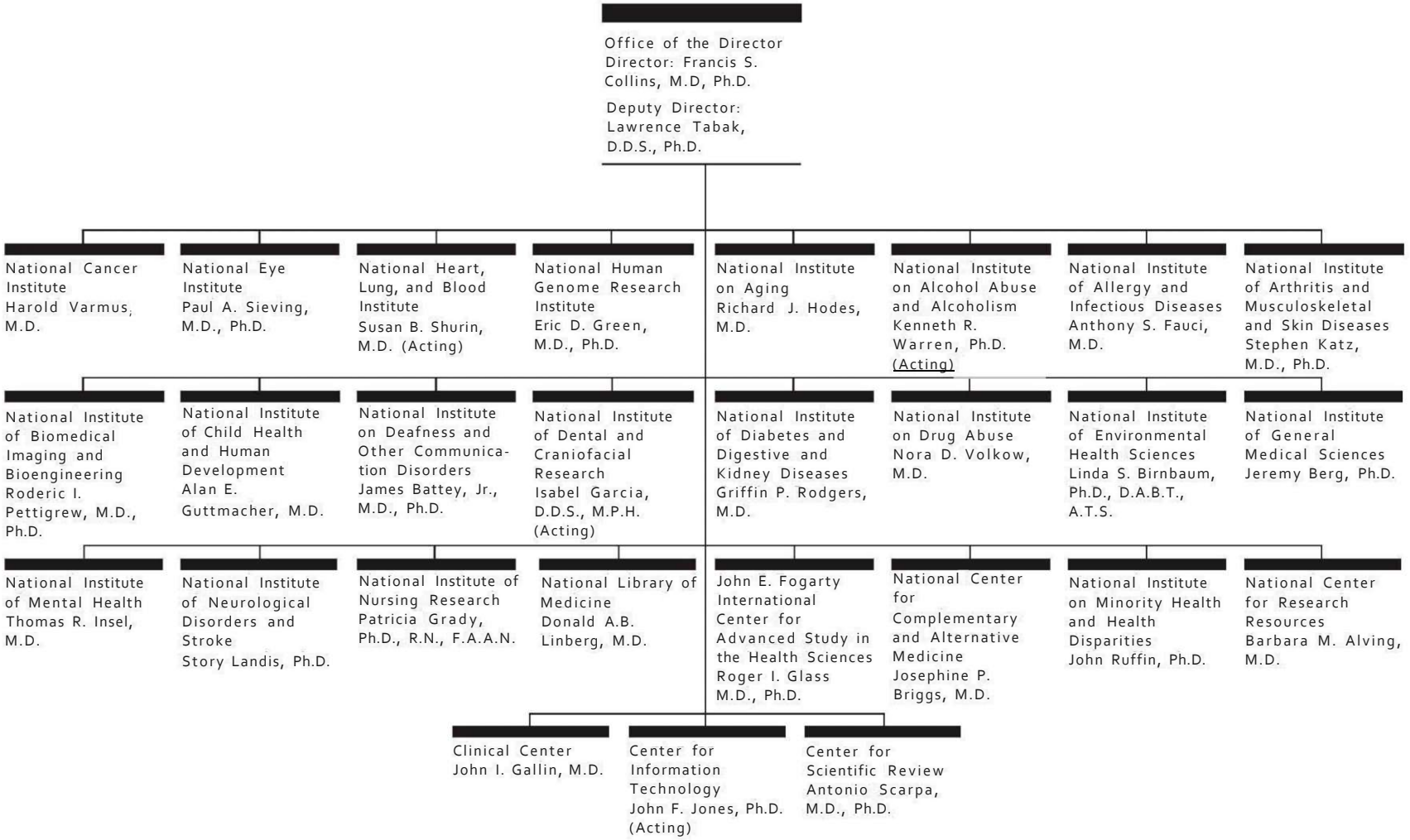
DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

Executive Summary

National Institutes of Health



FY 2012 Budget Request
National Institutes of Health

Introduction and Mission

The mission of the National Institutes of Health (NIH) is science in the pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to extend healthy lives and to reduce the burdens of illness and disability. As a steward of public funds, NIH has a responsibility to ensure that the Nation's investment in biomedical research is fully leveraged to maximize its benefit not only to fundamental scientific understanding, but also to improvements in treatments and cures for disease, as well as the overall quality of life for Americans and other populations around the globe.

NIH supports a robust research enterprise that provides biomedical researchers with the tools and incentives that help foster discovery. These include state-of-the-art technologies and facilities for scientific investigation; mechanisms for data sharing and interdisciplinary collaboration; and, the means to translate fundamental research findings into clinically useful applications. NIH support of research and training stimulates the creativity of individual investigators, while fostering highly productive collaborations among disciplines.

FY 2012 Budget Request
National Institutes of Health

OVERVIEW OF BUDGET REQUEST

Total Budget Request

($ in millions)

	FY 2010 Actual	FY 2012 Budget Request
Total Program Level[1]	$31,243	$31,987
Change from FY 2010 Actual: Dollars	---	+$745
Change from FY 2010 Actual: Percent	-	+2.4%

[1] Reflects FY 2010 total program level on a comparable basis with FY 2012. Includes discretionary budget authority (appropriations from Labor/HHS and Interior Superfund), mandatory Type 1 Diabetes appropriations and Program Evaluation funds from HHS in the NLM..

Overview of NIH Budget Request

The President's Budget request for the National Institutes of Health (NIH) is a total program level of $31.987 billion for fiscal year (FY) 2012—an increase of $745 million or 2.4 percent from the FY 2010 Actual funding level. This funding level invests in areas of extraordinary promise for biomedical science and its supporting infrastructure, while achieving efficiencies to maintain fiscal constraint. Investments in biomedical and behavioral research will increase the understanding of disease and generate tangible progress toward solving the Nation's most pressing health challenges. Through these investments, NIH will help improve the health of the American people, as well as the long-term economic health of the Nation.

Recent progress in genomics and biotechnology has advanced the development of new treatments for a wide range of diseases, such as Alzheimer's, cancer, autism, diabetes, and obesity. NIH-funded researchers have contributed to the identification of more than 800 genetic variants identified in the last five years alone. These discoveries can now be translated into new and improved diagnostics and novel drug targets, a critical task that will most effectively be accomplished through a new model for therapeutics development. The new model will marshal the relevant NIH programs in a concerted effort and draw upon the respective strengths of the public and private sectors.

Progress in stem cell biology is also opening doors to the development of new treatments for a wide range of devastating diseases. In the last three years, NIH-supported researchers have developed and refined methods to reprogram adult human cells to assume a stem cell-like state. These cells, called "induced pluripotent stem cells," are being used to make rapid advances in the study of disease. The next step is to translate these ground-breaking basic discoveries into clinical applications that lead to health improvements and new diagnostic and treatment advances

for patients, as has already begun for products derived from human embryonic stem cells. Three clinical trials of therapeutic products derived from human embryonic stem cells have already received approval from the Food and Drug Administration (FDA) to begin enrolling patients. The first trial, a phase I safety trial sponsored by Geron Corporation to treat spinal cord injury, has already been initiated.

Advances like these are creating exciting opportunities in biomedical research. Through the agency's continuous evaluation and careful management of its research portfolio, NIH focuses funding on those areas of greatest promise. This portfolio management approach ensures the most effective use of funding to achieve the greatest results within fiscal constraints. With continued support, NIH will help to revolutionize patient care, reduce health care costs, and generate economic growth.

Benefits of Biomedical Research

NIH-driven advances have had profound effects on the health and quality of life for all Americans. Since 1970, life expectancy in the United States has risen from 71 years to 78 years. Similarly, the percentage of the elderly with chronic disabilities has declined from 27 percent in 1982 to 19 percent in 2005. NIH-supported research contributed significantly to these improvements by helping reduce deaths from heart disease, stroke, HIV/AIDS, cancer, and other diseases, and by developing innovative treatments for cardiovascular disease, age-related macular degeneration, musculoskeletal conditions, and other chronic conditions. NIH-supported research has led to dramatic improvements in many areas, including:

- Minimally invasive techniques funded by NIH to prevent heart attacks and highly effective drugs to lower cholesterol, control high blood pressure, and break up artery-clogging blood clots have dramatically reduced the death rate by 60 percent for coronary heart disease and by 70 percent for stroke since 1970.

- Over the past 15 years, cancer death rates have dropped 13.5 percent among women and 21.2 percent among men, which translates into some 800,000 lives saved.

- NIH's leadership and financial support to determine how HIV causes illness, develop rapid HIV tests, identify a new class of HIV-fighting drugs, and, ultimately, combine those drugs in life-saving ways have yielded extraordinary results and benefits. Today, HIV-infected men and women in their 20s who receive combination therapy may expect to live to age 70 or beyond.
- Research supported by NIH has spurred innovation in the biotech and pharmaceutical industries and contributed to 58 percent of new molecular entities approved by the Food and Drug Administration (FDA) from 1982 through 2006.

These are but a few of the many, tangible examples of NIH's contributions to the Nation's health. NIH's contributions also generate a wide range of secondary benefits that enhance the Nation's economic well-being and global competitiveness. The aggregate economic gains from the increased life expectancy between 1970 and 2000 are estimated at $95 trillion.[2] One study conducted by a research advocacy group estimates that each dollar invested in NIH research generates about $2.21 in state economic output annually, while each grant awarded by NIH generates about seven jobs. The reduction in chronic disability has helped to restrain long-term health care costs for the elderly. Dramatic improvements in disease treatments based on U.S. research breakthroughs have helped to maintain overall U.S. productivity and global competitiveness.

Exceptional Scientific Opportunities

These are extraordinarily exciting times for the biomedical research community. Through the application of genomic research and high throughput technologies, breakthroughs in our understanding of the causes of many diseases and the identification of new targets and pathways for the development of new therapeutics are within reach. What makes these opportunities so extraordinary is that they enable a truly comprehensive approach to human biology. For example, a decade ago, diagnosis of cancer was based on the organ involved and treatment depended on broadly aimed therapies that often greatly diminished a patient's quality of life. Today, research in cancer biology is moving treatment toward more effective and less toxic therapies tailored to the genetic profile of each patient's cancer. NIH-funded researchers are also uncovering information about genes and the environment that will help point the way toward more personalized, targeted treatments for other diseases. New insights into molecular mechanisms represent new opportunities for NIH to straighten and shorten the pathway from discovery to health. This expectation is grounded in several recent developments: the dramatic acceleration of our basic understanding of hundreds of diseases; the establishment of NIH-supported centers that enable academic researchers to use such understanding to screen thousands of chemicals for potential drug candidates; and, the emergence of public-private partnerships to aid the movement of drug candidates identified by academic researchers into the commercial development pipeline. The new National Center for Advancing Translational Sciences (NCATS) will provide the infrastructure and technologies to bring these critical basic discoveries to fruition through new diagnostics and therapeutics.

Scientific Preparedness in Public Health Emergencies

NIH also is positioned to take a lead role in the rapid response to public health emergencies. This has been particularly evident in the last year with the H1N1 pandemic, where the National Institute of Allergy and Infectious Diseases (NIAID) led the effort to conduct clinical trials on the new vaccine with record quality and speed. Even more recently, the National Institute of Environmental Health Sciences (NIEHS) committed to measure the health effects of the Deepwater Horizon oil spill in the Gulf, through a cohort study of 50,000 workers and controls.

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[2] Murphy, K. M., & Topel, R. H. (2006). The value of health and longevity. *Journal of Political Economy, 114(5),* 871-904.

FY 2012 Budget Request

The FY 2012 Budget Request reflects NIH's strong commitment to advance biomedical research. NIH will support many of its ongoing research efforts, will curtail other lower priority activities, and will make strategic investments in the key scientific opportunities. The budget request reflects the high priority placed on biomedical research within the current budget climate as an engine promising both better health and economic growth in the future.

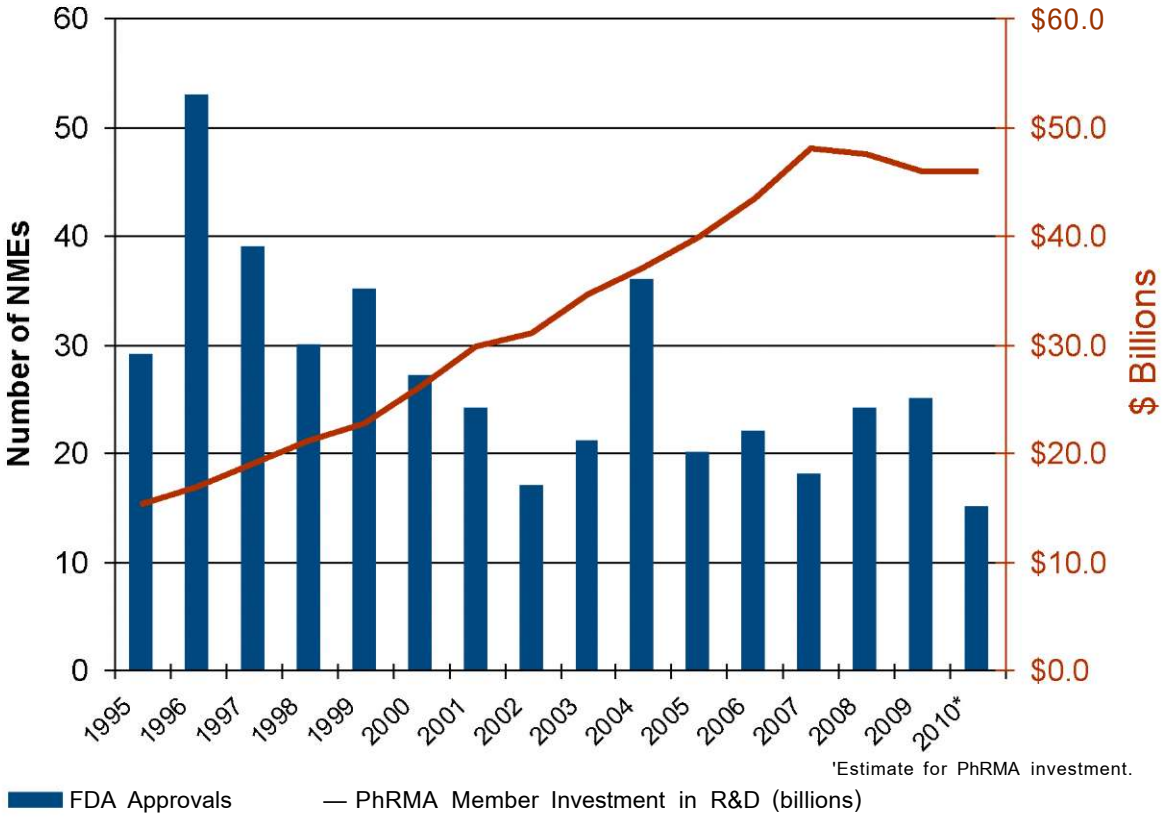
Priority Initiatives

Within the FY 2012 Budget Request, NIH plans to emphasize a groundbreaking new program to optimize and accelerate translational sciences and therapeutics development and three other themes that are exceptionally ripe for investment - technologies to accelerate discovery; the evidence base for health care decisions; and new investigators and new ideas. These four critical areas hold promise for advancing the health of the American people.

Optimizing and Accelerating Translational Sciences and Therapeutics Development: The National Center for Advancing Translational Sciences (NCATS)

Opportunities: NIH-supported basic biomedical research has been successful in deciphering the physiological processes that underpin health and disease. For example, we now understand—at the molecular level—the basis for thousands of diseases, both common and rare. This knowledge, combined with advanced technologies for rapidly screening thousands of molecules for therapeutic potential, has generated a rich inventory of potential new targets and candidates for therapeutic drug development.

Challenges: Translating basic discoveries into new and better diagnostics and treatments has historically been the province of the private sector. Developing new therapeutics, however, has become an exceedingly complex, costly, and risk-laden endeavor. Only a few compounds out of hundreds or thousands will ultimately prove safe and effective and make it to the medicine cabinet. According to research in 2004 and 2008 on the drug discovery process, 90-95 percent of new compounds entering clinical testing do not succeed. The cost of developing a new drug is estimated to range from $500 million to $2 billion, when all of the failures are taken into account. Moreover, in spite of significant investments in research and development, the number of FDA-approved new molecular entities (NMEs) has declined by 49 percent in recent years—from an average of 37 per year between 1995 and 1999 to an average of 21 per year between 2000 and 2010. These two trends are illustrated below in a chart that maps investments by pharmaceutical companies in drug research and development against the annual number of FDA approvals for NME drugs, excluding new biologic approvals, in the period from 1995 to 2010.



Note: Data on FDA approvals obtained from: http://www.fda.gov/Drugs/DevelopmentApprovalProcess/HowDrugsareDeveloped andApproved/DrugandBiologicApprovalReports/ucm121136.htm. Data on Pharma Investment from the Pharmaceutical Research and Manufacturers of America, Profile 2010, pages 24-25 (http://www.phrma.org/sites/default/files/159/2010 phrma annual report.pdf)

The staggering development costs and failure rates have become a potent disincentive for pharmaceutical and biotechnology companies. In the last decade, for example, industry efforts to develop new antibiotics for multidrug-resistant organisms such as methicillin-resistant *Staphylococcus aureus* have declined significantly. According to 2007 research on the drug market, since 1999, 10 of the 15 largest companies have fully abandoned, or cut down significantly, discovery efforts in this field. In 2010, two pharmaceutical companies decided to end drug discovery work on pain, depression, anxiety, schizophrenia, and bipolar disorder. As another potential missed opportunity of significant consequence, the genetic bases of more than 2,000 rare diseases have now been identified, but effective therapies are available for only about 200 of those diseases. The limited economic incentive for such small markets means that roughly 20 million Americans affected by these rare diseases may have little hope of a new therapeutic - unless NIH gets involved.

A New Role for NIH in Therapeutics Development: The cost and amount of time required for developing new therapies has increased the risk associated with this research in the private sector. NIH is uniquely positioned to catalyze progress in therapeutics development by capitalizing on new and emerging scientific opportunities, leveraging new biomedical discoveries and existing scientific resources, and forging new partnerships with diverse organizations and sectors.

To do so, however, certain translational sciences programs at NIH must be more effectively organized in order to maximize synergy and efficiency. Although not yet reflected in the present FY 2012 Budget Justification documents, NIH is proposing to establish the National Center for Advancing Translational Sciences (NCATS) at the beginning of FY 2012 to catalyze improvements in therapeutics discovery and speed the development of new, urgently needed diagnostics and drugs. In December 2010, the Scientific Management Review Board (SMRB), which was established by Congress to advise the NIH Director on organizational issues, recommended the creation of a new NIH Center with the mission of supporting and strengthening translational medicine and therapeutics development. The SMRB reached its conclusions about the need for a new center after considering the views of internal and external experts and stakeholders, and analyzing a range of organizational alternatives. NIH's proposal is consistent with the advice of the SMRB. Budget details for transitioning to this new Center will be provided this spring.

NCATS would be responsive to the need for innovative strategies for therapeutics development, a need recognized as never before—by the public, government, academic institutions, pharmaceutical and biotechnology companies, and venture capitalists. The recognition of this need and the mounting interest in these strategies are outgrowths of several forces. One is intense interest from the public, whom NIH serves, in development of new treatments for both rare and common diseases. Another is investor-generated pressures on the private sector to speed the pace of therapeutics discovery and reap more rapid returns on the billions of dollars that pharmaceutical and biotechnology companies invest in R&D. Another force is widespread dissatisfaction with the traditional model of therapeutics discovery and its low success rate. Every quarter of the enterprise is calling for approaches that are both *modular* and *integrative,* that enable each sector to deploy its strengths to the component of the process at which it excels, and that foster coordination by bringing the efforts and strengths of the sectors together through public-private partnerships.

A Bird's Eye View of Drug Development

Therapeutics development involves many phases, beginning with basic research to illuminate the cause and natural history of disease and preclinical studies to identify a disease target i.e. an aspect of the disease process that might be discoverable for diagnostic purposes and susceptible to intervention for therapeutic purposes. The target must then be validated, another complex and pivotal process. Compounds that hit the target are screened to identify promising candidates for further assessment of their therapeutic potential. The most promising candidates will undergo painstaking preclinical research involving animal models of disease to assess the safety, toxicity, pharmacokinetics, and metabolic properties of the candidate compounds, only a few of which will ultimately prove to be safe or promising enough for clinical studies in humans. Such studies are conducted in a three-phase process of clinical trials, which are expensive and laden with challenges. A final step is FDA approval.

An illustrative example of how productive these approaches can be is the recent collaborative effort between several components of NIH (including the National Heart, Lung, and Blood Institute; the NIH Clinical Center; and the Therapeutics for Rare and Neglected Diseases Program) and a private sector company (AesRx) to develop a new therapy for sickle cell disease (SCD). Sickle cell disease is the most common inherited blood disorder in the United States, affecting approximately 70,000 to 100,000 Americans, primarily those of African descent. It affects 1 in every 500 African American newborns.

Sickle cell disease is caused by a defect in the oxygen carrying capacity of red blood cells. Affected individuals face a lifetime of episodes of pain, chronic anemia, severe infections, and multi-organ damage, usually beginning in early childhood. As yet, there is no cure for SCD; a combination of fluids, painkillers, antibiotics and transfusions are used to treat symptoms and complications. The new investigational sickle cell drug acts by increasing the red cell oxygen carrying capacity. It has been designated by the FDA as an orphan drug for the treatment of sickle cell disease. The collaborative effort between NIH and AesRx will carry out both the pre-clinical development activities necessary for Investigational New Drug (IND) application, as well as the clinical trials following IND approval. The result will potentially lead to a major advance toward a safe and effective therapy for SCD -- a disease affecting approximately 13 million people worldwide.

NIH has the capacity to conduct and to support research in the early, preclinical stages of therapeutics discovery and development—research that industry and venture capital are increasingly reluctant to pursue. NIH also has a key role to play in identifying new techniques and technologies that enhance the predictive value of work done at the preclinical stages of therapeutics discovery. As such, NIH can both conduct the essential preclinical work and help prevent the attrition of compounds and failure at later, more expensive, stages of clinical testing by discovering and disseminating innovative approaches to preclinical development.

By establishing NCATS, NIH is positioning itself to assume a greater and more focused role in the therapeutics discovery and development enterprise. The intent is not to assume a role more appropriate for the private sector, rather, through the marshalling and concentration of expertise, technologies, and resources, to fill gaps in the early developmental phases that biotechnology and pharmaceutical corporations are not equipped to fill, and to "de-risk" projects for future commercial investment. NCATS will work synergistically with the private sector and enable NIH to help bridge the translational divide by accelerating, improving, and streamlining a newly collaborative process for realizing the promise of translational medicine and science.

Components, Functions, and Focus of the New Center

NCATS will align and bring together in one organization a number of trans-NIH programs that are inherently cross-cutting (i.e. they do not have a specific disease focus) and are ideally suited for incorporation into the new Center. NCATS programs are expected to include the following components:

The ***Molecular Libraries Program (MLP)*** provides academic researchers with access to technology for assay development, so that the discovery of a new drug target can be developed into an assay amenable to high throughput screening of chemical libraries. More than 100 potential lead compounds relevant to a long list of rare and common diseases have been identified, and many of these are poised for further development. Under the auspices of the new Center, MLP will continue to grow and gain more attention from potential investigators engaged in a wide variety of research areas. One program funded by MLP is the ***NIH Chemical Genomics Center (NCGC),*** which provides robotic high-throughput screening services and a library of more than 350,000 compounds for use in basic discoveries and as probes of cellular pathways, and provides medicinal chemistry support to identify initial hits and lead compounds for preclinical testing.

The ***Therapeutics for Rare and Neglected Diseases (TRND)*** program is designed to bridge the gap that often exists between basic research discovery and the testing of a new drug in humans, as in the example of SCA mentioned above. Leveraging expertise and investments from both the public and the private sectors, TRND strives to encourage and speed the development of drugs for rare and neglected diseases—an area where limited market and commercial potential may discourage others from pursuing critical, life-saving research. This unique program moves candidate drug compounds forward until they meet FDA requirements for an Investigational New Drug (IND) application, at which point they will be attractive to biotechnology and pharmaceutical companies willing to carry them through clinical development and subsequent commercialization. In addition, the TRND program also offers a laboratory for research on the development process itself with a specific focus on improving success rates in the crucial preclinical stage.

The ***NIH Rapid Access to Interventional Development (RAID)*** program helps fill the gap and reduces some of the common barriers that block progress of therapeutic discoveries from the bench to the bedside. The program makes available critical resources that are needed to develop new therapeutic agents, including ones that can generate bulk amounts of the drug candidate or test its stability or toxic effects. It also provides researchers with access to expertise at the FDA on document preparation and submission.

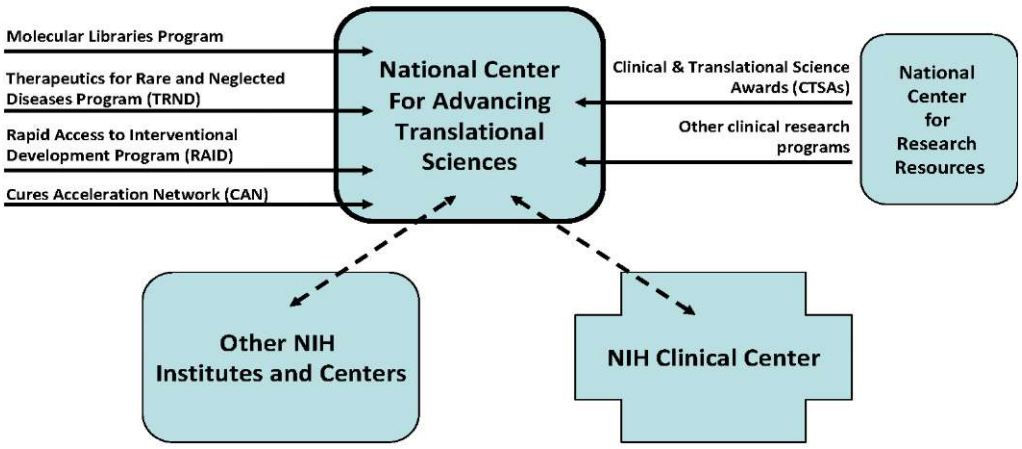
NCATS will be involved in a new ***NIH-FDA Partnership*** formed in 2010 to foster regulatory science, a specialized and interdisciplinary area of biomedical research that generates new knowledge and tools for assessing experimental therapies, preventatives, and diagnostics. A key goal of the partnership is to accelerate the development and use of new tools, standards, and approaches to enhance the efficiency of product development and the effectiveness of product review for safety, efficacy, and quality. Through a funding initiative begun in FY 2010, *Advancing Regulatory Science through Novel Research and Science-Based Technologies,* the agencies are supporting four regulatory science grants to advance nanoparticle characterization, adaptive trial design, development of a heart-lung micromachine for safety and efficacy testing, and toxicology testing strategies that will reduce dependency on the use of animals in toxicology testing.

The ***Cures Acceleration Network (CAN)*** will also be part of NCATS. CAN will advance the development of "high need cures" through the reduction of barriers between research discovery and clinical trials. Authorized by the Affordable Care Act of 2010 (P.L. 111-148), CAN includes flexible authorities to conceptualize and execute projects that will enable transactions other than contracts, grants, and cooperative agreements to achieve the goals and objectives of CAN, where, in the Director's determination, these standard mechanisms are not adequate. Contracts require the agency to envision and establish the project at the beginning, direct the project, and receive a deliverable. Grants require the recipient to envision and direct the project and report results after completion of the project. NIH will use the flexible research authority to work collaboratively with individual experts and teams in order to envision and identify new opportunities, and then fund exactly what is needed to overcome scientific and developmental hurdles. The authority allows NIH, on a project-by-project basis, to act quickly to capitalize on scientific opportunities and to direct the project, set and monitor specific milestones, and stay involved from both the scientific and administrative aspects, as well as to terminate the project as

necessary. This sort of flexibility has been essential to the success of DARPA, and will also be critical in translational medicine, where product development is the goal and where the exact needs to meet this specific goal cannot be fully anticipated in advance.

NCATS will become the new home of the ***Clinical and Translational Science Awards (CTSAs).*** Originally administered under the auspices of the National Center for Research Resources, the CTSAs provide funding for a nationwide consortium of biomedical research institutions. Consortium members are united around the goals of accelerating therapeutics development, engaging communities in clinical research efforts and training clinical and translational investigators. Launched in 2006, the CTSA program now includes 55 medical research institutions in 28 states and the District of Columbia.

NCATS



These programs and other components will enable NCATS to perform a range of critical functions in translational science and medicine. These include:

- Conducting and supporting translational research throughout the process of therapeutics development, but especially in the early phases of fundamental discovery and application;

- Providing a visible, central focus for broader access to scientific and technological resources, tools, and expertise in translational science and medicine;

- Streamlining and improving therapeutics development by facilitating effective handoffs between steps; learning from successes and failures of each project, enhancing the feedback loop; and designing innovative approaches to product development;

- Serving as a resource for NIH by augmenting the strengths and experience of current Institute/Center (IC)-based activities providing services and expertise to ICs, and informing the development of trans-NIH strategies and initiatives;

- Serving as a catalyst, resource, and convener for collaborative interactions by developing and providing scientific resources (e.g., assay development, chemical libraries, high-throughput screening, databases, repositories, data-sharing infrastructures, unique research facilities); promoting and facilitating open exchange of information; supporting novel and innovative partnerships; providing a means of "de-risking" projects that currently seem economically unattractive to the private sector; and developing creative intellectual property frameworks that provide a "win-win" outcome for public-private partnerships;

- Addressing the needs for education and training in translational science and medicine;

- Enhancing communication among all stakeholders in the enterprise of translational medicine.

NCATS will focus research efforts in high-need areas that attract insufficient commercial interest, areas that will not detract from the agency's emphasis on fundamental knowledge but rather stimulate the pursuit of new avenues of scientific inquiry. The scientific agenda of the new Center will evolve to meet the emerging needs of the field, but initial opportunities will include the rescue of abandoned drug products that have not been approved but hold promise, and the repurposing of approved products for new indications (i.e. applying them for other preventative, diagnostic, and therapeutic purposes). Rescue and repurposing offer a major short cut in getting a product into clinical trials, saving years of work and hundreds of millions of dollars.

NCATS will move quickly to conceptualize, incubate, and launch new partnerships among the various sectors engaged in therapeutics discovery and development. As previously noted, no one entity or sector can pursue all the opportunities available in translational medicine, nor can any single organization or sector tackle the myriad, inherent challenges and risks. A model that relies to a greater extent on cross-sector and interdisciplinary collaborations will distribute risks and capitalize on diverse perspectives and expertise. Public-private partnerships to advance biomedical science and translational medicine are not new. There is, however, a growing recognition on the part of all those involved in translational medicine that the current model for development is not sustainable and that novel partnerships and collaborations are critical to progress. Especially in this tight budget climate, the limits of any one sector are well recognized, as is the need for approaches that integrate and coordinate the respective strengths of multiple sectors.

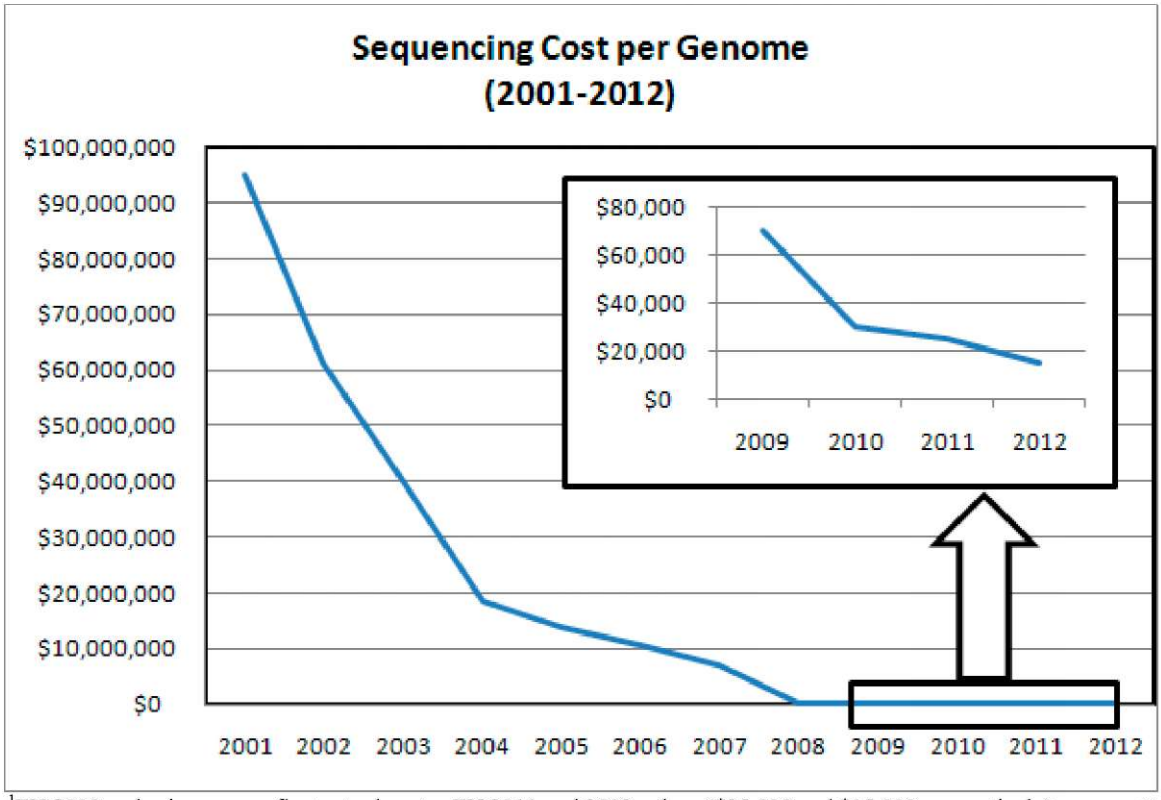
By virtue of its role in funding biomedical research and training—and thereby shaping the landscape of biomedical science and public health in the U.S.—NIH has the singular capacity to convene government, academia, and industry around common goals in translational medicine and science, in ways that would not have been possible a few years ago. The agency can develop and provide platforms for sharing data, including both positive and negative results, and it is

equipped to incentivize the sharing of this information. Through establishment of the new National Center for Advancing Translational Sciences, NIH will employ its convening power to facilitate the sharing of scientific ideas that are foundational to new collaborations. Success on this front will depend on other efforts, including building bridges between and among different disciplinary cultures and addressing administrative and legal hurdles presented by such issues as intellectual property and conflicts of interest. But, more than ever before, all sectors of the enterprise are committed to working together to achieve the promise of translational medicine and advance the development of effective treatments and cures for patients.

Technologies to Accelerate Discovery

In the past, most basic science projects in biomedicine required investigators to limit the scope of their studies to some single aspect of cell biology or physiology. The revolution now sweeping the field is the ability to be comprehensive (i.e. to define ***all*** of: the genes of the human or a model organism, the human proteins and their structures, the common variations in the genome, the major pathways for signal transduction in the cell, the patterns of gene expression in the brain, the steps involved in early development, and the components of the immune system). Technologies contributing to these advances, many of which have moved from the development stage to broad use across the research community only in the last few years, include DNA sequencing, microarray technology, nanotechnology, new imaging modalities, and computational biology.

Advances in DNA sequencing make it possible to both obtain the complete genome sequence of thousands of individuals and address comprehensive questions about hereditary factors in cancer, autism, heart disease, diabetes, and many other disorders. The Cancer Genome Atlas (TCGA), led jointly by the National Cancer Institute and the National Human Genome Research Institute, is a sweeping effort to accelerate understanding of the molecular basis of cancer through DNA sequencing, gene expression profiling, and epigenetic technologies. TCGA recently identified distinct molecular subtypes for a deadly brain cancer, for ovarian cancer, and for adult leukemia, providing a foundation for more effective personalized treatments across diseases and disorders. For efforts like these to succeed, additional major investments are needed in hardware and software for data analysis. The recent rapid reduction in genome sequencing cost has led to a gratifying increase in sequence information, but that is outpacing computing memory capacity and processing speed. Powerful new and creative methods are needed to mine the nuggets of biological revelation from the massive volumes of genomic information being produced.

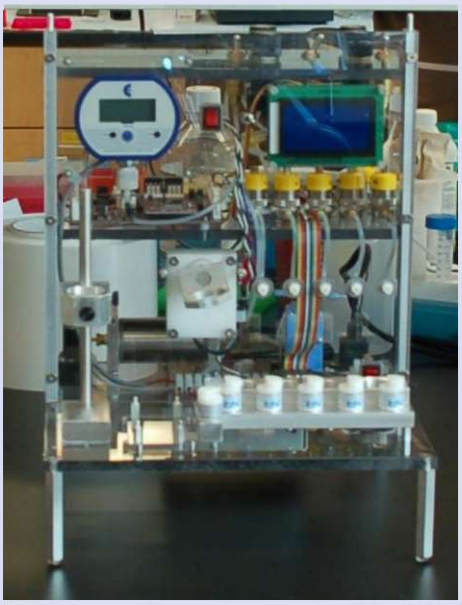


[1]FY 2009 and prior years reflect actual costs. FY 2011 and 2012 values ($25,000 and $15,000, respectively) represent targets for this NIH high priority performance goal.

Other exciting opportunities to gather comprehensive information in systems biology have recently emerged. One such opportunity is metabolomics - the ability to measure cellular levels of sugars, lipids, amino acids, nucleotides, and ions sensitively and cost-effectively, and to see how these metabolites are altered in the presence of disease. The field of proteomics (i.e. measurement and functional assessment of all the proteins in a tissue or cell type) also is poised to move into a new and more comprehensive mode, if appropriate resources are invested in technology development. These advances in systems biology will be particularly powerful if the technology is advanced to the point where measurements can be reliably made on single cells.

Understanding environmental contributions to health and disease has never been more important, but current technologies only detect a small fraction of the substances whose impact may be important to understand. Thus, the development and deployment of sensitive technologies to assess potential toxins in the air, water, and food are high priorities. New engineering approaches, aided by real time cell phone transmission, make major advances possible.

The development of new molecular imaging techniques has arrived at an important juncture. New positron emission tomography (PET) ligands, further advances in magnetic resonance imaging (MRI) scanning resolution, and more accurate ultrasound methods for vascular assessment are needed. There is a need to develop and implement new methods with high sensitivity and specificity to detect the presence of diseases like prostate cancer at the earliest possible moment.



A fully automated bench top CTC processing machine, which connects the CTC-chip to a pneumatic pump to push blood through the device.

Early detection of cancer is critical to provide effective therapy. Supported through the National Institute of Biomedical Imaging and Bioengineering, investigators recently reported the detection of *a single metastatic cell* from lung cancer in one billion normal blood cells. These circulating tumor cells (CTCs) may also be released into the bloodstream of patients with invasive but localized cancers. The presence of CTCs may be an early indicator of tumor invasion into the bloodstream long before distant metastases are detected. Identifying CTCs may be viewed as performing liquid biopsies, which can be especially advantageous for prostate cancer. Researchers plan to extend their work to develop a point-of-care microchip that would allow non-invasive isolation of CTCs from patients with many different types of cancer, to improve the management and treatment of this devastating disease.

Through this investment in technologies for discovery in FY 2012, NIH will support the development and application of state-of-the art technologies including computational biology, proteomics, genomics, metabolomics, single cell biology, stem cell biology, environmental technology, and new imaging technologies.

Enhancing the Evidence Base for Health Care Decisions

NIH's long-term investment in Comparative Effectiveness Research (CER) has informed the clinical guidelines used by doctors in consultation with their patients to select the most effective care. Knowledge from NIH-supported CER has changed the way diabetes, atrial fibrillation, hypertension, HIV/AIDS, schizophrenia, and many other conditions are treated. In addition to diagnostic and treatment trials, knowing more about the performance of disease prevention initiatives and medical care delivery will improve health. For example:

- ***Comparing the effectiveness for anti-seizure drugs for childhood epilepsy.*** NIH conducted the first comprehensive comparative clinical trial of three widely used anti-seizure drugs for the most common form of childhood epilepsy, which is absence epilepsy, and established an evidence-based approach for initial treatment. This form of epilepsy is characterized by short seizures of 10 seconds or so when the child stares and is unaware or unresponsive. The study showed that ethosuximid, one of the oldest available anti-seizure medications in the U.S., provided the best combination of seizure control and fewest side effects over the initial 16- to 20-week period after starting therapy.

- ***Comparing the effectiveness of tamoxifen and raloxifene for breast cancer prevention.*** Results from a long-term study of tamoxifen and raloxifene showed lower toxicities of raloxifene. Analysis of more than 19,000 participants who were monitored for nearly seven years after initiation of treatment showed that raloxifene was modestly less effective than tamoxifen in reducing risk of both invasive and noninvasive breast cancer. However, raloxifene was found to be markedly safer than tamoxifen. Women who had taken raloxifene showed a 45 percent reduced risk of endometrial cancer and a 25 percent lower risk of serious blood clots compared with women who had taken tamoxifen.

CER methodologies will also be important to advancing personalized medicine. Advances in pharmacogenomics, for instance, are moving clinical care away from "one-size-fits-all-medicine" toward individually-tailored treatments. The capacity to predict accurately which drugs may be safe and effective or, on the other hand, unsafe or ineffective for certain individuals, can go far to ensure the safety and value of medical interventions. Key to developing personalized treatments is testing candidate therapies in a real-world setting. Toward this end, NIH plans to fund a Health Maintenance Organization (HMO) Research Network Collaboratory, made up of HMOs currently caring for more than 13 million patients. The Collaboratory will accelerate science across three high-priority areas: large epidemiology studies, clinical trials, and electronic-health-record (EHR)-enabled health care delivery.

New Investigators, New Ideas Initiative

NIH plays a central role in the vitality of the biomedical research community in the United States and globally. The agency must continue to place a high priority on funding innovative people and ideas, providing support for the next generation of scientists, and ensuring support for early stage investigators.

Through the New Investigators, New Ideas initiative, NIH will empower and reinvigorate the biomedical research community. The initiative will enable NIH to award research project grants to first-time, early-stage investigators with new ideas and new perspectives and continue two programs - the NIH Director's New Innovator Award and the Pathway to Independence Award. These awards are designed to support and enable our brightest young scientists to pursue innovative research, and participate and thrive in the biomedical research community. The NIH Director's New Innovator Awards supports exceptionally creative new investigators who propose highly innovative projects that have the potential for unusually high impact. It is designed specifically to support creative investigators with highly innovative ideas at an early stage of their career when they may lack data required to compete successfully for an R01 grant. The Pathway to Independence Award provides a unique opportunity for highly promising scientists to transition from a mentored postdoctoral fellowship to their first independent research support. The program facilitates the ability of new investigators to complete their supervised research work, establish independence, publish results, obtain an independent research position, and prepare an application for other NIH grant support.

Over the past decades, young scientists are spending longer and longer periods of time as postdoctoral fellows. The average age of a scientist at his/her first independent award from NIH has risen to 42 years (from 36 years in 1981). In FY 2012, the new Director's Early Independence Award Program will encourage and support the most talented young scientists to

move directly from a doctoral degree to an independent career. A selected group of scientists who recently completed their graduate work will be provided resources, support, and mentorship to pursue independent projects. This will eliminate the increasingly elongated period of postdoctoral training, and it will jump-start the independent research contributions from these exceptionally creative and independent young investigators.

The development of physician scientists is a critical priority given longstanding concerns about the many barriers that physicians face in becoming clinical investigators and given their critical role in advancing translational science. The new Lasker Clinical Research Scholars program, a public-private partnership with the Lasker Foundation, will enable NIH to step up efforts to facilitate the training of clinical researchers. Lasker Scholars are drawn from the Nation's most talented clinically trained scientists who are in the early stages of research careers. The program provides them with research experience as a tenure-track principal investigator within the NIH Intramural Research Program, as well as additional years of independent research support, either through intramural support or at an extramural institution.

NIH will provide an across-the-board increase of four percent for stipends under the Ruth L. Kirschstein National Research Service Award training program.

Impact on the Biomedical Research Enterprise

This budget request reflects the agency's emphasis on areas of exceptional opportunity for advancing biomedical knowledge and the application of this knowledge to improve health. Of the $745 million increase over FY 2010, NIH will invest $100 million in the Cures Acceleration Network. Other programs and objectives cited above also will receive additional funding. The grant application and peer review process will focus funding on these objectives, while leaving intact the investigator-initiated nature of NIH-funded research projects. Thus, although specific funding levels for each investment area are not specified in advance, these areas will be supported heavily in FY 2012.

Policies also have been established to guide investments, while limiting inflationary cost increases. These policies for FY 2012 include: a one percent increase in the average cost of competing and non-competing Research Project Grants (RPGs); a one percent increase in Research Centers and Other Research; and a one percent increase for Intramural Research and Research Management and Support. Staffing levels also have been constrained. These policies were necessary to enable expanded support for critical areas of opportunity.

NIH estimated funding for the individual funding delivery mechanisms (e.g., competing research project grants, training), taking into account the NIH-wide investment policies and the current NIH research portfolio. As the NIH-wide policies are applied to the budgets and research portfolios of each institute and center, other factors (e.g., multiple grant cohorts, exceptionally large single grants and assessments to support cross-NIH requirements) come into play. The resulting funding estimates by mechanism, therefore, do not correspond solely to the inflation policy limitations.

For example, this budget request protects critical activities, including new and competing research project grants (RPGs), to the extent possible within overall funding constraints and requirements to support extramural commitments and NIH's infrastructure. However, since 75-80 percent of the RPG budget in any given year is committed to multi-year grants, the funds available for new and competing grants are limited. From FY 2010 to FY 2011 these factors, combined with the overall funding level, resulted in a decrease of 652 in the number of competing RPGs. However, for FY 2012, NIH again will focus funding on RPGs, resulting in an increase over the FY 2011 level of 424 competing RPGs. Overall, from FY 2010 to FY 2012, the number of competing RPGs, nonetheless, decline by 228.

The FY 2012 NIH Budget Request reflects changes in the distribution of funding by funding mechanism, as noted in the summary table below. A detailed funding mechanism table is provided following the All Purpose Table later in this section. A more detailed discussion of the impact of the Request by funding mechanism is provided in the Narrative by Activity section below.

Summary of Impacts on Mechanism Funding and Key Program Measures

($ in millions, except where noted)

	FY 2012 President's Budget	Change from FY 2010
Research Project Grants:		
Competing Average Cost ($ in 000s)	$433	$16
Number of Competing Awards (whole number)	9,158	-228
Estimated Competing RPG Success Rate: Absolute Rate	19%	-2%
Total Funding, All RPGs	$16,909	$436
Research Centers	$3,036	-$41
Other Research	$1,820	$25
Training	$794	$19
Research & Development Contracts	$3,545	$89
Intramural Research	$3,382	$50
Research Management and Support	$1,538	$30
Common Fund [1]	*$557*	*$13*
Buildings and Facilities	$134	$26
Other Mechanisms [2]	$831	$111
Total, Program Level	**$31,987**	**$745**

[1]Common Fund support also is represented within the relevant funding delivery mechanisms and appears separately here in italics as a "non-add."

[2]Includes budget authority identified for Office of the Director-Other and Superfund Research account, as well as transfer-in resources provided for National Library of Medicine (NLM) Program Evaluation.

Other NIH-Supported Initiatives

Presidential Initiatives

Autism, Cancer and Alzheimer's Disease Research

NIH will continue support for cancer, autism and Alzheimer's research in FY 2012. Consistent with the Administration's priority to both advance research and improve the outcomes for individuals suffering from these debilitating and costly illnesses, NIH will expand efforts that focus on the most promising avenues for discovery and translation of scientific understanding into effective prevention and treatment.

- Autism: NIH will continue to support a study of the health outcomes of children with ASD and their families. The study is the first of its kind to analyze existing administrative medical claims data to describe health trajectories and the utilization of health care services among children with ASD and their families compared with demographically matched control families. NIH will continue to support the Autism Centers of Excellence (ACE) program, which comprises 11 research centers and networks at major research institutions across the country, focusing on identifying the causes of ASD and developing new and improved treatments. Initially funded in FY 2007 and FY 2008, these centers will be supported through FY 2013. NIH is currently planning to issue a funding opportunity announcement to renew the ACE program in FY 2012 and beyond.

- Cancer: NCI is using new technologies to develop a deeper understanding of the molecular and genetic mechanisms that cause cancer and is establishing the Center for Cancer Genomics to coordinate activities related to genome structure and function across the Institute. The major component of this Center, The Cancer Genome Atlas, is a multi-institutional, collaborative study, conducted jointly with the NHGRI. It has recently cataloged the genetic alterations in two important cancers for which early diagnostic methods, broadly applicable prevention strategies, and effective therapies are not yet available: the uniformly lethal brain cancer, glioblastoma multiforme (GBM), and serous ovarian carcinoma.

  NCI is implementing changes to its Cooperative Groups Clinical Trials Program that will improve efficiency, oversight, and collaboration of trials, as recommended in an April 2010 Institute of Medicine report. These changes include: consolidation of the adult clinical trials groups; standardization of clinical trials data management software for NCI-sponsored multi-site trials; acceleration of clinical trial activation through the implementation of a real-time, internet-based dashboard containing clinical trial information for all parties involved in the process; collaboration with the Food and Drug Administration (FDA) by involving FDA scientists in NCI's disease-specific scientific steering committees; standardization of language for clinical trial and intellectual property agreements; improving funding of studies and increasing incentives for patient and physician participation by increasing per case reimbursement rates and developing a credentials registry for investigators and clinical trial sites.

- Data recently announced by the NCI-sponsored National Lung Screening Trial indicate that screening with low-dose computed tomography (CT) results in twenty percent fewer lung cancer deaths among current and former heavy smokers. This development marks the first time that a screening test has been found to reduce mortality from lung cancer, the most common cause of cancer deaths in the United States and the world.

- Alzheimer's Disease: NIH plans an expanded initiative to stimulate and advance research on the discovery and development of new preventive and therapeutic interventions for Alzheimer's Disease (AD), mild cognitive impairment, and age-related cognitive decline. This initiative will continue to support studies that lead to the submission of Investigational New Drug (IND) applications to the Food and Drug Administration, a prerequisite for beginning human trials of potential new therapies. It is anticipated that the program will support the development of an estimated 25 to 50 compounds over the continuation period.

  In addition, NIH will renew support for the Alzheimer's Disease Cooperative Study (ADCS), the Nation's preeminent clinical trials consortium devoted to the discovery, development and testing of new interventions for the prevention and treatment of AD. Building on recent exciting discoveries from the Alzheimer's Disease Neuroimaging Initiative, the ADCS will focus on new trial approaches using imaging and other biomarkers in cerebrospinal fluid and plasma to identify participants with AD pathology and to track disease progression and treatment response. ADCS investigators will place an increased emphasis on prevention studies, particularly in at-risk but presymptomatic individuals.

  Moreover, NIH will develop the AD Genetics Data Warehouse, a web-based repository of genetic data from a variety of AD studies. Warehouse data will be available to qualified investigators worldwide for use on basic science and clinical research studies. This initiative will speed the pace of discovery by providing a centralized resource through which investigators can access, study, and share their own high-quality data relevant to AD.

Recognizing the enormous and as yet untapped potential of human induced pluripotent stem (iPS) cells as models of human disease, NIH plans to support a ground-breaking initiative on the development of iPS cells and other reprogrammed cells for aging and Alzheimer's disease modeling. The use of human iPS cells would facilitate study of the genetic, molecular, and cellular mechanisms underlying human aging and AD and would provide a platform for drug screening and toxicity testing, and iPS cells would serve as a versatile complement to the cell lines and animal models currently in use.

Sustainability

In accordance with Executive Order (E.O.) 13514 - Federal Leadership in Environmental, Energy and Economic Performance - NIH has developed an inventory of its investments in sustainable resource use. This inventory demonstrates NIH's longstanding commitment to the responsible use of resources. Based on this inventory, NIH will provide an estimated $118 million in FY 2010-FY 2011 to implement the E.O. For example, NIH will invest approximately $4 million in FY 2010-FY 2011 in facility remediation and decommissioning

to address hazardous contaminants and minimize construction and demolition waste. Also, NIH has conducted a number of sustainability assessments, including an analysis of features to be incorporated into the design of the Porter Neuroscience Research Center Phase II project. Using a portion of the building and facilities funding in FY 2012, NIH will continue to invest in the E.O.'s objectives.

Administrative Cost Reductions

NIH is continuing to pursue every viable opportunity to reduce administrative costs and expand contracting and grant-making efficiencies. The agency is reviewing several proposals under the President's SAVE initiative. One such proposal may significantly reduce the travel costs associated with NIH's grant proposal peer review process by implementing more advanced communications technologies. In addition, NIH is continuing to implement more competitive and performance-based contracting approaches to ensure contracts provide high quality and cost-effective products and services. Overall, NIH estimates additional administrative cost savings in FY 2012 of over $15 million.

Other Priorities

Type 1 Diabetes

The Medicare and Medicaid Extenders Act of 2010 extended through FY 2013 the authorization for the mandatory appropriation of $150 million a year for the special research program on Type 1 diabetes.

HIV/AIDS

NIH will continue support in FY 2012 for its HIV/AIDS research. This research is discussed in greater detail in the Office of AIDS Research section in Tab 5 below.

High Priority Performance Goal

NIH will continue to focus on achieving the High Priority Performance Goal (HPPG) to reduce the fully loaded cost of sequencing a human genome to $15,000 in FY 2012 from the FY 2010 target of $50,000 and the FY 2011 target of $25,000. The reduction of sequencing costs will stimulate ground-breaking research ranging from studies aimed at understanding the human genome to those intended to lead to improvements in the prevention, diagnosis, and treatment of human illness.

FY 2012 Budget Request
National Institutes of Health

OVERVIEW OF PERFORMANCE

NIH supports a wide spectrum of scientific endeavors and engages in a full range of activities that enable research, its management, and the communication of research results. Because of this diversity and complexity, NIH uses a set of performance measures that are representative of its activities and that are useful for tracking progress in achieving performance priorities. By assessing the progress and results of its activities, NIH is positioned to respond effectively to new scientific opportunities and emerging public health needs.

Many of the NIH performance measures support the four initiatives, as described in the previous pages. In addition to aligning with these initiatives, NIH's performance priorities support the goals and objectives of the new HHS Strategic Plan 2010-2015. In particular, NIH substantially contributes to the HHS Strategic Goal 2 - Advance Scientific Knowledge and Innovation (Objective A: Accelerate the process of scientific discovery to improve patient care). For example, in FY 2012 NIH will:

- Apply innovative high-throughput technologies to understanding health and disease - by making freely available to researchers the results of 300 high-throughput biological assays, screened against a library of 300,000 unique compounds that are expected to provide a scientific resource that will accelerate the discovery of protein functions that control critical processes such as development, aging, and disease.

- Implement personalized medicine - by identifying and characterizing two molecular pathways of potential clinical significance that may serve as the basis for discovering new medications for preventing and treating asthma exacerbations.

Moreover, in support of the President's goal of transforming and modernizing the U.S. health care system and the HHS Strategic Goal 1 - Transform Health Care (Objective C: Emphasize primary and preventive care linked with community prevention services), NIH will:

- Identify three key factors influencing the scaling up of research-tested interventions across large networks of services systems such as primary care, specialty care and community practice.

NIH uses performance data to inform strategic decision-making. Effective performance measures have allowed NIH to monitor progress towards achieving its goals, to adjust its activities to increase efficiency and effectiveness, and to identify and promote evidence-based approaches in managing its programs. However, a number of challenges must be addressed to develop useful performance measures to track progress of scientific programs. In many instances, research outcomes cannot be foreseen with certainty, but progress may be captured with milestones toward the planned objectives. Unplanned results also are common in scientific studies. At times they can provide new information to redirect the course of research. Moreover, the full value of any given research finding may not be apparent at the time of

discovery. The implications or applications of some findings often only occur after many years or in combination with other advances. In some cases, the downstream impact of scientific knowledge generated by basic research is not known without further development by the private sector, public agencies, universities, or other research institutions.

NIH strives to achieve transparency and accountability to the American people by regularly reporting results, achievements, and the impact of its activities. By using a set of measures that are representative of its activities, NIH has successfully implemented an approach to actively measure its performance priorities and share this information with HHS, the rest of the Executive Branch, the Congress, and the general public. Detailed information on all of NIH's performance measures is available in the NIH Online Performance Appendix.

Summary of Targets and Results Table

NIH tracks its performance against a set of performance measures with targets for each measure specified for each fiscal year. As appropriate, the measures are retired when they are no longer relevant and new measures are added. The following table provides summary data on NIH's overall performance against its established targets. For example, of the 89 measures applicable to FY 2010, there were 99 performance targets. NIH met 91 of these targets, or 92 percent of the targets for which data were available.

Fiscal Year	Total Targets	Targets with Results Reported	Percent of Targets with Results Reported	Total Targets Met	Percent of Targets Met
2007	76	74	97%	66	87%
2008	80	79	99%	72	90%
2009	85	84	99%	74	87%
2010	99	99	100%	91	92%
2011	94	N/A	N/A	N/A	N/A
2012	74	N/A	N/A	N/A	N/A

NATIONAL INSTITUTES OF HEALTH

AH Purpose Table [1]

(Dollars in thousands)

	FY 2010 Actual	FY 2011 CR[1]	FY 2012 Estimate	Change from FY 2010 Actuals
Labor/HHS Discretionary Budget Authority (B.A.)	**$31,005,201**	**$30,705,788**	**$31,747,915**	**$742,714**
Interior B.A.	$79,212	$79,212	$81,085	$1,873
Total Discretionary B.A.	**$31,084,413**	**$30,785,000**	**$31,829,000**	**$744,587**
Type I Diabetes Initiative	$150,000	$150,000	$150,000	$0
Total B. A.	$31,234,413	$30,935,000	$31,979,000	$744,587
NIH Program Level [2]	$31,242,613	$30,943,200	$31,987,200	$744,587
Number of Competing RPGs	*9,386*	*8,734*	*9,158*	*-228*
Total Number of RPGs	*36,809*	*36,328*	*36,852*	*+43*
FTEs	*18,362*	*18,412*	*18,412*	*+50*

[1] The 2010 Labor, HHS, and Education Appropriations Act included a total of $4,818,275,000 for NIAID, of which $304,000,000 was transferred from the Biodefense Countermeasures account in the Department of Homeland Security. Since there are no funds remaining in that account in 2011, under the current law continuing resolution (P.L. 111-317), there can be no transfer to NIAID. The Administration supports replacing this transfer with budget authority for NIAID in 2011. Includes $1 million transfer from GDM for the Interagency Autism Coordinating Committee in FY 2010 and FY 2011.

[2] Includes NLM Program Evaluation of $8.2 million in each year.

NATIONAL INSTITUTES OF HEALTH

Budget Mechanism - Total [1]

(dollars in thousands)

MECHANISM	FY 2010 Actual [7]		FY 2011 CR [7]		FY 2012 PB		Change	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Grants:								
Research Projects:								
Noncompeting	25,738	$11,732,029	25,936	$11,871,057	26,019	$12,135,448	281	$403,419
Administrative Supplements	*1,517*	174,393	*1,378*	164,699	*1,282*	154,923	(235)	(19,470)
Competing:							0	0
Renewal	2,537	1,249,215	2,429	1,207,457	2,429	1,233,106	(108)	(16,109)
New	6,792	2,650,274	6,258	2,495,690	6,681	2,721,759	(111)	71,485
Supplements	57	15,347	47	14,168	48	14,197	(9)	(1,150)
Subtotal, Competing	9,386	$3,914,836	8,734	$3,717,315	9,158	$3,969,062	(228)	$54,226
Subtotal, RPGs	35,124	$15,821,258	34,670	$15,753,071	35,177	$16,259,433	53	$438,175
SBIR/STTR	1,685	$651,519	1,658	$637,161	1,675	$649,370	(10)	($2,149)
Research Project Grants	36,809	$16,472,777	36,328	$16,390,232	36,852	$16,908,803	43	$436,026
Research Centers:								
Specialized/Comprehensive	1,197	$2,294,986	1,201	$2,227,367	1,198	$2,242,880	1	($52,106)
Clinical Research	79	435,787	74	434,148	71	443,844	(8)	8,057
Biotechnology	109	153,412	100	147,078	100	148,574	(9)	(4,838)
Comparative Medicine	50	133,062	49	139,631	49	141,018	(1)	7,956
Research Centers in Minority Institutions	23	60,452	22	59,455	22	60,024	(1)	(428)
Research Centers	1,458	$3,077,699	1,446	$3,007,679	1,440	$3,036,340	(18)	($41,359)
Other Research								
Research Careers	4,049	$649,044	4,025	$651,467	4,007	$651,917	(42)	$2,873
Cancer Education	91	35,444	89	34,944	89	34,944	(2)	(500)
Cooperative Clinical Research	332	430,727	386	458,598	412	464,209	80	33,482
Biomedical Research Support	134	67,626	133	66,305	123	61,958	(11)	(5,668)
Minority Biomedical Research Support	371	107,035	372	106,009	378	107,232	7	197
Other	1,706	504,286	1,718	495,543	1,678	499,241	(28)	(5,045)
Other Research	6,683	$1,794,162	6,723	$1,812,866	6,687	$1,819,501	4	$25,339
Total Research Grants	44,950	$21,344,638	44,497	$21,210,777	44,979	21,764,644	29	$420,006
Research Training:	FTTPs		FTTPs		FTTPs			
Individual Awards	3,071	$125,301	3,084	$129,510	3,104	$134,661	33	$9,360
Institutional Awards	14,090	649,916	13,947	652,527	13,727	659,743	(363)	9,827
Total Research Training	17,161	$775,217	17,031	$782,037	16,831	$794,404	(330)	$19,187
Research & Development Contracts	2,508	$3,455,571	2,518	$3,257,522	2,519	$3,544,551	11	$88,980
(SBIR/STTR)	*129*	*$39,438*	*135*	*$45,039*	*127*	*$44,749*	*(2)*	*$5,311*
Intramural Research		$3,331,414		$3,342,540		$3,381,705		$50,291
Research Management and Support		1,507,640		1,522,721		1,537,588		29,948
Extramural Construction		0		0		0		0
Office of the Director - Appropriation [3]		*$1,176,844*		*$1,176,299*		*$1,298,412*		*$121,568*
Office of the Director - Other		632,816		632,271		741,522		109,251
Bridge Awards [3]		*0*		*0*		*0*		*0*
Common Fund [3]		*544,028*		*544,028*		*556,890*		*12,862*
Buildings and Facilities [4]		107,905		107,920		133,501		25,596
Appropriation		*125,581*		*100,000*		*125,581*		*0*
Type 1 Diabetes [5]		(150,000)		(150,000)		(150,000)		(0)
Subtotal, Labor/HHS Budget Authority		**$31,005,201**		**$30,705,788**		**$31,747,915**		**$742,714**
Interior Appropriation for Superfnd Res.		79,212		79,212		81,085		1,873
Total, NIH Discretionary B.A.		**$31,084,413**		**$30,785,000**		**$31,829,000**		**$744,587**
Type 1 Diabetes [6]		150,000		150,000		150,000		0
Total, NIH Budget Authority		**$31,234,413**		**$30,935,000**		**$31,979,000**		**$744,587**
NLM Program Evaluation		8,200		8,200		8,200		0
Total, Program Level		**$31,242,613**		**$30,943,200**		**$31,987,200**		**$744,587**
Grand Total, BA		**$31,242,613**		**$30,943,200**		**$31,987,200**		**$744,587**

[1] All items in italics are "non-adds"; items in parenthesis are subtractions.

[2] Flexible Research Authority is noted as a non-add since the funding is accounted for within the Office of the Director (OD) - Other line.

[3] Number of grants and dollars for The Common Fund are distributed by mechanism and are noted here as a non-add. The Office of the Director - Appropriations also is noted as a non-add since these funds are accounted for under OD - Other and Common Fund within the above mechanism distribution.

[4] Includes B&F appropriation plus construction dollars appropriated to NCI.

[5] Number of grants and dollars for Type I Diabetes are distributed by mechanism above; therefore, Type I Diabetes amount is deducted to provide subtotals only for th Labor/ HHS Budget Authority.

[6] Reflects HHS ASFR specified treatment of mandatory Type 1 Diabetes funding from the U.S. Treasury.

[7] FY 2010 reflects Secretary's 1% Transfer ($4.587 million), as well as $1 million transfer from HHS for the Interagency Autism Coordinating Committee. FY 2011 also reflects the $1 million transfer.

Summary of Recovery Act Performance

Buildings and Facilities Implementation Plan

Performance Measure	FY 2009 Result	FY 2010 Result	FY 2011 Target/Date	FY 2012 Target/Date
Number of capital facility project awards completed	6	18	-	-
Reduction in the backlog of maintenance and repairs	$ 23.0 M	$ 157.7 M	-	-
Condition Index improvement	0.5	3.1	-	-

Implementation Data Source: Deputy Director, Office of Research Facilities for ARRA Oversight; ARRA contract oversight specialists; and ARRA Contract and Project Officers.

NIH's Building and Facilities program received $500 million of Recovery Act funding to obligate during FY 2009 and FY 2010 by awarding 24 pre-approved capital facility projects. The first six projects were awarded in FY 2009, and the remaining 18 project awards were successfully completed during FY 2010. Awarding these 24 projects reduced NIH's backlog of maintenance and repairs by $180.7 million. Awards made in FY 2009 reduced the backlog by $23.0 million, and awards completed during FY 2010 further reduced the backlog by $157.7 million. In addition, successfully awarding these 24 projects improved NIH's Condition Index by 3.6 points. Awards made in FY09 improved the Condition Index by 0.5 points, and awards completed during FY 2010 improved the Condition Index by an additional 3.1 points. The remaining funding, $319.3 million, was used to support new construction efforts, including the new PNCR II building for $175.7 million and the construction of a new west utility tunnel for $22.3 million, thus helping to meet some of NIH's most critical construction needs.[3]

Comparative Effectiveness Research (CER) Implementation Plan

Performance Measure	FY 2009 Result	FY 2010 Result	FY 2011 Target/Date	FY 2012 Target/Date
Number of Meritorious Grants Awarded	166	214	N/A	N/A
Number of CER Meetings	27	34	46	58

Implementation Data Source: RePORTer

NIH received $400 million to support expanded comparative effectiveness research. For the performance measure, number of meritorious grants awarded, the 214 awards allowed NIH to expand its portfolio of landmark clinical effectiveness trials to fund additional comparisons within ongoing clinical trials, support new CER projects, and compare the effectiveness of

[3] The ARRA measurement data reported here is consistent with all prior ARRA reporting where the Condition Index and Backlog of Maintenance and Repair methodology recognized improvements when an award was made.

dissemination and translation techniques to facilitate the use of CER by patients, clinicians, payers, and others. ARRA funding also addressed a critical need for CER, namely developing and optimizing methods to design, implement, analyze, and report CER. Moreover, ARRA funds bolstered CER infrastructure and training--all in a trans-agency context.

For the performance measure, the number of CER meetings, the meetings included both the NIH CER Coordinating Council meetings, which occur monthly, and related meetings that included other Federal agencies (e.g., Agency for Healthcare Research and Quality, Food and Drug Administration, U.S. Department of Veterans Affairs) and the Federal Coordinating Council (FCC - CER), as well as national CER meetings focused on CER methodology research or the interface of CER and personalized medicine.

Extramural Construction Implementation Plan

Performance Measure	FY 2009 Result	FY 2010 Result	FY 2011 Target/Date	FY 2012 Target/Date
Number of grantees that have completed the final design phase	0	10	146	147

Implementation Data Source: The data comes from NIH internal databases that receive the design documents and track when design submissions occur.

NIH received $1 billion to support extramural construction programs. This performance measure reports the number of extramural construction awards that have completed the final design phase. Once final designs have been reviewed and approved, funds are released to allow the awardees to begin their construction/renovation project.

Shared Instrumentation Implementation Plan

Performance Measure	FY 2009 Result	FY 2010 Result	FY 2011 Target/Date	FY 2012 Target/Date
Shared instrumentation projects complete	0	128	150	200

Implementation Data Source: The data comes from recipient 1512 reports.

To support shared instrumentation programs, NIH received $300 million. This performance measure reports the number of major scientific research instruments that have been purchased and installed. Generally, it is expected that recipients will only mark their project as complete when the instrument has been delivered and has passed the benchmarks that demonstrate that the equipment is functioning correctly.

Performance Measure	FY 2009 Result	FY 2010 Result	FY 2011 Target/Date	FY 2012 Target/Date
Take advantage of advances in genomics research and high-throughput technologies to understand the fundamentals of biology and the causes of specific diseases.	N/A	Four of five FY 2010 targets were met.	Use the newly developed tools and resources to advance the research into the underlying causes of prevalent diseases. (12-2011)	N/A
Use new discoveries about health and disease to develop diagnostics, prevention, and therapies.	N/A	FY 2010 targets were met.	Demonstrate the therapeutic feasibility of the identified strategies and refine the stem cell models for future use in therapeutics. (12-2011)	N/A
Put science to work for the benefit of health care and reform.	N/A	FY 2010 targets were met.	Finalize development and begin testing the tools and resources identified in 2010. (12-2011)	N/A

Implementation Data Source: Complete descriptions of each performance measure and corresponding targets are available on the web at http://officeofbudget.od.nih.gov/index.htm

To support expanded scientific research, NIH received $8.2 billion. There were fourteen FY 2010 targets planned under the three performance objectives to gauge the performance of the scientific research implementation plan. Thirteen of the targets were met; however, the plan to analyze oral cancer genomes using high throughput methods to develop a blueprint of genetic

alterations is behind schedule. The rigorous screening protocol resulted in a lower than expected yield of analyzable specimens in the first year, and future targets have been adjusted to permit an expected 94 matched oral cancer specimens to be analyzed. This revised schedule will still permit the goal of developing a blueprint of genetic alterations for oral cancer to be realized. The 2011 target has been adjusted to reflect these technological improvements in genomic analysis.

FY 2012 Budget Submission
National Institutes of Health

Recovery Act Outlays
(dollars in millions)

ARRA Implementation Plan	Total Resources Available	FY 2009/ FY 2010 Outlays	FY 2011 Outlays	FY 2012 Outlays
Scientific Research	8,200.0	2,948.0	2,795.0	2,253.0
Comparative Effectiveness Research	400.0	88.0	150.0	145.0
Shared Instrumentation	300.0	96.0	113.0	60.0
Extramural Construction	1,000.0	18.0	82.0	100.0
Building and Facilities	500.0	50.0	123.0	145.0
Total Outlays	10,400.0	3,200.0	3,263.0	2,703.0

NIH ARRA APPROPRIATED FUNDS
(dollars in thousands)

	Scientific Research	Shared Instrumentation	Extramural Construction	B&F	Comparative Effectiveness Research[1]	Total
National Cancer Institute	$1,256,500					$1,256,500
National Heart, Lung and Blood Institute	762,600					762,600
National Institute of Dental and Craniofacial Research	101,800					101,800
National Institute of Diabetes and Digestive and Kidney	445,400					445,400
National Institute of Neurological Disorders and Stroke	402,900					402,900
National Institute of Allergy and Infectious Diseases	1,113,300					1,113,300
National Institute of General Medical Sciences	505,200					505,200
National Institute of Child Health and Human Development	327,400					327,400
National Eye Institute	174,100					174,100
National Institute of Environmental Health Sciences[2]	187,400					187,400
National Institute on Aging	273,300					273,300
National Institute of Arthritis and Musculoskeletal and Skin	132,700					132,700
National Institute on Deafness and Other Communication	103,000					103,000
National Institute of Mental Health	366,800					366,800
National Institute on Drug Abuse	261,200					261,200
National Institute on Alcohol Abuse and Alcoholism	113,900					113,900
National Institute of Nursing Research	35,900					35,900
National Human Genome Research Institute	127,000					127,000
National Institute of Biomedical Imaging and Bioengineering	77,900					77,900
National Center on Minority Health and Health Disparities	52,100					52,100
National Center for Research Resources	310,100	$300,000	$1,000,000			1,610,100
National Center for Complementary and Alternative Medicine	31,700					31,700
Fogarty International Center	17,400					17,400
National Library of Medicine	83,600					83,600
Common Fund	136,800					136,800
Office of the Director	800,000				$400,000	1,200,000
Buildings and Facilities:				$500,000		500,000
NIH ARRA Total:	**$8,200,000**	**$300,000**	**$1,000,000**	**$500,000**	**$400,000**	**$10,400,000**

[1] ARRA funding for NIH included a $400 million transfer from the Agency for Healthcare Research and Quality for patient-centered/comparative effectiveness health research.

[2] Includes funds for the Superfund program.