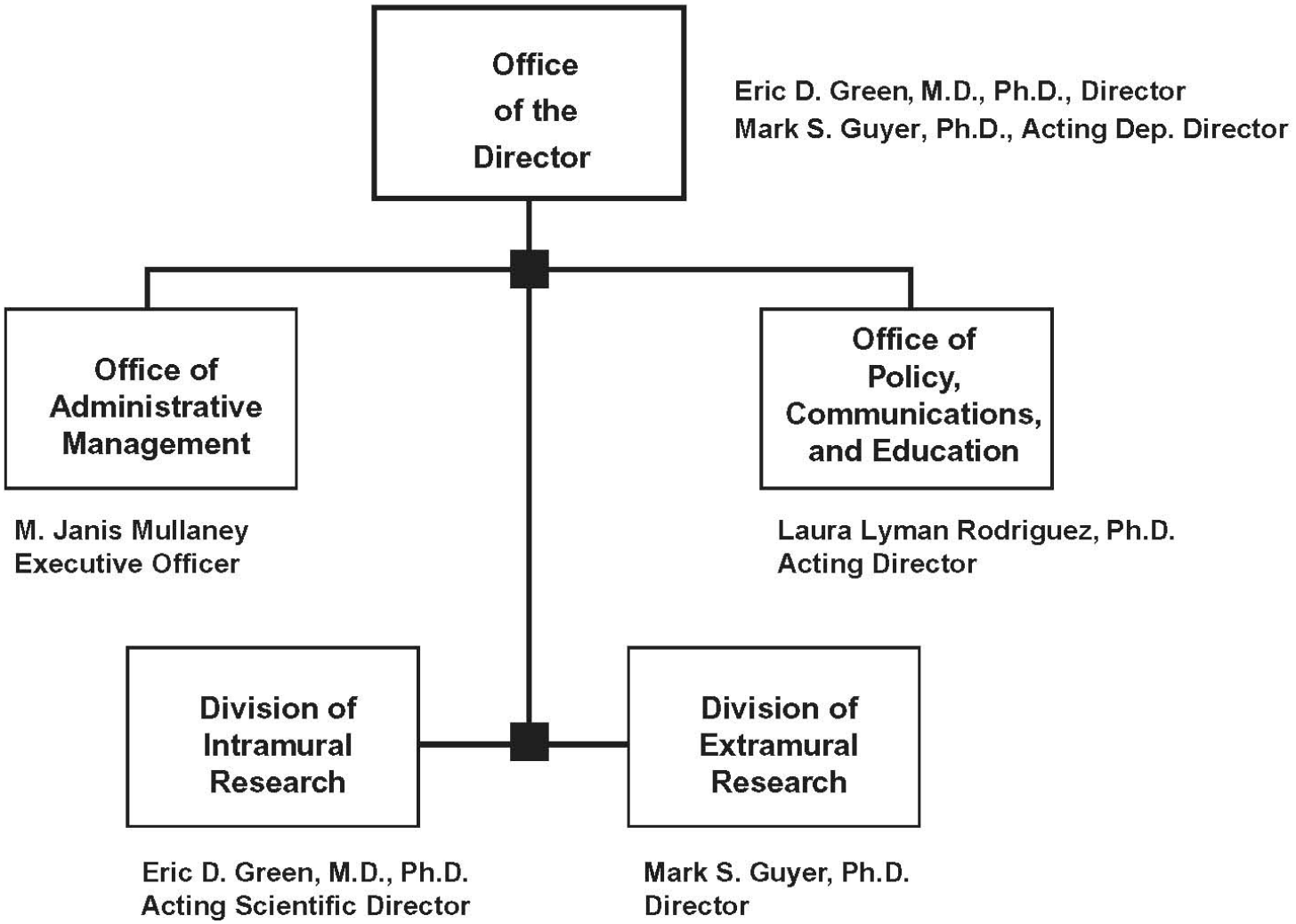
DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Human Genome Research Institute

NATIONAL HUMAN GENOME RESEARCH INSTITUTE

Organizational Structure



NATIONAL INSTITUTES OF HEALTH

National Human Genome Research Institute

For carrying out section 301 and title IV of the Public Health Services Act with respect to human genome research [$516,028,000] *$533,959,000* (Public Law 111-117, Consolidated Appropriations Act, 2010.)

National Institutes of Health
National Human Genome Research Institute

Amounts Available for Obligation 1/

Source of Funding	FY 2009 Actual	FY 2010 Enacted	FY 2011 PB
Appropriation	$502,367,000	$516,028,000	$533,959,000
Type 1 Diabetes	0	0	0
Rescission	0	0	0
Supplemental	0	0	0
Subtotal, adjusted appropriation	502,367,000	516,028,000	533,959,000
Real transfer under Director's one-percent transfer authority (GEI)	4,911,000	0	0
Real transfer to the Global Fund to fight HIV/AIDS, Malaria and Tuberculosis	0	0	0
Comparative transfer to NLM for NCBI, Public Access	-106,000	-152,000	0
Comparative transfer under Director's one-percent transfer authority (GEI)	-4,911,000	0	0
Comparative transfer to the Global Fund to fight HIV/AIDS, Malaria and Tuberculosis	0	0	0
Comparative transfer from DHHS for Autism	0	0	0
Subtotal, adjusted budget authority	502,261,000	515,876,000	533,959,000
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	502,261,000	515,876,000	533,959,000
Unobligated balance lapsing	-68,000	0	0
Total obligations	502,193,000	515,876,000	533,959,000

1/ Excludes the following amounts for reimbursable activities carried out by this account:
FY 2009 - $51,321,000 FY 2010 - $52,290,000 FY 2011 - $78,290,000

Excludes $247,328 in FY 2009, $116,985 in FY 2010 and $166,862 in FY 2011 for royalties.

NATIONAL INSTITUTES OF HEALTH

National Human Genome Research Institute

(Dollars in Thousands)

Budget Mechanism - Total

MECHANISM	FY 2009 Actual		FY 2009 Recovery Act Actual		FY 2010 Recovery Act Estimated		FY 2010 Enacted		FY 2011 PB		Change	
Research Grants:	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Projects:												
Noncompeting	167	$96,903	0	$0	44	$33,267	168	$108,797	133	$91,937	(35)	-$16,860
Administrative supplements	(36)	15,127	(56)	32,533	(17)	6,732	(21)	8,663	(22)	10,522	1	1,859
Competing:												
Renewal	14	15,513	0	0	0	0	15	15,969	23	24,432	8	8,463
New	51	24,020	45	34,507	1	2,075	51	24,976	76	38,213	25	13,237
Supplements	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal, competing	65	39,533	45	34,507	1	2,075	66	40,945	99	62,645	33	21,700
Subtotal, RPGs	232	151,563	45	67,040	45	42,074	234	158,405	232	165,104	(2)	6,699
SBIR/STTR	25	11,060	1	198	3	925	24	10,983	25	11,022	1	39
Subtotal, RPGs	257	162,623	46	67,238	48	42,999	258	169,388	257	176,126	(1)	6,738
Research Centers:												
Specialized/comprehensive	24	153,748	1	4,220	0	0	21	151,976	22	156,552	1	4,576
Clinical research	0	0	0	0	0	0	0	0	0	0	0	0
Biotechnology	19	34,302	0	5,650	0	0	17	40,828	18	42,057	1	1,229
Comparative medicine	0	839	0	0	0	0	0	700	0	700	0	0
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal, Centers	43	188,889	1	9,870	0	0	38	193,504	40	199,309	2	5,805
Other Research:												
Research careers	8	1,815	0	0	0	0	8	1,842	8	1,897	0	55
Cancer education	0	0	0	0	0	0	0	0	0	0	0	0
Cooperative clinical research	0	0	0	0	1	926	0	0	0	0	0	0
Biomedical research support	0	0	0	0	2	4,385	0	0	0	0	0	0
Minority biomedical research support	0	0	0	0	0	0	0	0	0	0	0	0
Other	14	709	0	0	0	0	14	720	14	742	0	22
Subtotal, Other Research	22	2,524	0	0	3	5,311	22	2,562	22	2,639	0	77
Total Research Grants	322	354,036	47	77,108	51	48,310	318	365,454	319	378,074	1	12,620
Research Training:	FTTPs		FTTPs		FTTPs		FTTPs		FTTPs			
Individual awards	14	571	0	0	0	0	14	577	14	609	0	32
Institutional awards	155	6,971	0	0	0	0	155	7,041	155	7,433	0	392
Total, Training	169	7,542	0	0	0	0	169	7,618	169	8,042	0	424
Research & development contracts	16	15,460	0	0	0	0	16	15,649	16	16,214	0	565
(SBIR/STTR)	(0)	(18)	(0)	(0)	(0)	(0)	(0)	(18)	(0)	(18)	(0)	(0)
	FTEs		FTEs		FTEs		FTEs		FTEs		FTEs	
Intramural research	246	103,092	0	488	0	147	243	104,639	254	107,987	11	3,348
Research management and support	81	22,131	1	287	1	695	80	22,516	84	23,642	4	1,126
Construction		0		0		0		0		0		0
Buildings and Facilities		0		0		0		0		0		0
Total, NHGRI	327	502,261	1	77,883	1	49,152	323	515,876	338	533,959	15	18,083

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

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute
BA by Program
(Dollars in thousands)

	FY 2007 Actual		FY 2008 Actual		FY 2009 Actual		FY 2009 Comparable		FY 2010 Enacted		FY 2011 PB		Change	
Extramural Research	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount	FTEs	Amount
Detail:														
Basic Genomics														
Large-scale Sequencing														
Comparative Genomic Sequencing		$105,029		$70,073		$41,884		$41,884		$35,000		$25,000		-$10,000
Medical Sequencing		11,006		26,261		31,000		31,000		38,870		44,681		5,811
The Cancer Genome Atlas		5,846		16,945		34,000		34,000		35,000		43,000		8,000
Genomic Function		59,201		56,764		54,478		54,919		55,490		57,433		1,943
Genomic Variation		11,538		13,109		16,406		16,406		16,711		17,296		585
Computational Genomics		45,000		46,276		49,871		49,871		50,798		52,576		1,778
Technology Development		47,658		45,475		45,561		45,561		46,408		48,032		1,624
Other Basic Genomics		58,314		57,977		57,211		57,653		58,273		60,315		2,042
Population Genomics		29,599		32,909		32,563		27,088		33,168		34,329		1,161
ELSI		18,628		18,175		18,656		18,656		19,003		19,668		665
Subtotal, Extramural		391,819		383,964		381,630		377,038		388,721		402,330		13,609
Intramural research	217	97,775	228	99,402	246	103,115	246	103,092	243	104,639	254	107,987	11	3,348
Res. management & support	69	18,662	75	22,037	81	22,533	81	22,131	80	22,516	84	23,642	4	1,126
TOTAL	286	508,256	303	505,403	327	507,278	327	502,261	323	515,876	338	533,959	15	18,083

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

Major Changes in the Fiscal Year 2011 Budget Request

Major changes by budget mechanism and/or budget activity 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 2011 budget request for NHGRI, which is $18.083 million more than the FY 2010 Enacted level, for a total of $533.959 million.

Research Project Grants (RPGs) (+$6.738 million, total $176.126 million): The NIH Budget policy for RPGs in FY 2011 provides a two percent inflationary increase in noncompeting awards and a two percent increase in the average cost for competing RPGs. NHGRI will support a total of 257 Research Project Grant (RPG) awards in FY 2011. Noncompeting awards will decrease by 35 awards and $16.860 million. Competing RPGs will increase by 33 awards and $21.700 million. NHGRI will continue to support new investigators and to maintain an adequate number of competing RPGs.

Research Centers (+$5.805 million; total $199.309 million): The FY 2011 budget policy provides a three percent increase. The number of research centers is expected to increase by two to 40 in FY 2011.

Comparative Genomic Sequencing (-$10 million; total $25 million): This decrease represents a continuation of on-going reprioritization and is balanced by increases in the Medical Sequencing and The Cancer Genome Atlas large scale sequencing components (see below). This will allow the Institute to devote a larger proportion of the overall large-scale sequencing effort in FY 2011 to projects directed toward understanding disease.

Medical Sequencing (+$5.811; total $44.681 million): Medical sequencing continues to be an area of growth for the NHGRI. With large-scale sequencing now completely transitioned to the next-generation sequencing instruments, many new opportunities have been created to apply genomic tools to the study of human disease and the application of that information to the development of new approaches to disease management.

The Cancer Genome Atlas (+$8 million; total $43 million): Now in its full-scale production phase, the TCGA effort will be generating enormous amounts of data that will change the face of cancer research. The increase in FY2011 is necessary to maintain the pace of the program, which received significant support from ARRA funds in FY 2009 and FY 2010.

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute
Summary of Changes

FY 2010 estimate				$515,876,000
FY 2011 estimated budget authority				533,959,000
Net change				18,083,000
	2010 Current Estimate Base		Change from Base	
CHANGES	FTEs	Budget Authority	FTEs	Budget Authority
A. Built-in:				
1. Intramural research:				
a. Annualization of January 2010 pay increase		$34,005,000		$206,000
b. January FY 2011 pay increase		34,005,000		357,000
c. Zero less days of pay (n/a for 2011)		34,005,000		0
d. Payment for centrally furnished services		14,417,000		288,000
e. Increased cost of laboratory supplies, materials, and other expenses		56,217,000		916,000
Subtotal				1,767,000
2. Research management and support:				
a. Annualization of January 2010 pay increase		$11,272,000		$68,000
b. January FY 2011 pay increase		11,272,000		118,000
c. Zero less days of pay (n/a for 2011)		11,272,000		0
d. Payment for centrally furnished services		1,011,000		20,000
e. Increased cost of laboratory supplies, materials, and other expenses		10,233,000		169,000
Subtotal				375,000
Subtotal, Built-in				2,142,000

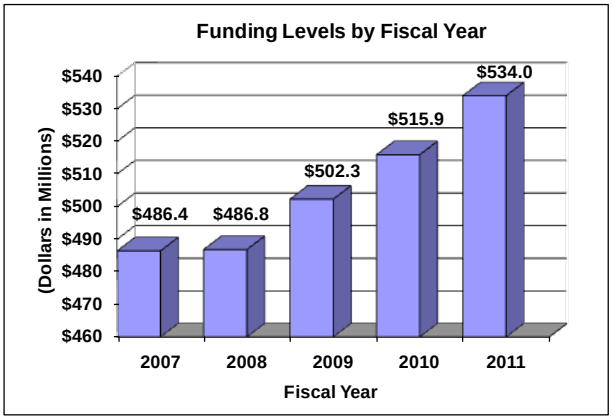
NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

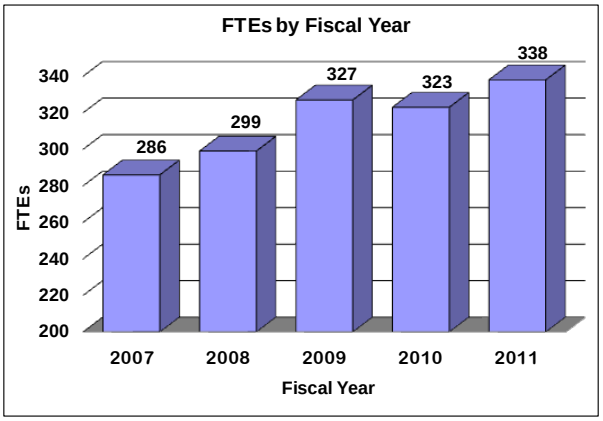
Summary of Changes--continued

CHANGES	2010 Current Estimate Base		Change from Base	
	No.	Amount	No.	Amount
B. Program:				
1. Research project grants:				
a. Noncompeting	168	$117,460,000	(35)	($15,001,000)
b. Competing	66	40,945,000	33	21,700,000
c. SBIR/STTR	24	10,983,000	1	39,000
Total	258	169,388,000	(1)	6,738,000
2. Research centers	38	193,504,000	2	5,805,000
3. Other research	22	2,562,000	0	77,000
4. Research training	169	7,618,000	0	424,000
5. Research and development contracts	16	15,649,000	0	565,000
Subtotal, extramural				13,609,000
	FTEs		FTEs	
6. Intramural research	243	104,639,000	11	1,581,000
7. Research management and support	80	22,516,000	4	751,000
Subtotal, program		515,876,000		15,941,000
Total changes	323		15	18,083,000

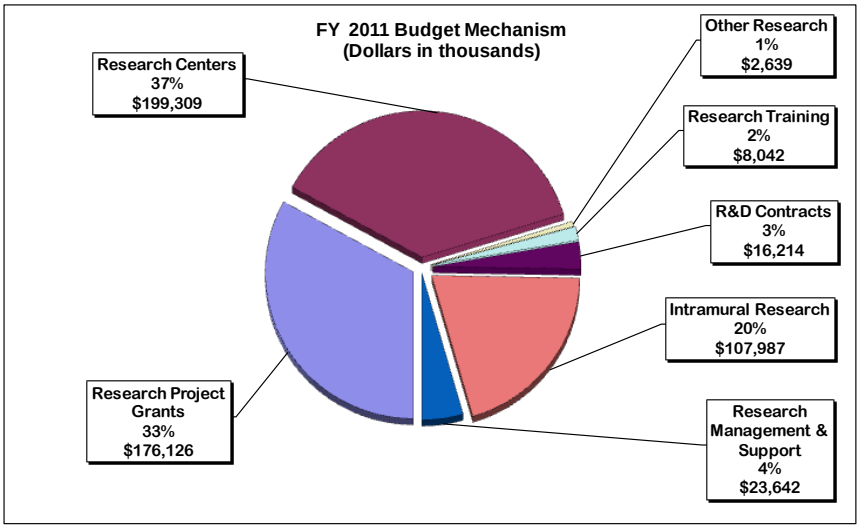
Fiscal Year 2011 Budget Graphs

History of Budget Authority and FTEs:

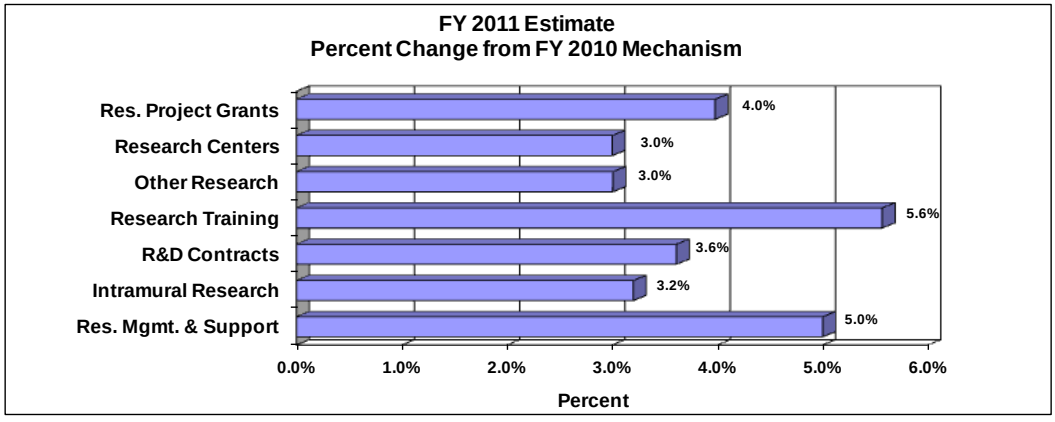




Distribution by Mechanism:



Change by Selected Mechanism:



Justification

National Human Genome Research Institute

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

Budget Authority:

	FY 2009 Omnibus	FY 2010 Appropriation	FY 2011 President's Budget	FY 2011 +/- 2010 Appropriation
BA	$502,261,000	$515,876,000	$533,959,000	+$18,083,000
FTE	327	323	338	+15

This document provides justification for the Fiscal Year (FY) 2011 activities of the National Human Genome Research Institute (NHGRI), including HIV/AIDS activities. Details of the FY 2011 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.

DIRECTOR'S OVERVIEW

In 2003, the National Human Genome Research Institute (NHGRI) oversaw the completion of the Human Genome Project, one of the most ambitious collaborative scientific achievements in history. In the years that have followed, NHGRI has built on that initial success by supporting research to increase understanding of the human genome, drive down the cost of sequencing, and apply the new knowledge and genomic tools to improve preventive and therapeutic health strategies. In this way, NHGRI is creating the necessary framework for a future in which genomic medicine plays a significant role in the health and wellbeing of the nation.

Both independently and in conjunction with other Institutes and Centers, NHGRI continues to support genome-wide association studies (GWAS) that have uncovered many genetic factors associated with common diseases. These are a vital step in the pathway that leads from the Human Genome Project to a future in which genomic medicine is commonplace.

The Genes, Environment and Health Initiative (GEI) is building tools and a knowledge base to allow better understanding of the interplay of the genome with environmental factors (ranging from diet to physical activity to exposure to pollutants) in health. GEI is

examining this interplay in some of the leading causes of morbidity and mortality in the Nation, such as cardiovascular disease and type 2 diabetes, as well other conditions such as lung cancer and addiction.

NHGRI's Medical Sequencing Program is currently gathering genomic sequence data from individuals to gain more information about specific genes and their relationship to disease. The NHGRI-funded sequencing centers across the country are advancing understanding of common diseases such as cardiovascular disease, diabetes, and metabolic syndrome, as well as rarer ones. Gaining a better understanding of the genetic underpinnings of disease and of individual disease predispositions will translate to better treatments for tens of millions of Americans.

In addition to funding studies that elucidate the functions of our genomes and how they influence our health, NHGRI has driven development of revolutionary new technologies that are lowering the price and increasing the speed with which we can read genetic data. NHGRI's funding of technology development has reduced sequencing costs over 100 fold since 2004, when an individual's complete genome sequence cost about $10 million. By the end of 2009, it cost less than $50,000. The "$1000 Genome Project" is on track to reduce whole genome sequencing costs to a fraction of even that, so that genetic analysis will be no more expensive than many routine medical tests. Although vendors of DNA sequencing instruments or services publicly describe their costs of generating a human genomic sequence as $10,000 or even less, these figures generally represent only the cost of the actual reagents (supplies) used in the sequencing process. However, the actual costs must be the focus of the reduction. The actual costs are referred to as "fully loaded costs", i.e., what it actually takes to produce useful data, including reagents, personnel, instrument amortization, facilities and other overhead costs, and computational analysis. Seventeen groups of scientists are funded as part of NHGRI's technology development effort, which was singled out as NHGRI's Signature Project for funding under the 2009 American Recovery and Reinvestment Act, due to its significance for the broader NHGRI and NIH portfolios. The ability to sequence many more genomes faster and cheaper brings a new set of challenges. Chief among these is coping with the huge datasets that are generated, since each genome represents many gigabytes of information. Thus, NHGRI is funding projects to create the computational genomic tools necessary to store, assemble, and analyze the data, as well as to share those results with the scientific community to maximize the return on the public's investment in this research.

NHGRI's population genomics programs are helping to explore the use of electronic health records to integrate genomic information into routine clinical care. Coupled with several NHGRI-funded pharmacogenomics studies (studies of how individual genetic variations affect drug metabolism) that will be launched soon, these efforts have the potential to assist clinicians in prescribing the right drug for the right patient and to reduce adverse drug reactions. The ability to know in advance whether or not a particular drug will be ineffective or have a greater potential for an adverse drug event in a particular individual should improve health and reduce healthcare costs. NHGRI-funded pharmacogenomics studies will examine hormone therapy's effects on

cardiovascular diseases and diabetes, vitamin therapy to prevent stroke, chemotherapy for breast cancer, and statin therapy for high cholesterol levels.

Programs such as these will create the knowledge and tools to allow individual patients to use their genetic information in the clinic, but NHGRI is also working to ensure that novel and effective therapeutics are available. There are nearly 7,000 rare disorders, but pharmaceutical development has ignored the vast majority due to the low economic incentive in the private sector to assume the high risk and high cost of drug development for diseases that affect relatively few people. Similarly, many diseases with profound public health impact in the developing world are neglected because of the low prospect for return on the investment in drug development for them. The NIH Therapeutics for Rare and Neglected Diseases program, or TRND, is a program created in May 2009 and operated by NHGRI to help address this problem. In synergy with the NIH Chemical Genomics Center (also operated by NHGRI), the two programs comprise the first integrated drug development pipeline to produce new treatments for rare and neglected diseases.

Beyond the scourge of rare and neglected diseases, cardiovascular disease, diabetes, and other common conditions that challenge the industrialized world are increasingly global in their impact. The NHGRI-administered Center for Research on Genomics and Global Health (CRGGH) is helping address these issues, using genomic tools to understand the interplay between obesity, hypertension, and diabetes in different human populations, with a focus on African-American and African populations. Findings from CRGGH will inform discussions about health disparities, whether between different ethnic groups in the United States or between nations.

Throughout all these programs, NHGRI is helping to train the next generation of scientists and scientist-clinicians through its funding for Centers of Excellence in Genomic Science and Centers for Excellence in Ethical, Legal, and Social Implications Research. Through these basic, translational, clinical, and educational efforts, NHGRI is moving us rapidly closer to a day when personalized medicine is a literally lifesaving and commonplace reality.

Overall Budget Policy: The FY 2011 request for NHGRI is $533.959 million, an increase of $18.083 million or +3.5 percent over the FY 2010 Enacted level. NHGRI is increasing funding for Medical Sequencing and The Cancer Genome Atlas while proportionally decreasing funding for Comparative Genomics Sequencing. This will allow the NHGRI to devote a larger proportion of the overall large-scale sequencing effort in FY 2011 to projects directed toward understanding disease. Funds are included in R&D contracts to support several trans-NIH initiatives, such as the Therapeutics for Rare and Neglected Diseases program (TRND), the Basic Behavioral and Social Sciences Opportunity Network (OppNet), and support for a new synchrotron at the Brookhaven National Laboratory, as well as increased support for other HHS agencies through the program evaluation set-aside. In FY 2011, NHGRI will support new investigators on R01 equivalent awards at success rates equivalent to those of established investigators submitting new R01 equivalent applications.

FY 2011 JUSTIFICATION BY ACTIVITY DETAIL

Program Descriptions and Accomplishments

EXTRAMURAL RESEARCH

Basic Genomics

Large-scale Sequencing

Among the primary objectives of contemporary biomedical research are to define how the human genome functions, understand how its malfunctions lead to specific diseases, and use that knowledge to develop new preventive strategies, diagnostic methods, and therapies. The NHGRI extramural program provides a unique window into these questions for the entire biomedical research enterprise. By supporting the development and use of high throughput methods to produce high quality, large datasets comprising both comprehensive descriptions of the human genome sequence in healthy and diseased individuals, and the genomes of other organisms, NHGRI supports research across all disease states by researchers around the world.

Comparative Genomic Sequencing

The Comparative Genomic Sequencing program generates genomic sequence data from many sources to further understanding of the human genome by revealing its functional components. Comparison of the genome sequence of humans with those of both closely and distantly related organisms identifies regions of similarity and difference. Such comparisons can identify similar regions of genomes that can be inferred to have been preserved throughout evolution because they are involved in critical biological functions, while regions of differences can be inferred to be associated with human-specific functions. Such knowledge can lead to insights into the evolution, structure, and function of human genes and can point to new paths to combat human disease. Currently, the genomes of 197 organisms are either in the sequencing pipeline or have been completely sequenced using NHGRI funding. Ongoing sequencing targets include non-human primates and other mammals; fungi, including multiple strains of yeast; and other disease-causing organisms, such as parasites and their host vectors. NHGRI funds this work in three large-scale sequencing centers that are world-renowned for their cost effective, high quality work. Recent highlights of this sequencing program include the publication of the genome of domestic cattle, the first livestock mammal to have its genetic blueprint sequenced and analyzed.

Budget Policy: The FY 2011 budget estimate for Comparative Genomic Sequencing is $25.000 million, a decrease of $10.000 million or -28.6 percent over the FY 2010 Enacted level. This decrease represents a continuation of on-going reprioritization and is balanced by increases in the Medical Sequencing and The Cancer Genome Atlas large-scale sequencing components (see below), so that the total amount of NHGRI spending on large-scale sequencing will remain constant. This will allow the Institute to devote a larger proportion of the overall large-scale sequencing effort in FY 2011 to projects directed toward understanding disease, specifically, Medical Sequencing (see

below) and The Cancer Genome Atlas (see below). The activity in Comparative Genomic Sequencing will continue the NHGRI's signature efforts to generate the genomic sequence data from many sources; these data represent a key resource which, along with other data sets such as those from the ENCODE and modENCODE projects (see below), are needed to reveal the functional components of the human genome.

Medical Sequencing

NHGRI's medical sequencing program was initiated in 2006 to drive continued improvement in DNA sequencing technologies and to produce data critical for biomedical research. A number of studies currently are underway to identify the genes responsible for several relatively rare disorders; to survey the range of gene variants that contribute to certain common diseases; to better characterize the genomic regions containing genetic components underlying many common diseases, such as diabetes, breast cancer, schizophrenia, and Crohn's disease; and ,in collaboration with the National Institute of Allergy and Infectious Disease (NIAID), to sequence the genomes of important human pathogens, such as those that cause malaria and sleeping sickness, and their invertebrate vectors. Recently, NHGRI reached one of the goals of its Sequencing Technology Program (see below), using next-generation sequencing technologies to sequence the complete genome of an individual for approximately $100,000. Anticipated continued decreases in this cost will make it increasingly affordable to sequence samples from a large number of patients, not only in gene regions, but across the entire genome.

Budget Policy: The FY 2011 budget estimate for Medical Sequencing is $44.681 million, an increase of $5.811 million or 14.9 percent over the FY 2010 Enacted level. Medical sequencing continues to be an area of growth for the NHGRI. With large-scale sequencing now completely transitioned to the next-generation sequencing instruments, many new opportunities have been created to apply genomic tools to the study of human disease and the application of that information to the development of new approaches to disease management. In FY 2011, the NHGRI will continue to increase the proportion of its Large-Scale Sequencing program funds that support Medical Sequencing component. Many of the new opportunities will be pursued in collaboration with other NIH ICs.

The Cancer Genome Atlas

All cancers are diseases of the genome, as they result from DNA mutations and epigenetic changes that lead to uncontrolled cell growth. The Cancer Genome Atlas (TCGA), a collaborative program of NHGRI and the National Cancer Institute, applies NHGRI's unprecedented capability for genomic analysis to the problem of cancer by developing a comprehensive catalog of the many genomic alterations that occur in major types of cancer, and rapidly providing these data to the research community. Taking advantage of recent advances in genomic characterization technologies, tumor and matched normal tissue samples can be analyzed for gene mutations, chromosomal rearrangements, copy number variation, gene expression alteration, and changes in epigenetic modifications. In its pilot phase, TCGA met several objectives, most

importantly the demonstration of the feasibility and value of a genomic analysis of the genomes of specific tumor types. TCGA's first undertaking, which focused on brain cancer, demonstrated in FY 2009 the technical feasibility and potential clinical utility of large-scale, multi-dimensional analysis of cancer genomes. Comprehensive characterization of ovarian cancer, the second tumor type tackled by TCGA, is opening new avenues of research for diagnosis and treatment of this devastating disease. With successful completion of the pilot phase in 2009, TCGA is expanding, with a plan to investigate 20 to 25 additional tumor types by 2015.

Budget Policy: The FY 2011 budget estimate for TCGA is $43.000 million, an increase of $8.000 million or 22.9 percent over the FY 2010 Enacted level. Now in its full-scale production phase, the TCGA effort will be generating enormous amounts of data that will change the face of cancer research. The increase in FY2011 is necessary to maintain the pace of the program, which received significant support from ARRA funds in FY 2009 and FY 2010.

Genomic Function

NHGRI supports research to identify and characterize the function of all parts of the genome and to understand their biological relevance. Efforts to uncover functional elements are not limited to the human genome, since understanding the genomes of other, "model," organisms can also give insight into the structure and function of the human genome. The major activities in this area are the ENCODE and modENCODE projects. ENCODE, the ENCyclopedia Of DNA Elements, is an international research consortium organized by the NHGRI to identify all functional elements in the human genome. Until recently, most studies of genome function have focused on the small fraction of the genome that contains protein-coding genes, overlooking the many other parts of the human genetic blueprint important to biological function. ENCODE is designed to take advantage of new analytical technologies, including next-generation sequencing, that can be applied at high throughput to identify all of the coding and non-coding (regulatory) elements in the human genome. The data, as with other NHGRI resource projects, are made available rapidly, prior to publication, through the ENCODE Data Coordination Center and other public databases. Analysis of the data is ongoing and promises to lead to new ways of thinking about the genome that will result in an enhanced understanding and improvement of human health. The Model Organism ENCODE (modENCODE) Project extends the ENCODE approach to two model organisms that are widely used in biomedical research, the fruit fly, and the round worm. The introduction of next-generation sequencing technology into both the ENCODE and modENCODE projects has resulted in a dramatic increase in the amount and quality of data without a significant increase in cost. The data that the modENCODE project produces already are providing important insights into the biology of these organisms, as well as providing a valuable tool for comparative studies aimed at understanding human biology.

Budget Policy: The FY 2011 budget estimate for Genomic Function is $57.433 million, an increase of $1.943 million or 3.5 percent over the FY 2010 Enacted level. Activity in Genomic Function will remain essentially constant, maintaining the proportion of the

NHGRI extramural budget devoted to this area. One reason why this can be done is that the introduction of next-generation sequencing technology has enabled a significant increase in the amount of data generated without an increase in cost. The Institute also will continue to fund meritorious investigator-initiated applications submitted in response to announcements that encourage new technologies and new approaches to the analysis of genomic function.

Genomic Variation

Although the genome sequence variation between two people is less than one percent, this tiny difference underlies a variety of observable characteristics ranging from the benign, such as hair or eye color, to disease, such as diabetes, cancer, Alzheimer's, or heart disease. NHGRI began the comprehensive, genome-wide mapping of human variation by leading the International HapMap Project, which charted the common patterns of genetic variation in the world's population, specifically the single letter spelling variations in our genome's alphabet known as single nucleotide polymorphisms, or SNPs. To get an even more detailed description of human genetic variation, the 1,000 Genomes Project is sequencing the genomes of approximately 1,200 people from around the world to produce a new map of the human genome that will provide a view of biomedically relevant DNA variations at a very high resolution. As with other major human genome reference projects, data from the 1,000 Genomes Project will be made swiftly available to the worldwide scientific community through freely accessible public databases. In addition, larger scale genomic variants, involving a few thousand to more than a million bases, are now thought to be a significant cause of disease. NHGRI has initiated several projects to characterize such "structural variation" in the human genome. Moreover, significant information about human structural variation will result from the 1,000 Genomes project.

Budget Policy: The FY 2011 budget estimate for Genomic Variation is $17.296 million, an increase of $585 thousand or 3.5 percent over the FY 2010 Enacted level. Activity in Genomic Variation will remain essentially constant, maintaining the proportion of the NHGRI extramural budget devoted to this area. The primary emphasis within this program will be on the full-scale implementation of the 1000 Genomes Project, which has expanded to include the analysis of structural variation in the human genome in light of the increasing amount of evidence that structural variants contribute significantly to human disease. The Institute also will continue to fund meritorious investigator-initiated applications submitted in response to announcements that encourage new technologies and new approaches to the analysis of genetic variation, and the role that genetic variation plays in the determination of human disease, disease susceptibility, and environmental sensitivities.

Computational Genomics

New genomic methods, such as next generation sequencing, along with attempts to correlate sequence data with other biological data, have led to a rapid rise in the volume and complexity of genomic data. As the costs of generating genomic data continue to decrease in the future, the rate of data production will increase even more rapidly, and the effort required to manage the data and make them available to the entire scientific

community will increase significantly. NHGRI supports a program in computational genomics research to develop new computational methods that will facilitate the acquisition, analysis, and dissemination of the data generated in genome-wide studies. Through this program, NHGRI supports the development of new technologies and new analytical approaches to the emerging challenge of how to analyze the enormous amount of data generated by large-scale, genomic studies and how to make such large datasets available to the broad research community. NHGRI will continue its support for genomic databases because these are essential resources that link biological data to genome sequence information and are utilized worldwide to accelerate biomedical research. Along with these resources, NHGRI will continue to encourage investigator-initiated research to develop robust software tools to improve on the utility of these genomic databases and the ability to analyze genomic data.

Budget Policy: The FY 2011 budget estimate for Computational Genomics is $52.576 million, an increase of $1.778 million or 3.5 percent over the FY 2010 Enacted level. Activity in Computational Genomics will remain essentially constant, maintaining the proportion of the NHGRI extramural budget devoted to this area. Effort will be directed to increasing the efficiency of data storage and distribution mechanisms, as the amount of data that needs to be processed has increased significantly with the introduction of next-generation sequencing and other new genomic technologies. In FY 2011, the NHGRI will continue its support for the essential biomedical research resource represented by genomic databases. The Institute also will continue to fund meritorious investigator-initiated applications submitted in response to announcements that encourage new technologies and new approaches to the rapidly emerging issue of public access to large genomic datasets.

Technology Development

The mission of NHGRI's technology development programs is to make DNA sequencing and other genomic analyses faster and more cost effective for use in medical research and, eventually, health care. The cost of DNA sequencing has fallen dramatically, by a factor of more than 100, over the past decade and continues to fall due, in large part, to research supported by NHGRI. The ability to sequence an individual genome inexpensively would not only further biomedical research, but would enable health care professionals to tailor diagnosis, treatment, and prevention strategies to each person's own genetic profile. After the completion of the Human Genome Program, NHGRI continued to support the development of new technology, and in 2004 started a program to drive sequencing costs down from approximately $10 million for a genome the size of the human to $100,000 within five years. In 2009, that goal was exceeded. To do so, NHGRI funded seventeen teams of investigators who worked toward those goals, several of whom also participated in private sector efforts with similar goals. But $100,000 per genome does not put sequencing into the realm of a diagnostic technology, so NHGRI is continuing its sequencing technology development efforts. Now the majority of effort is to achieve another 100-fold reduction in cost, to $1,000 or less for a high quality sequence of a human genome. Seventeen groups of

investigators are actively supported to work toward that goal, and in FY 2009 ten new awards or extensions of existing awards were made to accelerate progress.

Budget Policy: The FY 2011 budget estimate for Technology Development is $48.032 million, an increase of $1.624 million or 3.5 percent over the FY 2010 Enacted level. The NHGRI will continue in FY 2011 its ground-breaking efforts to reduce the cost of DNA sequencing so that this technology, which is increasingly become central to biomedical research, can become a widely disseminated research tool and, beyond that, a tool for individual healthcare. The Institute also will continue to fund meritorious investigator-initiated applications submitted in response to announcements that encourage the development of new technologies for biomedical and translational research.

Genomic Sequencing Technology

FY 2010 Level:	$25.000 million
FY 2011 Level:	$25.875 million
Change	+$0.875 million

Having sequenced the human genome (and the genomes of a number of other organisms to aid the annotation of the human sequence), the NHGRI is intensifying its focus on realizing the long-range objective of making sequencing a tool for both research and medical practice. As more is learned from sequencing and other research deciphering the genome's role in disease, and as the cost of sequencing decreases, sequence information will become ever more integral to both biomedical research and the provision of medically relevant information to individuals. The NHGRI selected advancing sequencing technology as its ARRA Signature Project. In addition, the NHGRI continues other efforts to improve technologies sufficiently to produce a high quality human genome sequence for $1,000 or less. The "$1000 genome initiative" has already led to successful commercialization of technologies that received significant NHGRI research support. The definition of "sequencing" is expanding, so that new systems allow simultaneous collection of multiple different kinds of genomic datasets on a single platform; this capacity should accelerate the transition from research to clinical systems.

And, advances over the next two years are expected to be as stunning as those over the previous two. New technologies are already increasing the pace for sequencing projects such as The Cancer Genome Atlas (TCGA) and The 1000 Genomes Project. Only two years ago, costs for projects such as TCGA and 1000 Genomes would have been prohibitive. However, they are now possible because of stunning advances in technology and in our understanding of the human genome that are continuing to reduce costs.

Other Basic Genomics
Multi-investigator, interdisciplinary research teams that can use and expand the data sets and technologies developed by the Human Genome Project are crucial to develop novel and innovative genomic research projects and to foster the wider application of comprehensive, high-throughput genomics methods to the study of human biology and disease. Started in FY 2001, the NHGRI's Centers of Excellence in Genomic Science (CEGS) program supports the formation of such teams and provides focal points across the country to provide education and training about genomic research opportunities to members of under-represented population groups. In FY 2009, NHGRI announced grants to establish two new CEGS (one focused on psychiatric conditions and a second on regulation of the expression of genes during health and disease) and renewed support of two CEGS (one studying epigenetic changes and the other variations found in the human population and how these are related to disease).

Budget Policy: The FY 2011 budget estimate for Other Basic Genomics is $60.315 million, an increase of $2.042 million or 3.5 percent over the FY 2010 Enacted level. In FY 2011, the NHGRI will continue to support the CEGS program in its efforts to stimulate highly innovative research approaches that will substantially advance genomic approaches to the study of a biological problem, and to foster the wider application of comprehensive, high-throughput genomics methods to the study of human biology and disease. The Institute will also continue to fund meritorious investigator-initiated applications that will increase the ability of genomics to have a major impact on the progress of biomedical and translational research.

Population Genomics
NHGRI is strongly committed to translating the information gleaned from studies of genomic function and variation into clinical applications. Diseases arise from a complex interplay between genes and environment; therefore, DNA variations, regulatory elements, and external factors acting "on" the genome must all be considered in diagnosing and treating patients. Understanding this interplay will revolutionize our approach to health and health care, allowing not only much more accurate prediction of disease, but, ultimately, individually-based disease prevention and treatment.
In FY 2009, Genes, Environment and Health Initiative (GEI) programs in functional and translational studies and systems biology took the first steps in determining the role of GWA-defined genetic variants in disease, and using that information in clinical care. An FY 2010 GEI project is aimed at identifying all the genetic variants, even those that are quite rare, in a region of GWA-defined association through extensive sequencing in large numbers of individuals. Another "bench to bedside" translational research project is an innovative study, in collaboration with the National Heart, Lung and Blood Institute, to evaluate the use of genetic variants to personalize the dosing of a commonly-used and potentially risky medication, warfarin. Ongoing population genomics projects initiated in FY 2007 examine the unique challenges and opportunities for conducting genomic research presented by biorepositories linked to electronic medical records (EMR), and the development of standardized disease and exposure measures for this research. In particular, using EMR to define diseases and exposures in standardized ways can greatly accelerate genomic research in routine clinical care and the translation

of that research to direct clinical applications. In FY 2008, NHGRI initiated a four-year, $31 million project to gain a better understanding of how specific genetic variants identified by GWA and similar studies act to influence the risk of diabetes, heart disease, cancer, and other common diseases. Scientists have already discovered more than 400 genetic variants in association with over 100 diseases and clinical traits such as cancer, cholesterol levels, and lipid levels. In FY2009, the NHGRI expects to announce a major new program to identify genetic variants associated with treatment response, using GWA in randomized clinical trials.

Budget Policy: The FY 2011 budget estimate for Population Genomics is $34.329 million, an increase of $1.161 million or 3.5 percent over the FY 2010 Enacted level. Activity in Population Genomics will remain essentially constant, maintaining the proportion of the NHGRI extramural budget devoted to this area. The NHGRI will continue in FY 2011 to support this area of research as the combination of advances in genomics with cutting-edge approaches to population studies remains of very high programmatic interest as an important strategy for addressing problems of human health. The Institute also will continue to fund meritorious investigator-initiated applications, and to collaborate with other NIH Institutes/Centers in the area of population genomics.

Ethical, Legal, and Social Implications

As the use of genetics and genomics in translational and clinical studies continues to increase, the importance of addressing the ethical, legal, and social implications (ELSI) of the results of genetic and genomic research will grow as well. NHGRI addresses such issues through its ELSI Research Program and through public consultation and community engagement activities that identify and respond to culturally specific concerns and provide participating communities opportunities for input into the design of genetic and genomic research. An important component of the ELSI program is the Centers of Excellence in ELSI Research (CEERs) program. The CEERs were established to: 1) foster the multi-disciplinary approaches necessary to make advances in understanding the issues that progress in genomic science will raise, 2) conduct ELSI research to inform the development of research, health, and public policies and practices and, 3) train the next generation of ELSI researchers. Four CEERs were originally established around the country in FY 2004 and in FY 2008 two new centers were funded. In FY 2010, the original Centers are applying for competitive renewal, which will provide NHGRI with an excellent opportunity to assess accomplishments of the CEER program and determine the on-going role that this component will play in the Institute's ELSI program.

Budget Policy: The FY 2011 budget estimate for ELSI is $19.668 million, an increase of $665 thousand or 3.5 percent over the FY 2010 Enacted level. The ELSI budget is legislatively mandated at 5.0 percent of the total NHGRI extramural budget. In FY 2010, the NHGRI will continue to support the ELSI research program in its efforts to anticipate and address the social, legal, and ethical issues that will arise from new information about the human genome and the genetic contribution to human disease, and new approaches to applying that information to the improvement of human health.

INTRAMURAL RESEARCH

Researchers within the NHGRI Division of Intramural Research continue to identify and characterize the genetic components of both rare and common diseases. NHGRI research groups have recently identified a gene containing variants associated with an increased susceptibility to lung cancer in family members with a history of the disease and made similar important advances in unraveling the genetic basis for melanoma, the deadliest form of skin cancer. NHGRI intramural investigators plan to continue expanding their collective focus on translational research in FY 2011. One notable advance in this area is a transdisciplinary program to characterize fully the complete set of microbes growing on human skin (the skin microbiome). Meanwhile, two NHGRI intramural clinical genomics initiatives are reaching a mature and productive stage. The first, called ClinSeq, is a pilot study aimed at developing the technologic and procedural infrastructure to facilitate large-scale genome sequencing in a clinical research setting. The second, called Multiplex, is a study intended to evaluate patients' reactions to genetic susceptibility testing for several common health conditions. Together, these two initiatives are providing a foundation for studies in genetic-based personalized medicine. The NIH Undiagnosed Diseases Program, a clinical research program to study patients with mysterious conditions that have long eluded diagnosis, is now in full stride; over 2,350 inquires have already been evaluated for potential participation and over 100 patients have been admitted into the program.

Budget Policy: The FY 2011 budget estimate for Intramural Research is $107.987 million, an increase of $3.348 million or +3.2 percent over the FY 2010 Enacted level. This increase will facilitate growth in four major areas: (1) The addition of 2-3 new Tenure-Track/Tenured Investigators working in cancer genetics, human genetics, and social and behavioral research, who will arrive at the end of FY 2010 following rigorous searches and recruitments; (2) The addition of personnel to strengthen the Institute's translational and clinical research programs. This will include the recruitment of additional physician-scientists and other health professionals with expertise in clinical research. It also includes continued growth of our flagship intramural clinical genomics projects ClinSeq and growth to support the Undiagnosed Diseases Program; (3) Continued acquisition and implementation of 'next-generation' technologies for performing large-scale DNA sequencing. Genomics continues to see major growth in terms of new methods for obtaining very large amounts of DNA sequence data at lower costs. The NHGRI Intramural Program will continue to implement these powerful new DNA sequencing technologies in FY 2011. This is requiring substantial expansion of computational infrastructure as well as increased bioinformatics and computational staffing. Note that these new technologies are increasingly being applied to clinical research projects; and (4) Continued growth of a trans-disciplinary program to explore the skin's microbiome-- all of the genomes of the microbes that inhabit human skin. This effort will help to define the delicate balance between our own cells and the millions of bacteria and other single-celled microbes that live on the skin's surface, one of the body's first lines of defense against illness and injury.

Therapeutics for Rare and Neglected Diseases (TRND)

FY 2010 Level:	$24.000 million
FY 2011 Level:	$50.000 million
Change	+$26.000 million

In May 2009, NIH launched the Therapeutics for Rare and Neglected Diseases program (TRND). In synergy with the NIH Chemical Genomics Center (NCGC), these two programs now comprise the first integrated, drug development pipeline designed to produce new treatments for rare and neglected diseases.

There are nearly 7,000 “rare” disorders (ones that affect fewer than 200,000 Americans), but pharmaceutical development has ignored the vast majority, due to the low prospect for economic return. Other, more common diseases, are “neglected” because they primarily affect populations that have little money to pay for new drugs.

TRND will focus on the pre-clinical stage of drug development that is vital to meet the FDA's requirements for human testing of new drugs. It will bridge the wide gap in time and resources that too often exists between basic research and human testing of new drugs. The effort is grounded in, but aims to improve upon, existing processes for drug development in the pharmaceutical industry. TRND will work closely with disease-specific experts on selected projects, both leveraging the in-house scientific capabilities needed for much preclinical development work and contracting out other parts, as scientific opportunities dictate. The NIH Office of Rare Diseases Research will oversee the program, and the NHGRI (which also operates the NCGC) will administer TRND’s laboratory operations. This revolutionary initiative will stimulate important research collaborations involving other NIH components and academic and private sector scientists.

RESEARCH MANAGEMENT AND SUPPORT

NHGRI's Office of the Director, part of the RMS program, oversees the operation of the Institute and includes a number of component parts. Major ongoing initiatives for which the Office of the Director provides key leadership and financial support include National DNA Day, the U.S. Surgeon General's Family History Initiative, and the development of genetics education resources for health professionals. DNA Day is an annual opportunity to educate students about genetics and genomics and to use this cutting edge field to spark their interest in science. The U.S. Surgeon General's Family History Initiative is a coordinated multi-agency effort to encourage all American families to learn more about their family health history and to employ it in preventive health care. To expand the initiative's reach and public benefit, NHGRI continues to collaborate across federal agencies to enhance the family history tool's capabilities and to engage in demonstration projects to develop evidence regarding the tool's utility, including as part of electronic health records. Projects to promote the public's awareness and participation in the initiative will also be pursued. NHGRI is taking a leadership role in facilitating the development, pilot testing, and dissemination of interdisciplinary web-based genetics educational resources for all health care professionals.

Budget Policy: The FY 2011 budget estimate for research management and support is $23.642 million, an increase of $1.126 million or 5.0 percent over the FY 2010 Enacted level. In FY 2011, the NHGRI plans to continue to develop ongoing initiatives for which the Office of the Director provides leadership and financial support. Such programs within the Office of Policy, Communication, and Education include National DNA Day, the U.S. Surgeon General's Family History Initiative, and outreach and informational resources for the general public through community and web-based activities. In addition, the NHGRI is enhancing the Risk Management Program, which includes business process reengineering, setting up new procedures and tools to ensure our continued prudent use of RMS funds. RMS funds will be used to continue funding the activities mentioned above to support the infrastructure that allows the NHGRI to pursue and achieve its mission.

NIH COMMON FUND ROADMAP INITIATIVES

NHGRI is the lead Institute for the Connectivity Map supported through the NIH Common Fund. In addition, NHGRI is a co-lead for the Common Fund-supported Molecular Libraries initiatives, including: 1) NIH Chemical Genomics Center (NCGC); 2) Cheminformatics Computing Centers (virtual synthesis, virtual screening, other applications, and R&D on new tools); and, 3) Robotics/Instrumentation Technology Development. NHGRI also co-leads the new Common Fund-supported Human Microbiome Project. An early example of the kind of work that can be expected from NCGC was the discovery of a possible therapy for schistosomiasis, a parasitic disease that affects more than 200 million people in the developing world. Working with researchers from Illinois State University, NCGC's high-throughput screening assays discovered that a class of compounds called oxadiazoles possesses the ability to inhibit a certain enzyme that is essential for the Schistosoma parasites to survive. The Human

Microbiome Project (HMP) is a trans-NIH program that aims to expand upon traditional microbiology and discover what microbial communities exist in different parts of the human body and how they might change with disease. In a healthy adult, the number of microbial cells outnumbers those of the human host, but remarkably little has been known until now about how these microbes behave in vivo. HMP makes use of a metagenomic approach that reveals data about entire human-associated microbial communities. In 2009, data gathered by an NHGRI-led team revealed unexpected bacterial diversity on human skin that, it is hoped, will lead to advances in understanding a range of disorders, such as eczema, psoriasis, and acne.

Recovery Act Implementation

Recovery Act Funding: $127.035 million

In FY 2009, NHGRI received $127.0 million under the Recovery Act. Of this amount, $77.9 million was obligated in FY 2009 and $49.1 million will be obligated in FY 2010. These funds are stimulating 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. NHGRI's signature initiative is the development of technologies that can sequence a human genome for $1,000 or less. The availability of truly inexpensive genomic sequencing has the potential to revolutionize health and medicine. NHGRI is also funding medical sequencing initiatives which allow individual research labs to implement newer sequencing technologies to identify and understand the genetic roots of a disease or trait. In addition, NHGRI is funding: the development of computational tools to work with the large volumes of data generated through sequencing and other NHGRI research activities, projects that will move us toward fully realizing the benefits of population-based genomic research such as genome wide association studies, research on the Ethical, Legal and Social Implications of genome research, and methods to conduct high-throughput studies that can catalog and examine the relationship between cell function and its response to perturbations.

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Budget Authority by Object

	FY 2010 Enacted	FY 2011 PB	Increase or Decrease
Total compensable workyears:			
Full-time employment	323	338	15
Full-time equivalent of overtime and holiday hours	1	1	0
Average ES salary	$171,595	$173,997	$2,402
Average GM/GS grade	12.1	12.1	0.0
Average GM/GS salary	$95,747	$96,727	$980
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	$94,236	$95,556	$1,320
Average salary of ungraded positions	170,555	174,510	3,955

OBJECT CLASSES		FY 2010 Estimate	FY 2011 Estimate	Increase or Decrease
	Personnel Compensation:			
11.1	Full-time permanent	$16,077,000	$17,171,000	$1,094,000
11.3	Other than full-time permanent	14,476,000	15,452,000	976,000
11.5	Other personnel compensation	666,000	712,000	46,000
11.7	Military personnel	435,000	464,000	29,000
11.8	Special personnel services payments	4,333,000	4,624,000	291,000
	Total, Personnel Compensation	35,987,000	38,423,000	2,436,000
12.0	Personnel benefits	8,850,000	9,449,000	599,000
12.2	Military personnel benefits	440,000	470,000	30,000
13.0	Benefits for former personnel	0	0	0
	Subtotal, Pay Costs	**45,277,000**	**48,342,000**	**3,065,000**
21.0	Travel and transportation of persons	2,121,000	2,156,000	35,000
22.0	Transportation of things	232,000	236,000	4,000
23.1	Rental payments to GSA	2,000	2,000	0
23.2	Rental payments to others	13,000	13,000	0
23.3	Communications, utilities and miscellaneous charges	499,000	510,000	11,000
24.0	Printing and reproduction	57,000	58,000	1,000
25.1	Consulting services	1,271,000	1,306,000	35,000
25.2	Other services	12,488,000	12,862,000	374,000
25.3	Purchase of goods and services from government accounts	59,487,000	60,580,000	1,093,000
25.4	Operation and maintenance of facilities	453,000	460,000	7,000
25.5	Research and development contracts	1,079,000	1,215,000	136,000
25.6	Medical care	1,161,000	1,176,000	15,000
25.7	Operation and maintenance of equipment	2,539,000	2,576,000	37,000
25.8	Subsistence and support of persons	0	0	0
25.0	**Subtotal, Other Contractual Services**	**78,478,000**	**80,175,000**	**1,697,000**
26.0	Supplies and materials	10,123,000	10,260,000	137,000
31.0	Equipment	6,002,000	6,091,000	89,000
32.0	Land and structures	0	0	0
33.0	Investments and loans	0	0	0
41.0	Grants, subsidies and contributions	373,072,000	386,116,000	13,044,000
42.0	Insurance claims and indemnities	0	0	0
43.0	Interest and dividends	0	0	0
44.0	Refunds	0	0	0
	Subtotal, Non-Pay Costs	**470,599,000**	**485,617,000**	**15,018,000**
	Total Budget Authority by Object	**515,876,000**	**533,959,000**	**18,083,000**

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

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Salaries and Expenses

OBJECT CLASSES	FY 2010 Enacted	FY 2011 PB	Increase or Decrease
Personnel Compensation:			
Full-time permanent (11.1)	$16,077,000	$17,171,000	$1,094,000
Other than full-time permanent (11.3)	14,476,000	15,452,000	976,000
Other personnel compensation (11.5)	666,000	712,000	46,000
Military personnel (11.7)	435,000	464,000	29,000
Special personnel services payments (11.8)	4,333,000	4,624,000	291,000
Total Personnel Compensation (11.9)	**35,987,000**	**38,423,000**	**2,436,000**
Civilian personnel benefits (12.1)	8,850,000	9,449,000	599,000
Military personnel benefits (12.2)	440,000	470,000	30,000
Benefits to former personnel (13.0)	0	0	0
Subtotal, Pay Costs	**45,277,000**	**48,342,000**	**3,065,000**
Travel (21.0)	2,121,000	2,156,000	35,000
Transportation of things (22.0)	232,000	236,000	4,000
Rental payments to others (23.2)	13,000	13,000	0
Communications, utilities and miscellaneous charges (23.3)	499,000	510,000	11,000
Printing and reproduction (24.0)	57,000	58,000	1,000
Other Contractual Services:			
Advisory and assistance services (25.1)	1,271,000	1,306,000	35,000
Other services (25.2)	12,488,000	12,862,000	374,000
Purchases from government accounts (25.3)	38,906,000	39,617,000	711,000
Operation and maintenance of facilities (25.4)	453,000	460,000	7,000
Operation and maintenance of equipment (25.7)	2,539,000	2,576,000	37,000
Subsistence and support of persons (25.8)	0	0	0
Subtotal Other Contractual Services	**55,657,000**	**56,821,000**	**1,164,000**
Supplies and materials (26.0)	10,116,000	10,253,000	137,000
Subtotal, Non-Pay Costs	68,695,000	70,047,000	1,352,000
Total, Administrative Costs	**113,972,000**	**118,389,000**	**4,417,000**

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Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2010 Amount Authorized	FY 2010 Estimate	2011 Amount Authorized	FY 2011 PB
Research and Investigation	Section 301	42§241	Indefinite	$515,876,000	Indefinite	$533,959,000
National Human Genome Research Institute	Section 402(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				515,876,000		533,959,000

NATIONAL INSTITUTES OF HEALTH
National Human Genome Research Institute

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation 1/
2002	426,739,000	423,454,000	440,448,000	429,515,000
Rescission				(757,000)
2003	458,182,000	458,182,000	468,037,000	468,037,000
Rescission				(3,042,000)
2004	478,072,000	478,072,000	482,372,000	482,222,000
Rescission				(3,149,000)
2005	492,670,000	492,670,000	496,400,000	492,670,000
Rescission				(4,062,000)
2006	490,959,000	490,959,000	502,804,000	490,959,000
Rescission				(4,910,000)
2007	482,942,000	482,942,000	486,315,000	486,491,000
Rescission				0
2008	484,436,000	493,996,000	497,031,000	495,434,000
Rescission				(8,655,000)
Supplemental				2,589,000
2009	487,878,000	504,603,000	501,411,000	502,367,000
Rescission				0
2010	509,594,000	520,311,000	511,007,000	516,028,000
Rescission				0
2011	533,959,000			

1/ Reflects enacted supplementals, rescissions, and reappropriations.

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Details of Full-Time Equivalent Employment (FTEs)

OFFICE/DIVISION	FY 2009 Actual	FY 2010 Enacted	FY 2011 PB
Office of the Director	10	10	10
Office of Administrative Management	23	22	24
Office of Policy, Communications and Education	12	12	13
Division of Intramural Research	246	243	254
Division of Extramural Research	36	36	37
Total	327	323	338
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
2007	12.0
2008	12.1
2009	12.1
2010	12.1
2011	12.1

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Detail of Positions

GRADE	FY 2009 Actual	FY 2010 Enacted	FY 2011 PB
Total, ES Positions	2	2	2
Total, ES Salary	335,080	343,189	347,994
GM/GS-15	26	26	26
GM/GS-14	16	17	18
GM/GS-13	47	52	52
GS-12	49	49	50
GS-11	17	17	17
GS-10	2	2	2
GS-9	12	12	12
GS-8	19	19	23
GS-7	2	2	2
GS-6	0	0	0
GS-5	0	0	0
GS-4	0	0	0
GS-3	1	1	1
GS-2	0	0	0
GS-1	0	0	0
Subtotal	191	197	203
Grades established by Act of July 1, 1944 (42 U.S.C. 207):			
Assistant Surgeon General	0	0	0
Director Grade	4	4	4
Senior Grade	2	2	2
Full Grade	0	0	0
Senior Assistant Grade	2	2	2
Assistant Grade	0	0	0
Subtotal	8	8	8
Ungraded	158	158	167
Total permanent positions	201	207	222
Total positions, end of year	359	365	380
Total full-time equivalent (FTE) employment, end of year	327	323	338
Average ES salary	167,540	171,595	173,997
Average GM/GS grade	12.1	12.1	12.1
Average GM/GS salary	93,150	95,747	96,727

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

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New Positions Requested

	FY 2011		
	Grade	Number	Annual Salary
Senior Staff Scientist	Title 42	9	171,000
Grants Management Specialist	GS-14	1	126,000
Program Policy Analyst	GS-12	1	88,000
Administrative Support Staff	GS-8	2	58,000
Purchasing Agent	GS-8	1	58,000
Administrative Technician	GS 8	1	58,000
Total Requested		15	