



FACT BOOK

FISCAL YEAR

2010





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1. Abbreviated Staff Directory*

Office of the Director	Bldg.	Room	Phone	MSC**†
Acting Director, Susan B. Shurin, M.D.	31	5A48	496-5166	2486
Acting Deputy Director, Carl A. Roth, Ph.D., LL.M.	31	5A07	496-6331	2482
Chief of Staff, Sheila Pohl	31	5A48	594-5355	2486
Administrative Officer, Cheryl R. Wagoner	31	5A16	496-5931	2490
Acting Executive Officer, Timothy J. Wheelles	31	5A48	496-2411	2490
Administrative Officer, Stacey A. Long	31	5A16	496-5931	2490
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Legislative Liaison, James P. Schlicht	31	5A25	402-3421	2484
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 Center for Biomedical Informatics				
Director, Stephan P. Bour, Ph.D.	RKL1‡	6100	435-0119	7994
Administrative Officer, Kathleen D. Rechen	RKL2§	8095	435-6373	7921
Customer Support Branch				
Acting Chief, Brian Kotula	RKL1	6106	435-0119	7994
Infrastructure Engineering Branch				
Chief, Christopher E. Olaes	RKL1	6212	435-0119	7994
Operation and Performance Management Branch				
Acting Chief, Stephan P. Bour, Ph.D.	RKL1	6100	435-0119	7994
Software Engineering Branch				
Acting Chief, Zeyad Mobassaleh	RKL1	6104	435-0119	7994
 Center for Population Studies				
Director, Daniel Levy, M.D.			73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702-5827 508-935-3458	
Associate Director, Christopher J. O'Donnell, M.D., M.P.H.			73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702-5827 508-935-3435	
 Ethics Office				
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Lead Ethics Specialist, Kim Y. Brinson	31	5A33	496-6471	2486

* Current as of September 30, 2010. For locating personnel not listed, the general information number is 301-496-4000. All listed phone numbers are in area code 301. The Personnel Directory, which is periodically updated throughout the year, is located on the NHLBI Home Page under About NHLBI.

**MSC—Mail Stop Code.

† Full mailing address formats are located at the end of this chapter.

‡ RKL1—Rockledge I Building.

§ RKL2—Rockledge II Building.

Office of the Director (continued)	Bldg.	Room	Phone	MSC
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Office of Administrative Management				
Acting Executive Officer, Timothy J. Wheelles	31	5A48	496-2411	2490
Acting Deputy Executive Officer, Alesha M. Holliday	31	5A48	496-2411	2490
Administrative Officer, Stacey A. Long	31	5A16	496-5931	2490
Extramural Administrative Management Branch				
Chief, Loretta L. Usilton	RKL2	8095	435-6373	7921
Financial Management Branch				
Chief, Sandra L. Gault	31	5A34	496-4653	2490
Freedom of Information and Privacy Act Branch				
Chief, Suzanne A. Freeman	RKL1	6070	496-9737	7957
Management Policy and Administrative Services Branch				
Chief, Marilyn G. Jackson	31	5A16	496-5931	2490
Office of Workforce Management				
Director, Gwen G. Platt	RKL1	6070	496-1763	7957
Office of Communications				
Director, Sally McDonough	31	4A31	496-5804	2490
Deputy Director, Susan G. Dambrauskas	31	4A31	496-4236	2480
Administrative Officer, Stacey A. Long	31	5A16	496-5931	2490
Health Campaigns and Consumer Services Branch				
Chief, Ann M. Taubenheim, Ph.D.	31	4A31	496-4236	2480
Public Affairs Branch				
Chief, Diane E. Striar	31	4A31	496-4236	2480
Office of Global Health				
Director, Arun Chockalingam, Ph.D., M.S.	31	5A06	496-3620	2490
Deputy Director, Cristina Rabadan-Diehl, Ph.D., M.P.H.	31	5A06	496-3620	2490
Administrative Officer, Stacey A. Long	31	5A16	496-5931	2490
Office of Research Training and Minority Health				
Director, Helena O. Mishoe, Ph.D., M.P.H.	RKL2	9093C	451-5081	7913
Deputy Director, Chitra Krishnamurti, Ph.D.	RKL2	9093C	451-5081	7913
Administrative Officer, Roy Rich	RKL2	8095	435-6373	7921
Office of Science and Technology				
Director, Carl A. Roth, Ph.D., LL.M.	31	5A07	496-6331	2482
Deputy Director, Barbara R. Marzetta, M.S.	31	5A07	496-9899	2482
Administrative Officer, Cheryl R. Wagoner	31	5A16	496-5931	2490
Program Studies and Reports Program				
Director, Carl A. Roth, Ph.D., LL.M.	31	5A07	496-6331	2482
Science and Special Issues Program				
Director, Barbara R. Marzetta, M.S.	31	5A07	496-9899	2482
Office of Public Liaison				
Coordinator, Hilary S. Leeds, J.D.	31	5A07	594-9869	2482

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Office of Technology Transfer and Development				
Director, Alan H. Deutch	RKL1	6018	402-5579	7992
Administrative Officer, Terri B. Pike	RKL2	8095	435-6373	7921
Division of Cardiovascular Sciences				
Office of the Director				
Director, Michael S. Lauer, M.D.	RKL2	8128	435-0422	7959
Deputy Director, Sonia I. Skarlatos, Ph.D.	RKL2	8248	435-0466	7940
Administrative Officer, Lisa A. Freeny	RKL2	8095	435-6373	7921
Office of Special Projects				
Special Assistant for Clinical Studies, David J. Gordon, M.D., Ph.D.	RKL2	8134	435-0534	7940
Office of Biostatistics Research				
Director, Nancy L. Geller, Ph.D.	RKL2	9202	435-0434	7913
Office of Research Training and Career Development				
Director, Jane D. Scott, Sc.D., M.S.N.	RKL2	8138	435-0535	7940
Adult and Pediatric Cardiac Research Program				
Director, Gail D. Pearson, M.D., Sc.D.	RKL2	8104	435-0510	7940
Atherothrombosis and Coronary Artery Disease Branch				
Acting Chief, Yves D. Rosenberg, M.D.	RKL2	8148	435-1292	7956
Heart Developmental and Structural Diseases Branch				
Chief, Gail D. Pearson, M.D., Sc.D.	RKL2	8104	435-0510	7940
Heart Failure and Arrhythmias Branch				
Acting Chief, David A. Lathrop, Ph.D.	RKL2	8170	435-0504	7956
Basic and Early Translational Research Program				
Director, Denis B. Buxton, Ph.D.	RKL2	8216	435-0513	7940
Advanced Technologies and Surgery Branch				
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Vascular Biology and Hypertension Branch				
Acting Chief, H. Eser Tolunay, Ph.D.	RKL2	8120	435-0560	7940
Prevention and Population Sciences Program				
Director, Diane E. Bild, M.D., M.P.H.	RKL2	10018	435-0457	7936
Clinical Applications and Prevention Branch				
Chief, Lawrence J. Fine, M.D.	RKL2	10214	435-0305	7936
Epidemiology Branch				
Chief, Paul D. Sorlie, Ph.D.	RKL2	10210	435-0707	7936
Women's Health Initiative Branch				
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Administrative Officer, Amy W. Sheetz	RKL2	8095	435-6373	7921

Division of Lung Diseases (continued)	Bldg.	Room	Phone	MSC
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Lung Biology and Disease Branch				
Chief, Dorothy B. Gail, Ph.D.	RKL2	10042	435-0222	7952
National Center on Sleep Disorders Research				
Director, Michael J. Twery, Ph.D.	RKL2	10042	435-0199	7952
Research Training Programs				
Leader, Sandra Colombini Hatch, M.D.	RLK2	10042	435-0222	7952
Leader, Ann E. Rothgeb	RLK2	10042	435-0202	7952

Division of Blood Diseases and Resources

Office of the Director				
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Deputy Director, Donna M. DiMichele, M.D.	RKL2	9132	435-0080	7950
Administrative Officer, Amy W. Sheetz	RKL2	8095	435-6373	7921
Senior Program Analyst, Susan E. Pucie	RKL2	9138	435-0080	7950
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Thrombosis and Hemostasis Branch				
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Transfusion Medicine and Cellular Therapeutics Branch				
Chief, Simone A. Glynn, M.D.	RKL2	9142	435-0065	7950
Research Training Programs				
Leader, Traci H. Mondoro, Ph.D.	RKL2	9140	435-0065	7950
Leader, Rita Sarkar, Ph.D.	RKL2	9161	435-0070	7950
Leader, Ellen M. Werner, Ph.D.	RKL2	9162	435-0050	7950
Leader, Henry Chang, M.D.	RKL2	9176	435-0080	7950

Division for the Application of Research Discoveries

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Administrative Officer, Stacey A. Long	31	5A16	496-5931	2490
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Enhanced Dissemination and Utilization Branch				
Acting Chief, Karen A. Donato, S.M.	31	4A10	496-5437	2480
Research Translation Branch				
Acting Chief, Denise G. Simons-Morton, M.D., Ph.D., M.P.H. ...	31	4A10	496-5437	2480

Division of Extramural Research Activities

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Deputy Director, Jodi B. Black, Ph.D.	RKL2	7104	435-0260	7922
Chief of Staff, Janet George	RKL2	7220	435-0260	7922
Administrative Officer, Veronica M. VanWagner	RKL2	8095	435-6373	7921
Office of Acquisitions				
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Deputy Director, Christopher J. Belt	RKL2	6106	435-6672	7902

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Consolidated Operations Acquisition Center Services Branch				
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NHLBI Extramural Contracts Branch				
Chief, Richard A. Phillips, M.B.A.	RKL2	6106	402-6462	7902
Office of Committee Management				
Director, Kathryn M. Valeda	RKL2	7110	435-0255	7922
Deputy Director, David Alperin	RLK2	7118	435-0255	7922
Office of Extramural Policy and Review				
Director, Paul A. Velletri, Ph.D.	RKL2	7218	435-0569	7922
Office of Scientific Review				
Director, Valerie L. Prenger, Ph.D.	RKL2	7214	435-0270	7924
Referral Officer, Roy White, Ph.D.	RKL2	7176	435-0310	7924
Blood and Vascular Branch				
Chief, Jeffrey H. Hurst, Ph.D.	RKL2	7208	435-0303	7924
Cardiovascular and Pulmonary Branch				
Chief, William J. Johnson, Ph.D.	RKL2	7178	435-0725	7924
Clinical Studies and Training Branch				
Chief, Charles W. Joyce, Ph.D.	RKL2	7194	435-0288	7924
Office of Grants Management				
Director, Suzanne A. White	RKL2	7160	435-0166	7926
Deputy Director, (Vacant)	RKL2	7130	435-0166	7926
Blood Diseases and Resources and Lung Diseases Branch				
Chief, Ryan C. Lombardi	RKL2	7156	435-0166	7926
Cardiovascular Sciences Branch and Prevention and Population Sciences Branch				
Chief, Teresa F. Marquette	RKL2	7172	435-0166	7926
Division of Intramural Research				
Office of the Director				
Director, Robert S. Balaban, Ph.D.	10CRC*	4-1581	496-2116	1458
Office of the Scientific Director				
Director, Robert S. Balaban, Ph.D.	10CRC	4-1581	496-2116	1458
Deputy Director, L. Michelle Bennett, Ph.D.	10CRC	4-1581	496-2116	1458
Intramural Administrative Management Branch				
Chief, Gary Unger	10	7N214	451-0892	1686
Animal Program				
Director, James Hawkins, D.V.M.	14E	105A	451-6743	5570
Animal Care and Use Committee				
Program Coordinator, Kelly E. Cole	14E	106C	451-6459	5570
Laboratory of Animal Medicine and Surgery				
Chief, Robert Hoyt, D.V.M.	14E	105B	496-9673	5570
Imaging Probe Development Center/Road Map Initiative				
Chief, Gary L. Griffiths, Ph.D.	B**	3042	217-5770	3372

* 10CRC—Building 10 Clinical Research Center.

** B—B Building, off site.

Division of Intramural Research (continued)	Bldg.	Room	Phone	MSC
Office of Education				
Director, Herbert M. Geller, Ph.D.	10	6N248	451-9440	1754
Office of the Clinical Director				
Director, Richard O. Cannon III, M.D.	10CRC	5-3330	496-9895	1454
Office of Clinical Affairs				
Associate Director, Melissa B. Bryant, M.S.	10CRC	6-5140	594-8378	1608
Hematology Branch				
Chief, Neal S. Young, M.D.	10CRC	3-5140	496-5093	1202
Flow Cytometry Core (FACS)				
Head, J. Philip McCoy, Ph.D.	10	8C103D	451-8824	1357
Center for Molecular Medicine				
Chief, Toren Finkel, M.D., Ph.D.	10	6D03	402-1448	1590
Transgenic Core				
Head, Chengyu Liu, Ph.D.	50	3305	435-5034	8018
iPS Core				
Head, (Vacant)	10	5N210	NA*	NA*
Cardiovascular-Pulmonary Branch				
Chief, Andrew E. Arai, M.D., Ph.D.	10CRC	5-3332	496-3648	1061
MRI/Imaging Core				
Head, Stasia Anderson, Ph.D.	10	B1D49C	402-0908	1518
Biochemistry and Biophysics Center				
Director, Nico Tjandra, Ph.D.	50	3503	402-3029	8012
Biochemistry Core				
Head, Duck-Yeon Lee, Ph.D.	50	2339	435-8369	8012
Biophysics Core				
Head, Grzegorz Piszczek, Ph.D.	50	2341	435-8082	8012
Cell Biology and Physiology Center				
Director, Clare Waterman, Ph.D.	50	4535	435-2949	8019
Light Microscopy Core				
Head, Christian Combs, Ph.D.	10	6N309	496-3236	1623
Genetics and Development Biology Center				
Director, Alan M. Michelson, M.D., Ph.D.	31	5A48	594-5353	2490
Electron Microscopy Core				
Head, Mathew Daniels, Ph.D.	14E	111B	496-2898	5570
Pathology Core				
Acting Head, Zu-Xi Yu, Ph.D.	14E	107D	496-5035	5570
Genomics Core				
Head, Nalini Raghavachari, Ph.D.	10	8C103B	435-2304	1357
DNA Sequencing Core				
Head, Jun Zhu, Ph.D.	10	5N107	443-7927	1654
Immunology Center				
Director, Warren Leonard, M.D.	10	7B05	496-0098	1674
Systems Biology Center				
Director, Mark A. Knepper, M.D., Ph.D.	10	6N260	496-3064	1603
Proteomics Core				
Head, Marjan Gucek, Ph.D.	10	8C103C	594-1060	1774

* Not available at time of printing.

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2. Program Overview

The National Heart Institute (NHI) was established in 1948 through the National Heart Act with a mission to support research and training in the prevention, diagnosis, and treatment of cardiovascular diseases (CVD). Twenty-four years later—through section 413 of the National Heart, Blood Vessel, Lung, and Blood Act (P.L. 92-423)—Congress mandated the Institute to expand and coordinate its activities in an accelerated attack against heart, blood vessel, lung, and blood diseases. The renamed National Heart, Lung, and Blood Institute (NHLBI) expanded its scientific areas of interest and intensified its efforts related to research on diseases within its purview. Over the years, the Institute’s areas of interest have grown to encompass genetic, genomic, proteomic, and metabolomic research; systems biology; sleep disorders; and the Women’s Health Initiative (WHI).

The NHLBI provides global leadership for research, training, and education programs to promote the prevention and treatment of heart, lung, and blood diseases and enhance the health of all individuals so that they can live longer and more fulfilling lives.

The NHLBI stimulates basic discoveries about the causes of disease, enables the translation of basic discoveries into clinical practice, fosters training and mentoring of emerging scientists and physicians, and communicates research advances to the public. It creates and supports a robust, collaborative research infrastructure in partnership with private and public organizations, including academic institutions, industry, and other government agencies. The Institute collaborates with patients, families, health care professionals, scientists, professional societies, patient advocacy groups, community organizations, and the media to promote the application of research results and leverage resources to address the health needs of the public. The NHLBI also collaborates with international organizations to help reduce the burden of heart, lung, and blood diseases worldwide.

Each year, the NHLBI assesses progress in the scientific areas for which it is responsible and updates its goals and objectives. As new opportunities are identified, the Institute expands and revises its areas of interest. Throughout the process, the approach used by the Institute is an orderly sequence of research activities that includes:

- Acquisition of knowledge
- Evaluation of knowledge
- Application of knowledge
- Dissemination of knowledge

NHLBI Programs

The programs of the NHLBI, as shown in the following table, are implemented through four extramural units:

- Division of Cardiovascular Sciences (DCVS)
- Division of Lung Diseases (DLD)
- Division of Blood Diseases and Resources (DBDR)
- Division for the Application of Research Discoveries (DARD)

and one intramural unit:

- Division of Intramural Research (DIR)

The extramural divisions use a variety of funding mechanisms, such as individual research project grants, cooperative agreements, program project grants, Small Business Innovation Research (SBIR) grants, Small Business Technology Transfer (STTR) grants, Specialized Centers of Clinically Oriented Research (SCCOR) grants, comprehensive center grants, contracts, and research training and career development grants.

In fiscal year (FY) 2010, the DCVS was created by combining two previously existing divisions—the Division of Cardiovascular Diseases and the Division

Programs Supported by the National Heart, Lung, and Blood Institute

Cardiovascular Diseases

Advanced Technologies and Surgery

Diagnostics Development
Emerging Therapeutics
Enabling Technologies
Surgical Advances

Atherothrombosis and Coronary Artery Disease

Acute and Chronic Coronary Syndromes
Acute and Silent Ischemia
Angina
Atherothrombosis
Coronary Artery Disease
Myocardial Infarction
Revascularization

Clinical Applications and Prevention

Behavioral Medicine
Prevention of Cardiovascular Disorders
Obesity Health Outcomes

Epidemiology

Analytical Resources
Field Studies and Clinical Epidemiology
Genetic Epidemiology

Heart Development and Structural Disease

Adult Congenital Disease
Cardiac Immunology and Infection
Cardiovascular Development
Heart Transplantation
Pediatric Cardiovascular Disease
Valvular Heart Disease

Heart Failure and Arrhythmias

Arrhythmias
Heart Failure
Myocardial Protection
Resuscitation
Sudden Cardiac Death

Vascular Biology and Hypertension

Aneurysms
Cerebrovascular Disease
Hypertension
Lymphatic Diseases
Peripheral Vascular Disease
Renal Vascular Disease
Vascular Biology
Vascular Development and Angiogenesis

Cardiovascular Diseases (continued)

Women's Health Initiative

Hormone Therapy Trial
Dietary Modification Trial
Calcium and Vitamin D Trial
Observational Study
Memory Study

Lung Diseases

Airway Biology and Disease

Asthma
Chronic Obstructive Pulmonary Disease (COPD) and Environmental Lung Diseases
Cystic Fibrosis (CF)
Genetics, Genomics, and Biotechnology

Lung Biology and Disease

Acquired Immunodeficiency Syndrome (AIDS) and Tuberculosis (TB)
Critical Care and Acute Lung Injury
Developmental Biology and Pediatric Lung Disease
Immunology and Fibrosis
Lung Cell and Vascular Biology

National Center on Sleep Disorders Research

Sleep Disorders and Related Conditions
Ventilatory Control

Blood Diseases and Resources

Blood Diseases

Anemias
Erythropoiesis
Malaria
Red Cells
Sickle Cell Disease (SCD)
Thalassemia

Thrombosis and Hemostasis

Hematologic Immune Disorders
Hemophilia and Other Bleeding Disorders
Hemostasis
Immunity and Inflammation
Thrombosis

Blood Diseases and Resources (continued)

Transfusion Medicine and Cellular Therapeutics

Hematopoietic Stem Cell Transplantation
Immune Deficiencies, Reconstitution, Response, and Tolerance
Myelodysplasia, Marrow Failure, and Myeloproliferative Disorders
Novel Cellular Therapies for Repair and Regeneration
Stem Cell Biology
Transfusion Medicine Use, Safety, and Availability of Blood and Blood Components

Application of Research Discoveries

Research Translation Branch

Development of Clinical Practice Guidelines
Clinical Support and Implementation Applications
Knowledge Exchange Networks

Enhanced Dissemination and Utilization Branch

Research Dissemination
Research Utilization
Community Programs
Data Analysis and Evaluation

Intramural Research

Clinical Research

Cardiothoracic Surgery
Hematology
Pulmonary and Vascular Medicine
Translational Medicine

Laboratory Research

Biochemistry and Biophysics
Cell Biology and Physiology
Genetics and Development Biology
Immunology

of Prevention and Population Sciences—so that the administrative structure would better match the dynamic interaction that exists among basic, clinical, and population sciences. Because the areas addressed by the two previous divisions are closely linked, the Institute believed that merging the two Divisions would stimulate the collaborative efforts that are needed to advance cardiovascular research.

Descriptions of the Divisions follow.

Division of Cardiovascular Sciences

The DCVS supports basic, clinical, population, and health services research on the causes, prevention, and treatment of CVD and technology development for its diagnosis and treatment. The Division fosters research in atherothrombosis, coronary artery disease, myocardial infarction and ischemia, heart failure, arrhythmia, sudden cardiac death, adult and pediatric congenital heart disease, high blood pressure, stroke, cardiovascular complications of diabetes and obesity, and other cardiovascular disorders. A SCCOR supports clinical collaborative research in vascular injury, repair, and remodeling and a Centers Program supports cardiac translational research associated with preventing and treating heart failure and arrhythmias.

The Division's research portfolio includes a number of well-known epidemiological cohort studies that describe disease and risk factor patterns in populations; clinical trials of interventions to prevent disease and to reduce or eliminate risk factors; studies of the influence of genetic, behavioral, sociocultural, environmental, and health systems factors on disease risk and outcomes; and studies of the application of prevention and treatment strategies to determine how to improve clinical care and public health. The Division also supports research training and career development in these areas.

In addition to the Office of the Director, the Division is organized into three Programs, eight Branches, and three Offices, which are described below.

Basic and Early Translational Research Program

The Basic and Early Translational Research Program supports and provides leadership for basic, preclinical, and early translational studies on vascular biology and

hypertension, cardiovascular surgery, and development of advanced technologies for diagnosis and treatment of CVD.

The Program is divided into the two branches described below.

Advanced Technologies and Surgery Branch

The Advanced Technologies and Surgery Branch supports integrated basic, translational, and clinical research to develop technologies for the diagnosis, prevention, and treatment of CVD. Research on diagnostics focuses on proteomic, genomic, and other biomarker technologies and on imaging modalities and agents. Therapeutics research focuses on tissue-, cell-, and gene-based therapies; regenerative and reparative medicine; image-guided therapies; and cardiac and circulatory support and repair devices. Research related to surgery addresses improved surgical and image-guided therapies and the translation of cardiovascular surgical advances into clinical practice. Enabling technologies research includes bioinformatics, computational and systems biology, bioengineering, nanotechnology, materials research, and personalized medicine.

Vascular Biology and Hypertension Branch

The Vascular Biology and Hypertension Branch supports integrated basic and clinical research on the etiology, pathogenesis, prevention, diagnosis, and treatment of hypertension and vascular diseases. Vascular biology focuses on the biology of the vascular wall and its role in hypertension and vascular diseases; the development of arteries, veins, lymphatics, and microcirculation; and angiogenesis. Vascular disease research focuses on cerebrovascular, renal, lymphatic, aneurismal, and peripheral vascular diseases. Hypertension research focuses on the study of blood pressure regulation—including central, renal, and vascular control—and cerebrovascular disease resulting from high blood pressure.

Adult and Pediatric Cardiac Research Program

The Adult and Pediatric Cardiac Research Program supports and provides leadership for basic, translational, and clinical research on development, maturation, and functioning of the heart throughout all stages of life. Areas of research include cardiac development and maturation, myocyte structure and function, myocardial energetics and metabolism, cardiac electrophysiology, coronary artery structure and function, the failing heart,

valvular heart disease, exercise physiology, nutrition and the heart, congenital heart disease from birth through adulthood, the intrauterine environment and cardiovascular risk, cardiomyopathy, atherothrombosis, and coronary artery disease. A major function of the Program is to provide collaborative leadership for systematic oversight of clinical research across the Division, including clinical research information technology and standard but flexible operating procedures.

The Program is organized into the three branches described below.

Atherothrombosis and Coronary Artery Disease Branch

The Atherothrombosis and Coronary Artery Disease Branch supports integrated basic and clinical research on the etiology, pathogenesis, prevention, diagnosis, and treatment of coronary artery disease and atherothrombosis. Research on coronary artery disease focuses on acute and chronic coronary syndromes, including myocardial infarction; acute ischemia, angina, and silent ischemia; and percutaneous and surgical revascularization of stenotic and restenotic coronary lesions. Atherothrombosis research investigates atherosclerotic lesions in coronary arteries and other arterial beds; lipid fractions and interactions with the arterial wall; lesion instability, vulnerable plaques, and thrombosis; and biomarker and imaging diagnostics to quantify plaque and atherosclerosis progression. Atherothrombosis research also includes studies of diet, exercise, diabetes, obesity, and other metabolic conditions related to atherothrombosis.

Heart Development and Structural Diseases Branch

The Heart Development and Structural Diseases Branch supports integrated basic and clinical research on normal and abnormal cardiovascular development and the etiology, pathogenesis, prevention, diagnosis, and treatment of pediatric and adult structural heart disease. Research areas in heart development include normal and abnormal development, molecular and genetic etiology of cardiovascular malformations, cardiomyogenic differentiation of stem cells, and gene–environment interactions in the development of congenital heart disease. Structural disease research includes the investigation of congenital heart disease, from embryology through adulthood, and the associated exercise physiology and neurodevelopmental outcomes; valve disease; pediatric

cardiomyopathy and heart transplantation; and pediatric cardiac inflammation and infection.

Heart Failure and Arrhythmias Branch

The Heart Failure and Arrhythmias Branch supports integrated basic and clinical research on normal and abnormal cardiac function to improve diagnosis, treatment, and prevention of heart failure and arrhythmias and to protect the myocardium and manage resuscitation. Heart failure research addresses the pathogenesis and treatment of heart failure and cardiomyopathies, including the use of devices, medical treatments, and cell-based therapies. Arrhythmias research investigates the etiology of rare and common arrhythmias, sudden cardiac death, and arrhythmogenesis and explores the genetic and environmental bases of normal cardiac electrical activity. Myocardium protection research focuses on stunning and hibernation, ischemic/reperfusion injury, and preconditioning. Resuscitation research includes the study of whole-body oxygen deprivation; organ preservation; and cell, tissue, and organ protection during cardiac arrest and traumatic shock.

Prevention and Population Sciences Program

The Prevention and Population Sciences Program supports and provides leadership for population- and clinic-based research on the causes, prevention, and clinical care of cardiovascular, lung, and blood diseases and sleep disorders. Areas of research include epidemiological studies to describe disease and risk factor patterns in populations and to identify risk factors for disease; clinical trials of interventions to prevent disease; genetic, behavioral, sociocultural, and environmental influences on disease risk and outcomes; and the application of prevention and treatment strategies to determine how to improve clinical care and public health.

The Program is organized into the three branches described below.

Clinical Applications and Prevention Branch

The Clinical Applications and Prevention Branch supports, designs, and conducts research and supports training on behavioral, environmental, clinical, and health care approaches to reduce the occurrence and consequences of CVD. Prevention research examines the effectiveness of interventions to slow or halt risk factor or disease development or progression. Interventions—many of which focus on high-risk individuals and

populations—include medications, behavioral strategies, and environmental change. Studies to examine lifestyle, nutrition and exercise, psychological and sociocultural factors, and environmental and genetic influences relevant to prevention are supported. Also supported is clinical application research to examine approaches to improve health care delivery and patient outcomes. Studies include clinical and community trials and observational studies.

Epidemiology Branch

The Epidemiology Branch supports, designs, and conducts research and supports research training in the epidemiology of cardiovascular, lung, and blood diseases and sleep disorders. Studies are conducted to identify temporal trends and population patterns in the prevalence, incidence, morbidity, and mortality from the diseases and include single- and multicenter observational epidemiologic studies of development, progression, and treatment of cardiovascular, lung, and blood diseases and sleep disorders. Areas of emphasis include environmental, lifestyle, physiological, and genetic risk factors for disease and risk factor development including characterization of gene–gene and gene–environment interactions. Large cohorts of minority participants, such as Hispanics and blacks, have been assembled to explore health disparities in minorities. The Branch also distributes data from eligible NHLBI studies to researchers through a process that adheres to guidelines for the protection of participant privacy and confidentiality.

Women’s Health Initiative Branch

The Women’s Health Initiative Branch—in collaboration with the National Cancer Institute (NCI), the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), the National Institute on Aging (NIA), the National Institute of Neurological Disorders and Stroke (NINDS), and the Office of Research on Women’s Health (ORWH)—supports clinical trials and observational studies to improve the understanding of the causes and prevention of major diseases affecting the health of women. Current studies focus on CVD, cancer, and fractures. Large multicenter observational studies seek to identify risk markers for disease or to better quantify known markers using questionnaires, clinical examinations, and laboratory data. The large and long-term multicenter clinical trials test promising but unproven interventions—such as hormone therapy, diet, and supplements—to prevent major diseases and evaluate

overall effects on health. The Branch has established an infrastructure to support the use of data and blood samples from the studies by the scientific community.

The Women’s Health Initiative Memory Study (WHIMS), an ancillary study to the WHI, was designed to test whether hormone therapy prevents the development and progression of dementia symptoms in postmenopausal women.

Office of Biostatistics Research

The Office of Biostatistics Research (OBR) provides statistical expertise to the Institute and performs diverse functions in planning, designing, implementing, and analyzing NHLBI-sponsored studies. Its primary responsibility is to provide objective, statistically sound, and medically relevant solutions to problems. The OBR is expected to provide a new and valid statistical solution when presented with a problem for which techniques are not yet available. Its methodological interests concern survival analysis; longitudinal data analysis; and efficient study designs, including the monitoring of ongoing clinical studies for efficacy and safety. The OBR has recently made contributions to statistical genetics and has extended its expertise to bioinformatics.

Office of Research Training and Career Development

The Office of Research Training and Career Development supports training and career development programs in cardiovascular research for individuals at all educational levels, from high school students to faculty. It collaborates with the scientific community and professional organizations to ensure that its programs meet the needs of young scientists from diverse backgrounds. Activities include institutional and individual research training programs and fellowships; diversity supplements to provide mentored experiences with established research scientists; the Pathway to Independence Program, which allows recipients to bridge the gap between a career development award and a research award; and career development programs designed for clinical research.

Office of Special Projects

The Office of Special Projects represents the DCVS on NHLBI and NIH policy committees; oversees and works with Division leadership on selected activities of the DCVS clinical studies portfolio; fosters communication within DCVS by developing and coordinating

Division-wide and Institute-wide interest groups on various topics; develops and implements specific cross-cutting projects; and provides expert consultation as needed for large-scale projects or initiative development.

Division of Lung Diseases

The DLD supports research on the causes, diagnosis, treatment, and prevention of lung diseases and sleep disorders. Research is funded through investigator- and Institute-initiated grants and contracts in such disease areas as asthma, bronchopulmonary dysplasia, COPD, CF, sleep-disordered breathing; critical care and acute lung injury; developmental biology and pediatric pulmonary diseases; immunologic and fibrotic pulmonary disease; rare lung disorders; pulmonary vascular disease; and pulmonary complications of AIDS and tuberculosis. SCCORs support collaborative studies on COPD, pulmonary vascular disease, and host factors in chronic lung diseases.

The Division also supports demonstration and dissemination projects to transfer basic research and clinical findings to health care professionals and patients, and training and career development programs for individuals interested in furthering their professional abilities in lung disease research. The DLD, through the National Center on Sleep Disorders Research, coordinates sleep research activities across the NIH, other Federal Agencies, and outside organizations.

The Division is organized into the three Branches described below.

Airway Biology and Disease Branch

The Airway Biology and Disease Branch supports basic and clinical research and research training in asthma, COPD, CF, and airway function in health and disease. The Branch supports innovative genetics, genomics, and biotechnology programs to advance discovery of lung disease risk factors, mechanisms, and treatment. It also funds applied studies to develop new methods of lung imaging. Additionally, the Branch focuses on health education research and demonstration and education projects for the management of asthma and COPD.

Asthma research investigates the origins, pathogenesis, and management of asthma, including the role of immunologic and nonimmunologic events and inflammation in

its pathogenesis; the genetics of asthma and atopy; airway remodeling and repair in asthma; the mechanisms of severe asthma; and the regulation of mucous hypersecretion and mucous cell metaplasia.

Research on COPD and other diseases of the lung related to smoking or environmental exposures explores pathogenetic mechanisms involved in the development and progression of COPD, emphysema, and lung disease associated with alpha-1-antitrypsin deficiency; genetic determinants of lung disease; treatment of COPD; and properties and health effects of air pollution.

Research on CF focuses on the function of the CF transmembrane conductance regulator and its role in lung disease. Areas of interest include airway epithelial ion transport, airway surface liquids, animal and cellular models for CF, signaling pathways in airway cells, regulation of mucin expression and secretion, development and clinical testing of treatments, and mechanisms underlying the infectious and inflammatory aspects of CF lung disease.

Lung Biology and Disease Branch

The Lung Biology and Disease Branch supports basic, translational, and clinical research and research training programs in pulmonary conditions associated with human immunodeficiency virus (HIV)/AIDS, tuberculosis, acute lung injury and critical care medicine, lung development and pediatric lung diseases, lung immunobiology and interstitial lung diseases, lymphangiomyomatosis, and lung cell and vascular biology. In addition, it supports the development of tuberculosis curricula for medical schools.

AIDS and tuberculosis research focuses on the pathogenesis and course of pulmonary manifestations of HIV infection and tuberculosis and host lung defenses against them and HIV-associated opportunistic infections. Emphasis is on identifying and understanding the pathogenesis of lung complications associated with HIV infection and characterizing the lung microbiome in HIV-infected and HIV-uninfected individuals.

Research on acute lung injury and critical care medicine explores the pathogenesis, treatment, and prevention of acute lung injury and acute respiratory distress syndrome (ARDS). The Branch supports development of new diagnostic tools for detection of acute lung injury and development of an artificial lung and oversees clinical

studies of therapies for ARDS, including the ARDS Network.

Research in developmental biology and pediatric pulmonary diseases investigates the regulation of lung development, growth, and repair and focuses on pediatric pulmonary diseases in infants and children, including bronchopulmonary dysplasia, congenital and acquired upper airway abnormalities, and persistent pulmonary hypertension of the newborn. Research also focuses on identifying and determining the cell fate of lung progenitor stem cells, understanding lung regeneration, and exploring cell-based therapy for lung injury and disease.

Research on immunology and fibrosis includes studies of interstitial pulmonary fibrosis, sarcoidosis, occupational and environmental lung diseases, and the role of immune response and inflammation in these diseases. The Branch also supports research on lung immunobiology, lung transplantation, and pathogenesis of lymphangiomyomatosis.

Lung cell and vascular biology research investigates lung cell biology and function and pulmonary vascular disease, including pulmonary arterial hypertension and pulmonary embolism diagnosis. Research focuses on pulmonary alveolar epithelial cells, vascular endothelial cells, and the lung surfactant system. The Branch also performs research on the regulation of barrier function of pulmonary endothelial cells and regulation of lung permeability.

National Center on Sleep Disorders Research

The National Center on Sleep Disorders Research (NCSDR) supports research, health education, and research training related to sleep-disordered breathing and the fundamental function of sleep and circadian rhythms. Specific areas of interest include neurobiology of ventilatory control, respiratory rhythmogenesis, chemosensitivity, basic neurobiology of sleep-wake regulation, circadian-coupled cellular function, and effects of sleep deprivation. The NCSDR also stewards several forums, including the Sleep Disorders Research Advisory Board and the Trans-NIH Sleep Research Coordinating Committee, that facilitate the coordination of sleep research across the NIH and with other Federal Agencies and outside organizations. The Center participates in translation of new sleep research findings for dissemination to health care professionals and the public.

Division of Blood Diseases and Resources

The DBDR supports research and research training on the causes, diagnosis, treatment, and prevention of non-malignant blood diseases, including anemias, SCD, and thalassemia; premalignant processes, such as myelodysplasia and myeloproliferative disorders; hemophilia and other abnormalities of hemostasis and thrombosis; and immune dysfunction. It supports a SCCOR and other specialized centers that focus on clinical collaborative research in hemostatic and thrombotic diseases, SCD, and cell-based therapies for blood diseases.

The Division also supports research in transfusion medicine and blood banking, stem cell biology and disease, hematopoiesis, clinical cellular medicine, and blood supply adequacy and safety. It provides biospecimens and cellular resources to the scientific community.

The Division is organized into the three Branches described below.

Blood Diseases Branch

The Blood Diseases Branch supports research and research training in blood diseases, including SCD, thalassemia, Fanconi anemia, Diamond-Blackfan anemia, and other aplastic anemias and malaria. Additionally, it supports outcomes-related research. Research in SCD and thalassemia focuses on elucidating the etiology and pathophysiology of the diseases and improving disease treatment and management. Areas of emphasis include genetics, regulation of hemoglobin synthesis, iron chelation, development of drugs to increase fetal hemoglobin production, hematopoietic transplantation, and gene therapy. Basic and translational red cell research are also areas of interest.

Thrombosis and Hemostasis Branch

The Thrombosis and Hemostasis Branch supports research and research training in hemostasis, thrombosis, and endothelial cell biology, including basic research, clinical studies, and technology development. Areas of interest include hemophilia; von Willebrand disease; and such immune disorders as idiopathic thrombocytopenic purpura, thrombotic thrombocytopenic purpura, and systemic lupus erythematosus. Research on bleeding disorders focuses on identifying effective treatments. Emerging areas of interest are gene transfer; clinical proteomics; glycomics; inflammation related to vascular injury from trauma and sepsis; thrombosis; stroke;

coagulation activation; autoimmune disease; and thrombotic complications of obesity, diabetes, and cancer.

The Branch also supports research on the pathogenesis of arterial and venous thrombosis to improve the diagnosis, prevention, and treatment of thrombosis in heart attack, stroke, and peripheral vascular diseases. A major goal is to find additional platelet inhibitors, anticoagulants, and fibrinolytic agents to treat thrombotic and thromboembolic disorders with better specificity and fewer side effects than those currently used for treatment.

Transfusion Medicine and Cellular Therapeutics Branch

The Transfusion Medicine and Cellular Therapeutics Branch supports research and research training in transfusion medicine, stem cell biology and disease, hematopoiesis, clinical cellular medicine, and blood supply adequacy and safety. Research focuses on the use, safety, and availability of blood and blood components for transfusion and cellular therapies. Research areas include transmission of disease, noninfectious complications of transfusions, immunobiology, cell biology and disease, novel cell-based therapies, hematopoietic stem cell transplantation, and overall product availability. The Branch develops programs for basic and clinical research related to normal and abnormal cellular biology and pathology. It also collaborates with governmental, private sector, and international organizations to improve the safety and availability of the global supply of blood and blood components. The Branch also supports major NHLBI resource programs that provide cellular therapeutic products and biospecimens to the NHLBI scientific community.

Division of Intramural Research

The DIR conducts laboratory and clinical research in heart, vascular, lung, blood, and kidney diseases and develops technology related to cardiovascular and pulmonary diseases. Areas of interest include the biologic basis of arteriosclerosis and its manifestations; pathophysiology of hypertensive vascular disease; functions of the lung; clinical and experimental studies on physiologic and pharmacologic aspects of heart, lung, and blood diseases; and a broad program of other basic research and technical developments related to them.

The DIR is organized into the four Centers and three Branches described below.

Biochemistry and Biophysics Center

The Biochemistry and Biophysics Center develops a global view of the molecular basis of structure–function relationships of proteins and biologically relevant molecules. It performs state-of-the-art nuclear magnetic resonance spectroscopy studies of protein structure and functional interactions, develops mathematical tools for generating theoretical models of protein structure–function relationships, elucidates the mechanisms of enzyme function, and investigates the relationship between protein structure–function and cell signaling pathways.

Cell Biology and Physiology Center

The Cell Biology and Physiology Center develops a global view of the mechanisms that regulate cellular function and physiology. It evaluates the mechanisms that control different molecular machines within the cytosol, including those involved in muscle contraction and cytosolic and membrane transport processes. The Center studies cellular signaling events associated with hormone action, cytosolic trafficking, and energy metabolism; investigates the role of cellular processes on function and adaptation in whole-animal model systems; and develops unique measuring devices for studying biochemical and physiological processes in intact cells, whole animals, and clinical situations.

Genetics and Development Biology Center

The Genetics and Development Biology Center develops a global view of the mechanisms that regulate cardiovascular development and the etiology of congenital heart anomalies and CVD. It evaluates the function of specific genes and transcription factors in the development of the heart and other tissues, develops techniques and approaches for gene delivery and gene therapy in model systems, and works toward a better understanding of basic processes involved in regulating and interpreting the genetic code in development and disease.

Immunology Center

The Immunology Center develops a global view of the molecular basis of immune processes. It studies the intracellular and signaling processes involved in the activation of lymphocytes and mast cells, investigates the mechanisms by which drugs and other agents result in allergic-autoimmune reactions, and relates the results to the

development of new diagnostic and therapeutic approaches in humans.

Translational Medicine Branch

The Translational Medicine Branch conducts biomedical research directed at defining normal and abnormal biologic function at the molecular level. It develops diagnostic and therapeutic modalities for the treatment and understanding of CVD and implements mechanism-based clinical studies centered on innovative discoveries and observations from inside and outside the Branch.

Hematology Branch

The Hematology Branch conducts basic and clinical research on normal and abnormal hematopoiesis. Areas of interest include bone marrow failure, viral infections of hematopoietic cells, gene therapy of hematologic and malignant diseases, bone marrow transplantation, and mechanisms of immunologically mediated syndromes, such as graft-versus-host disease and autoimmune diseases.

Pulmonary and Vascular Medicine Branch

The Pulmonary and Vascular Medicine Branch conducts research on the lung, heart, and systemic vasculature directed at defining normal physiological function and novel mechanisms of disease at the molecular, biochemical, and functional levels. It conducts research on emerging diseases of the lung characterized by unknown etiology and molecular pathogenesis. Areas of interest include lung diseases in blacks, such as SCD and sarcoidosis; the role of nitric oxide, nitrite, gender, preconditioning, and mitochondrial function on the modulation of ischemia and reperfusion injury of the heart and lung; and translational study and drug development for therapeutic modulation of vascular, pulmonary, and cardiac cellular and molecular dysfunction in diseases of the lung and heart.

Division for the Application of Research Discoveries

The DARD supports efforts to advance the application of scientific discoveries for preventing, detecting, and treating cardiovascular, lung, and blood diseases and sleep disorders to improve the health of all Americans. It focuses on translating scientific evidence into clinical guidelines for physicians to implement in their practice and into community health promotion or education

programs for communities to disseminate to the public. The Division uses several channels of communications, including communities of practice, knowledge networks, social media, Web sites, conferences, and symposia. DARD programs reach out to people in high-risk, low-income communities to improve health and reduce health disparities. DARD activities promote communication and collaboration among researchers, clinical and public health practitioners, patients, and the general public. They also focus on identifying gaps in knowledge that can be addressed by future research.

The Division is organized into the two Branches described below.

Research Translation Branch

The Research Translation Branch interprets research findings into effective approaches for practice. The Branch synthesizes and organizes evidence around priority diseases or conditions and leads the effort to develop both evidence-based systematic literature reviews and guidelines for clinical practice. The Branch also develops clinical decision support systems and other innovative applications for use in clinical and public health practice settings, and it facilitates knowledge exchange opportunities for researchers and practitioners around issues of research applicability and relevance to practice. Branch activities also identify knowledge gaps to inform future research.

Enhanced Dissemination and Utilization Branch

The Enhanced Dissemination and Utilization Branch collects, synthesizes, and communicates evidence-based findings on the determinants of population health to maintain and improve the health of diverse populations and reduce health disparities in underserved groups. The Branch translates research into effective community health promotion programs, establishes effective partnerships to improve health and reduce health disparities, and builds communication among organizations and communities to ensure their personal involvement in improving community health. Results are achieved by providing technical assistance and information resources to diverse audiences, including high-risk and underserved groups in a variety of community practice settings. The Branch identifies appropriate health outcomes for assessing successful implementation and conducts evaluation activities to ensure continuous improvement and inform program planning.



3. Important Events

June 16, 1948. President Harry S. Truman signs the National Heart Act, creating the NHI in the Public Health Service (PHS), with the National Advisory Heart Council as its advisory body.

July 7, 1948. Dr. Paul Dudley White is selected to be “Executive Director of the National Advisory Heart Council and Chief Medical Advisor to the National Heart Institute” under section 4b of the National Heart Act.

August 1, 1948. The NHI is established as an institute of the NIH by Surgeon General Leonard A. Scheele. As legislated in the National Heart Act, the NHI assumes responsibility for heart research, training, and administration. Intramural research projects in CVD and gerontology conducted elsewhere in the NIH are transferred to the NHI. The Director of the NHI assumes all leadership for the total PHS heart program. Dr. Cassius J. Van Slyke is appointed as the first Director of the NHI.

August 29, 1948. Surgeon General Scheele announces the membership of the first National Advisory Heart Council. Varying terms of membership for the 16-member Council commence September 1.

September 8, 1948. The National Advisory Heart Council holds its first meeting.

January 1949. Cooperative Research Units are established at four institutions: the University of California, the University of Minnesota, Tulane University, and Massachusetts General Hospital. Pending completion of the NHI’s own research organization and facilities, the Units are jointly financed by the NIH and the institutions.

July 1, 1949. The NHI Intramural Research Program is established and organized on three general research levels consisting of three laboratory sections, five laboratory–clinical sections, and four clinical sections. The Heart Disease Epidemiology Study at Framingham, Massachusetts, is transferred from the Bureau of State Services, PHS, to the NHI.

January 18–20, 1950. The NHI and the American Heart Association jointly sponsor the first National Conference on Cardiovascular Diseases to summarize current knowledge and to make recommendations concerning further progress against heart and blood vessel diseases.

December 1, 1952. Dr. James Watt is appointed Director of the NHI, succeeding Dr. Van Slyke, who is appointed Associate Director of the NIH.

July 6, 1953. The Clinical Center admits its first patient for heart disease research.

July 1, 1957. The first members of the NHI Board of Scientific Counselors begin their terms. The Board was established in 1956 “to provide advice on matters of general policy, particularly from a long-range viewpoint, as they relate to the intramural research program.”

February 19, 1959. The American Heart Association and the NHI present a report to the Nation—*A Decade of Progress Against Cardiovascular Disease*.

April 21, 1961. The President’s Conference on Heart Disease and Cancer, whose participants on March 15 were requested by President John F. Kennedy to assist “in charting the Government’s further role in a national attack on these diseases,” convenes at the White House and submits its report.

September 11, 1961. Dr. Ralph E. Knutti is appointed Director of the NHI, succeeding Dr. Watt, who becomes head of international activities for the PHS.

December 30, 1963. February is designated as “American Heart Month” by a unanimous joint resolution of Congress with approval from President Lyndon B. Johnson.

November 22–24, 1964. The Second National Conference on Cardiovascular Diseases—cosponsored by the American Heart Association, the NHI, and the Heart Disease Control Program of the PHS—is held to evaluate progress since the 1950

Conference and to assess needs and goals for continued and accelerated growth against heart and blood vessel diseases.

December 9, 1964. The President's Commission on Heart Disease, Cancer, and Stroke—appointed by President Johnson on March 7, 1964—submits its report to “recommend steps that can be taken to reduce the burden and incidence of these diseases.”

August 1, 1965. Dr. William H. Stewart assumes the Directorship of the NHI upon Dr. Knutti's retirement.

September 24, 1965. Dr. William H. Stewart, NHI Director, is named Surgeon General of the PHS.

October 6, 1965. In FY 1966, Supplemental Appropriations Act (P.L. 89–199) allocates funds to implement the recommendations of the President's Commission on Heart Disease, Cancer, and Stroke that are within existing legislative authorities. The NHI is given \$5.05 million for new clinical training programs, additional graduate training grants, cardiovascular clinical research centers on cerebrovascular disease and thrombotic and hemorrhagic disorders, and planning grants for future specialized cardiovascular centers.

March 8, 1966. Dr. Robert P. Grant succeeds Dr. Stewart as Director of the NHI. Dr. Grant serves until his death on August 15, 1966.

November 6, 1966. Dr. Donald S. Fredrickson is appointed Director of the NHI.

March 15, 1968. Dr. Theodore Cooper succeeds Dr. Fredrickson as Director of the NHI, the latter electing to return to research activities with the Institute.

October 16, 1968. Dr. Marshall W. Nirenberg is awarded a Nobel Prize in Physiology or Medicine for discovering the key to deciphering the genetic code. Dr. Nirenberg, chief of the NHI Laboratory of Biochemical Genetics, is the first Nobel Laureate at the NIH and the first Federal employee to receive a Nobel Prize.

October 26, 1968. The NHI receives the National Hemophilia Foundation's Research and Scientific Achievement Award for its “medical leadership . . . , tremendous stimulation and support of research activities directly related to the study and treatment of hemophilia.”

November 14, 1968. The 20th anniversary of the NHI is commemorated at the White House under the auspices of President Johnson and other distinguished guests.

August 12, 1969. A major NHI reorganization plan creates five program branches along disease category lines in extramural programs (arteriosclerotic disease, cardiac disease, pulmonary disease, hypertension and kidney diseases, and thrombotic and hemorrhagic diseases); a Therapeutic Evaluations Branch and an Epidemiology Branch under the Associate Director for Clinical Applications; and three offices in the Office of the Director (heart information, program planning, and administrative management).

November 10, 1969. The NHI is redesignated by the Secretary, Health, Education, and Welfare (HEW), as the National Heart and Lung Institute (NHLI), reflecting a broadening scope of its functions.

February 18, 1971. President Richard M. Nixon's Health Message to Congress identifies sickle cell anemia as a high-priority disease and calls for increased Federal expenditures. The Assistant Secretary for Health and Scientific Affairs, HEW, is assigned lead-Agency responsibility for coordination of the National Sickle Cell Disease Program at the NIH and NHLI.

June 1971. The Task Force on Arteriosclerosis, convened by Dr. Cooper, presents its report. Volume I addresses general aspects of the problem and presents the major conclusions and recommendations in nontechnical language. Volume II contains technical information on the state of knowledge and conclusions and recommendations in each of the following areas: atherogenesis, presymptomatic atherosclerosis, overt atherosclerosis, and rehabilitation.

May 16, 1972. The National Sickle Cell Anemia Control Act (P.L. 92–294) provides for a national diagnosis, control, treatment, and research program. The Act does not mention the NHLI but has special pertinence because the Institute has been designated to coordinate the National Sickle Cell Disease Program.

June 12, 1972. Elliot Richardson, Secretary, HEW, approves a nationwide program for high blood pressure information and education and appoints two committees to implement the program: the Hypertension Information and Education Advisory Committee, chaired by the Director, NIH, and the Interagency Working Group, chaired by the Director, NHLI. A High Blood Pressure

Information Center is established within the NHLI Office of Information to collect and disseminate public and professional information about the disease.

July 1972. The NHLI launches its National High Blood Pressure Education Program (NHBPEP), a program of patient and professional education that has as its goal to reduce death and disability related to high blood pressure.

July 14, 1972. Secretary Richardson approves reorganization of the NHLI, with the Institute elevated to Bureau status within the NIH and comprising seven division-level components: Office of the Director, Division of Heart and Vascular Diseases (DHVD), DLD, DBDR, DIR, Division of Technological Applications, and Division of Extramural Affairs (DEA).

September 19, 1972. The National Heart, Blood Vessel, Lung, and Blood Act of 1972 (P.L. 92–423) expands the authority of the Institute to advance the national attack on the diseases within its mandate. The act calls for intensified and coordinated Institute activities to be planned by the Director and reviewed by the National Heart and Lung Advisory Council.

July 24, 1973. The first Five-Year Plan for the National Heart, Blood Vessel, Lung, and Blood Program is transmitted to the President and to Congress.

December 17, 1973. The National Heart and Lung Advisory Council completes its First Annual Report on the National Program.

February 13, 1974. The Director of the NHLI forwards his First Annual Report on the National Program to the President for transmittal to Congress.

April 5, 1974. The Assistant Secretary for Health, HEW, authorizes release of the Report to the President by the President's Advisory Panel on Heart Disease. The report of the 20-member panel, chaired by Dr. John S. Millis, includes a survey of the problem of heart and blood vessel disorders and panel recommendations to reduce illness and death from them.

August 2, 1974. The Secretary, HEW, approves regulations governing the establishment, support, and operation of National Research and Demonstration Centers for heart, blood vessel, lung, and blood diseases, which implement section 415(b) of the PHS Act, as amended by the National Heart, Blood Vessel, Lung, and Blood Act of 1972: (1) to carry out basic and clinical research on

heart, blood vessel, lung, and blood diseases; (2) to provide demonstrations of advanced methods of prevention, diagnosis, and treatment; and (3) to supply a training source for scientists and physicians concerned with the diseases.

September 16, 1975. Dr. Robert I. Levy is appointed Director of the NHLI, succeeding Dr. Theodore Cooper, who was appointed Deputy Assistant Secretary for Health, HEW, on April 19, 1974.

June 25, 1976. Legislation amending the PHS Act (P.L. 94–278) changes the name of the NHLI to the National Heart, Lung, and Blood Institute (NHLBI) and provides for an expansion in blood-related activities within the Institute and throughout the National Heart, Blood Vessel, Lung, and Blood Program.

August 1, 1977. The Biomedical Research Extension Act of 1977 (P.L. 95–83) reauthorizes the programs of the NHLBI, with continued emphasis on both the national program and related prevention and dissemination activities.

February 1978. The NHLBI and the American Heart Association jointly celebrate their 30th anniversaries.

September 1979. The Task Force on Hypertension, established in September 1975 to assess the state of hypertension research, completes its in-depth survey and recommendations for improved prevention, treatment, and control in 14 major areas. The recommendations are intended to guide the NHLBI in its future efforts.

November 1979. The results of the Hypertension Detection and Follow-Up Program (HDFP), a major clinical trial started in 1971, provide evidence that tens of thousands of lives are being saved through treatment of mild hypertension and that perhaps thousands more could be saved annually if all people with mild hypertension were under treatment.

November 21, 1980. The Albert Lasker Special Public Health Award is presented to the NHLBI for its HDFP, "which stands alone among clinical studies in its profound potential benefit to millions of people."

December 17, 1980. The Health Programs Extension Act of 1980 (P.L. 96–538) reauthorizes the NHLBI, with continued emphasis on both the national program and related prevention programs.

September 8, 1981. The Working Group on Arteriosclerosis—convened in 1978 to assess present understanding, highlight unresolved problems, and emphasize opportunities for future research in arteriosclerosis—completes its report. Volume I presents conclusions and recommendations in nontechnical language. Volume II provides an in-depth substantive basis for the conclusions and recommendations contained in Volume I.

October 2, 1981. The Beta-Blocker Heart Attack Trial (BHAT) demonstrates benefits to those in the trial who received the drug propranolol compared with the control group.

July 6, 1982. Dr. Claude Lenfant is appointed Director of the NHLBI. He succeeds Dr. Levy.

September 1982. The results of the Multiple Risk Factor Intervention Trial are released. They support measures to reduce cigarette smoking and to lower blood cholesterol to prevent coronary heart disease (CHD) mortality but raise questions about optimal treatment of mild hypertension.

October 26, 1983. The Coronary Artery Surgery Study (CASS) results are released. They demonstrate that mildly symptomatic patients with coronary artery disease can safely defer coronary artery bypass surgery until symptoms worsen.

January 12, 1984. The results of the Lipid Research Clinics Coronary Primary Prevention Trial (LRC-CPPT) are released. They establish conclusively that reducing total blood cholesterol reduces the risk of CHD in men at increased risk because of elevated cholesterol levels. Each 1 percent decrease in cholesterol can be expected to reduce heart attack risk by 2 percent.

April–September 1984. The *Tenth Report of the Director, NHLBI*, commemorates the 10th anniversary of the passage of the National Heart, Blood Vessel, Lung, and Blood Act. The five-volume publication reviews 10 years of research progress and presents a 5-year research plan for the national program.

April 1984. The Division of Epidemiology and Clinical Applications (DECA) is created. It provides the Institute with a single focus on clinical trials; prevention, demonstration, and education programs; behavioral medicine; nutrition; epidemiology; and biometry. It also provides new opportunities to examine the interrelationships of cardiovascular, respiratory, and blood diseases.

November 1984. An NHLBI–NIH Clinical Center inter-Agency agreement for studies on the transmission of HIV from humans to chimpanzees leads to the first definitive evidence that the transmission is by blood transfusion.

April 1985. Results of Phase I of the Thrombolysis in Myocardial Infarction (TIMI) trial comparing streptokinase (SK) with recombinant tissue plasminogen activator (t-PA) are published. The new thrombolytic agent recombinant t-PA is approximately twice as effective as SK in opening thrombosed coronary arteries.

October 1985. The NHLBI Smoking Education Program is initiated to increase health care provider awareness about clinical opportunities for smoking cessation programs, techniques for use within health care settings, and resources for use within communities to expand and reinforce such efforts.

October 14, 1985. NHLBI-supported researchers Michael S. Brown and Joseph L. Goldstein are awarded the Nobel Prize in Physiology or Medicine for their discoveries concerning the regulation of cholesterol metabolism.

November 1985. The NHLBI inaugurates the National Cholesterol Education Program (NCEP) to increase awareness among health professionals and the public that elevated blood cholesterol is a cause of CHD and that reducing elevated blood cholesterol levels will contribute to the reduction of CHD.

June 1986. Results of the Prophylactic Penicillin Trial demonstrate the efficacy of prophylactic penicillin therapy in reducing the morbidity and mortality associated with pneumococcal infections in children with SCD.

September 18, 1986. The NHLBI sponsors events on the NIH campus in conjunction with the meeting of the X World Congress of Cardiology in Washington, DC. Activities include a special exhibit at the National Library of Medicine titled “American Contributions to Cardiovascular Medicine and Surgery” and two symposia—“New Dimensions in Cardiovascular Disease Research” and “Cardiovascular Nursing and Nursing Research.”

December 17, 1986. The citizens of Framingham, Massachusetts, are presented a tribute by the Assistant Secretary, HHS, for their participation in the Framingham Heart Study over the past 40 years.

September 1987. The NHLBI commemorates the centennial of the NIH and the 40th anniversary of the Institute's inception. Two publications prepared for the Institute's anniversary—*Forty Years of Achievement in Heart, Lung, and Blood Research* and *A Salute to the Past: A History of the National Heart, Lung, and Blood Institute*—document significant Institute contributions to research and summarize recollections about the Institute's 40-year history.

October 1987. The National Blood Resource Education Program is established to ensure an adequate supply of safe blood and blood components to meet the Nation's needs and to ensure that blood and blood components are transfused only when therapeutically appropriate.

April 1988. The NHLBI initiates its Minority Research Supplements program to provide supplemental funds to ongoing research grants for support of minority investigators added to research teams.

September 1988. AIDS research is added to the National Heart, Blood Vessel, Lung, and Blood Diseases and Blood Resources Program. It is the first area of research to be added since the Program was established in 1973.

September 1988. The NHLBI funds the first of its new Programs of Excellence in Molecular Biology, designed to foster the study of the organization, modification, and expression of the genome in areas of importance to the Institute and to encourage investigators to become skilled in the experimental strategies and techniques of modern molecular biology.

September 1988. The Strong Heart Study is initiated. It focuses on CVD morbidity and mortality rates and distribution of CVD risk factors in three geographically diverse American Indian groups.

October 1988. The National Marrow Donor Program is transferred from the Department of the Navy to the NHLBI. The Program, which serves as a focal point for bone marrow research, includes a national registry of volunteers who have offered to donate marrow for transplant to patients not having suitably matched relatives.

March 1989. The NHLBI initiates a National Asthma Education Program to raise awareness of asthma as a serious chronic disease and to promote more effective

management of asthma through patient and professional education.

May 1989. The NHLBI Minority Access to Research Careers (MARC) Summer Research Training Program is initiated to provide an opportunity for MARC Honors Scholars to work with researchers in the NHLBI intramural laboratories.

September 14, 1990. The first human gene therapy protocol in history is undertaken at the NIH. A team of scientists—led by W. French Anderson, NHLBI, and R. Michael Blaese, NCI—insert a normal gene into a patient's cells to compensate for a defective gene that left the patient's cells unable to produce an enzyme essential to the functioning of the body's immune system.

January 1991. The NHLBI Obesity Education Initiative (OEI) begins. Its objective is to make a concerted effort to educate the public and health professionals about obesity as an independent risk factor for CVD and its relationship to other risk factors, such as high blood pressure and high blood cholesterol.

February 1991. The expert panel of the National Asthma Education Program releases its report, *Guidelines for Diagnosis and Management of Asthma*, to educate physicians and other health care providers in asthma management.

April 8–10, 1991. The First National Conference on Cholesterol and Blood Pressure Control is attended by more than 1,800 health professionals.

May 1991. The Task Force on Hypertension, established in November 1989 to assess the state of hypertension research and to develop a plan for future NHLBI funding, presents its conclusions. The report outlines a set of scientific priorities and develops a comprehensive plan for support over the next several years.

June 11, 1991. The NHLBI initiates a National Heart Attack Alert Program (NHAAP) to reduce premature morbidity and mortality from acute myocardial infarction (AMI) and sudden death. The Program emphasizes rapid disease identification and treatment.

July 1991. Results of the Systolic Hypertension in the Elderly Program (SHEP) demonstrate that low-dose pharmacologic therapy of isolated systolic hypertension in those older than 60 years of age significantly reduces stroke and myocardial infarction.

August 1991. Results of the Studies of Left Ventricular Dysfunction (SOLVD) are released. They demonstrate that use of the angiotensin-converting enzyme (ACE) inhibitor enalapril causes a significant reduction in mortality and hospitalization for congestive heart failure in patients with symptomatic heart failure.

August 1991. The NHLBI sponsors “Physical Activity and Cardiovascular Health: Special Emphasis on Women and Youth,” the first national workshop to assess the current knowledge in the field and to develop scientific priorities and plans for support. Recommendations from the Working Groups are published in the supplemental issue of *Medicine and Science in Sports and Exercise*.

March 1992. The *International Consensus Report on Diagnosis and Management of Asthma* is released. It is to be used by asthma specialists and medical opinion leaders to provide a framework for discussion of asthma management pertinent to their respective countries.

March 1992. Results of the Trials of Hypertension Prevention Phase I are published. They demonstrate that both weight loss and reduction of dietary salt reduce blood pressure in adults with high-normal diastolic blood pressure and may reduce the incidence of primary hypertension.

June 26–27, 1992. The Fourth National Minority Forum on Cardiovascular Health, Pulmonary Disorders, and Blood Resources is attended by nearly 600 individuals.

October 11–13, 1992. The First National Conference on Asthma Management is attended by more than 900 individuals.

October 30, 1992. A celebration of the 20th anniversary of the NHBPEP is held in conjunction with the NHBPEP Coordinating Committee meeting. The *Fifth Report of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure* (JNC V) and the *NHBPEP Working Group Report on the Primary Prevention of Hypertension* are released.

June 10, 1993. The NIH Revitalization Act of 1993 (P.L. 103–43) establishes the NCSDR within the NHLBI.

June 15, 1993. The *Second Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* (ATP II) is released to the

public at a press conference held in conjunction with the NCEP Coordinating Committee meeting.

January 30, 1995. Results of the Multicenter Study of Hydroxyurea (MSH) are released through a clinical alert. They demonstrate that hydroxyurea reduced the number of painful episodes by 50 percent in severely affected adults with SCD. This is the first effective treatment for adult patients with this disorder.

September 1995. The NHLBI funds a new Program of Specialized Centers of Research in Hematopoietic Stem Cell Biology, which is designed to advance our knowledge of stem cell biology and enhance our ability to achieve successful stem cell therapy to cure genetic and acquired diseases.

September 21, 1995. Results of the Bypass Angioplasty Revascularization Investigation are released through a clinical alert. They demonstrate that patients on drug treatment for diabetes who had blockages in two or more coronary arteries and were treated with coronary artery bypass graft (CABG) surgery had, at 5 years, a death rate markedly lower than that of similar patients treated with angioplasty. The clinical alert recommends CABG over standard angioplasty for patients on drug therapy for diabetes who have multiple coronary blockages and are first-time candidates for either procedure.

November 5–6, 1995. The first Conference on Socioeconomic Status (SES) and Cardiovascular Health and Disease is held to determine future opportunities and needs for research on SES factors and their relationships with cardiovascular health and disease.

December 4–5, 1995. A celebration of the 10th anniversary of the NCEP is held in conjunction with the NCEP Coordinating Committee meeting. Results of the 1995 Cholesterol Awareness Surveys of physicians and the public are released.

May 1996. The NHLBI announces results from the Framingham Heart Study that conclude earlier and more aggressive treatment of hypertension is vital to preventing congestive heart failure. The Treatment of Mild Hypertension Study (TOMHS) demonstrates that lifestyle changes—such as weight loss, a healthy eating plan, and physical activity—are crucial for reducing blood lipids in those treated for Stage I hypertension.

September 1996. Findings from the Asthma Clinical Research Network (ACRN) show that for people with

asthma, taking an inhaled beta-agonist at regularly scheduled times is safe but provides no greater benefit than taking the medication only when asthma symptoms occur. The recommendation to physicians who treat patients with mild asthma is to prescribe inhaled beta-agonists only on an as-needed basis.

November 13, 1996. The NHLBI releases findings from two studies, Dietary Approaches to Stop Hypertension (DASH) Trial and Trial of Nonpharmacologic Intervention in the Elderly (TONE). The DASH Trial demonstrates that a diet low in fat and high in vegetables, fruits, fiber, and low-fat dairy products significantly and quickly lowers blood pressure. The TONE shows that weight loss and reduction of dietary sodium safely reduce the need for antihypertensive medication in older patients while keeping their blood pressure under control.

January 1997. Definitive results from the Pathobiological Determinants of Atherosclerosis in Youth (PDAY) program are published. They show that atherosclerosis develops before age 20 and that the following risk factors affect the progression of atherosclerosis equally in women and men, regardless of race: low high-density lipoprotein (HDL) cholesterol, high low-density lipoprotein (LDL) cholesterol, and cigarette smoking.

February 24, 1997. The National Asthma Education and Prevention Program (NAEPP) releases the *Expert Panel Report 2, Guidelines for the Diagnosis and Management of Asthma* to the public at a press conference held in conjunction with a meeting of the American Academy of Allergy, Asthma, and Immunology in San Francisco.

May 8, 1997. Results of the Antiarrhythmic Versus Implantable Defibrillator (AVID) clinical trial are presented. They show that an implantable cardiac defibrillator reduces mortality compared to pharmacologic therapy in patients at high risk for sudden cardiac death.

September 1997. The Stroke Prevention Trial in Sickle Cell Anemia (STOP) is terminated early because prophylactic transfusion resulted in a 90 percent relative decrease in the stroke rate among children 2 to 16 years old.

September 1997. The Institute's National Sickle Cell Disease Program celebrates its 25th anniversary.

October 1997. The NHLBI commemorates the 50th anniversary of the Institute's inception. A publication prepared for the Institute's anniversary—*Vital Signs: Discoveries in Diseases of the Heart, Lungs, and Blood*—documents the remarkable research advances of the past 50 years.

October 1, 1997. The WHI, initiated in 1991, is transferred to the NHLBI.

November 6, 1997. The *Sixth Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC VI) is released at a press conference held in conjunction with the 25th anniversary meeting and celebration of the NHBPEP Coordinating Committee.

December 1997. Findings from the Trial To Reduce Alloimmunization to Platelets (TRAP) demonstrate that leucocyte reduction by filtration or ultraviolet B irradiation of platelets—both methods are equally effective—decreases development of lymphocytotoxic antibodies and alloimmune platelet refractoriness.

February 1998. The Task Force on Behavioral Research in Cardiovascular, Lung, and Blood Health and Disease—established in November 1995 to develop a plan for future NHLBI biobehavioral research in cardiovascular, lung, and blood diseases and sleep disorders—presents its recommendations. The report outlines a set of scientific priorities and develops a comprehensive plan for support over the next several years.

February 19–21, 1998. The NHLBI and cosponsors—California CVD Prevention Coalition; California Department of Health Services; CVD Outreach, Resources, and Epidemiology Program; and the University of California, San Francisco—hold Cardiovascular Health: Coming Together for the 21st Century, A National Conference, in San Francisco.

March 16, 1998. A special symposium is held at the annual meeting of the American Academy of Asthma, Allergy, and Immunology to celebrate 50 years of NHLBI-supported science.

June 17, 1998. The NHLBI, in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), releases *Clinical Guidelines on the Identification, Treatment, and Evaluation of Overweight and Obesity in Adults: Evidence Report*.

December 11, 1998. World Asthma Day is established on this date. The NAEPP launches the Asthma Management Model System, an innovative Web-based information management tool.

March 1999. The ARDS Network Study of Ventilator Management in ARDS is stopped early so that critical care specialists can be alerted to the results. The study demonstrated that approximately 25 percent fewer deaths occurred among intensive care patients with ARDS receiving small, rather than large, breaths of air from a mechanical ventilator.

March 22, 1999. The NAEPP holds its 10th anniversary meeting and celebration to recognize a decade of progress and a continued commitment to the future.

August 1999. Results of the Early Revascularization for Cardiogenic Shock are released. They show improved survival at 6 months in patients treated with balloon angioplasty or coronary bypass surgery compared with patients who receive intensive medical care to stabilize their condition.

September 27–29, 1999. The NHLBI sponsors the National Conference on Cardiovascular Disease Prevention: Meeting the Healthy People 2010 Objectives for Cardiovascular Health.

November 2, 1999. The NAEPP convenes a Workshop on Strengthening Asthma Coalitions: Thinking Globally, Acting Locally to gather information from coalition representatives on ways the NAEPP could support their efforts.

November 2–3, 1999. The NHLBI sponsors a Workshop on Research Training and Career Development.

March 8, 2000. A part of the Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT) is terminated early because one of the tested drugs, an alpha-adrenergic blocker, was found to be less effective than the more traditional diuretic in reducing some forms of CVD.

March 29, 2000. The NHLBI launches the Web-based Healthy People 2010 Gateway to provide information and resources on cardiovascular health, asthma, sleep, and minority populations.

April 25, 2000. The NHLBI sponsors a special expert meeting, Scientific Frontiers in Cardiothoracic Surgery, to discuss the future of cardiothoracic research.

September 2000. NHLBI-supported investigators identify a gene for primary pulmonary hypertension.

October 2000. Results from the Childhood Asthma Management Program (CAMP) demonstrate that inhaled corticosteroids are safe and effective for long-term treatment of children with mild-to-moderate asthma.

January 2001. Results of the DASH-Sodium Trial are released. They show that dietary sodium reduction substantially lowers blood pressure in persons with high blood pressure; the greatest effect occurs when sodium reduction is combined with the DASH diet.

February 2001. The NHLBI launches a sleep education program for children, using star sleeper Garfield the Cat.

February 1, 2001. The NHLBI—along with the HHS Office of Disease Prevention and Health Promotion, the Office of the Surgeon General, the Centers for Disease Control and Prevention (CDC), the NINDS, and the American Heart Association—signs a memorandum of understanding to focus and coordinate their efforts to meet the Healthy People 2010 objectives on cardiovascular health.

March 26–27, 2001. A strategy development workshop, “Women’s Heart Health: Developing a National Health Education Action Plan,” is held to develop an agenda for the NHLBI’s new heart health education effort directed at women.

April 2001. The NHLBI releases the international guidelines for diagnosis, management, and prevention of COPD.

April 2001. NHLBI-supported investigators identify genes that regulate human cholesterol levels.

May 2001. The NHLBI releases the NCEP’s *Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* (ATP III).

June 2001. NHLBI-supported investigators find that human heart muscle cells regenerate after a heart attack.

July 2001. A self-contained artificial heart is implanted in a patient for the first time.

August 2001. Early results from the National Emphysema Treatment Trial (NETT) identify characteristics of patients at high risk for death following lung volume reduction surgery.

August 2001. Scientists from the NHLBI SCOR program at Yale University identify two genes responsible for pseudohypoaldosteronism type II, a rare Mendelian form of high blood pressure. These genes encode for protein kinases involved in a previously unknown pathway and may provide new targets for therapy.

September 10, 2001. The NHLBI, along with the American Heart Association and other partners, launches “Act in Time to Heart Attack Signs,” a national campaign to increase awareness of the signs of heart attack and the need for a fast response.

October 2001. NHLBI-supported scientists report that the drug, infliximab, increases risk of TB reactivation and dissemination. The drug is used to treat refractory rheumatoid arthritis and Crohn’s disease and is proposed as a treatment for several chronic lung diseases.

November 2001. Results of the Randomized Evaluation of Mechanical Assistance for the Treatment of Chronic Heart Failure Trial demonstrate that using an implanted left ventricular assist device can prolong survival and improve quality of life in severely ill patients who are not candidates for heart transplantation.

December 2001. For the first time, scientists correct SCD in mice using gene therapy.

April 10, 2002. The World Hypertension League (WHL) and the NHLBI hold an international symposium; subsequently they prepare an action plan at the WHL Council Conference to control hypertension and obesity.

April 11–13, 2002. The NHLBI and cosponsors—the HHS Office of Disease Prevention and Health Promotion, the CDC, the American Heart Association, the Centers for Medicare & Medicaid Services, and the Health Resources and Services Administration—hold a national conference, “Cardiovascular Health for All: Meeting the Challenge of Healthy People 2010.”

June 2002. The NAEPP issues an update of selected topics in the *Guidelines for the Diagnosis and Management of Asthma*.

June 2002. The fourth edition of *The Management of Sickle Cell Disease*, which describes the current approach to counseling SCD patients and managing many of the medical complications of SCD, is issued to coincide with the 30th anniversary of the NHLBI Sickle Cell Program.

July 9, 2002. The NHLBI stops early the trial of the estrogen plus progestin component of the WHI due to increased breast cancer risk and lack of overall benefits. The multicenter trial also found increases in CHD, stroke, and pulmonary embolism in participants on estrogen plus progestin compared to women taking placebo pills.

August 2002. NHLBI-supported scientists identify a gene variant that is associated with arrhythmia in blacks.

December 4, 2002. Results of the Atrial Fibrillation Follow-Up Investigation of Rhythm Management Trial (AFFIRM) indicate that rate control rather than rhythm control may be the preferred approach for patients with atrial fibrillation. The rate control strategy involves the use of less expensive drugs and results in fewer hospitalizations.

December 17, 2002. Results of the ALLHAT, the largest hypertension clinical trial ever conducted, show that less expensive traditional diuretics are at least as good as newer medicines (calcium channel blocker and ACE inhibitors) in treating high blood pressure and preventing some forms of heart disease.

January 23, 2002. An NHLBI-supported study demonstrates that magnetic resonance imaging can be used to detect heart attacks faster and more accurately than traditional methods in patients who arrive at the emergency room with chest pain.

February 24, 2002. The Prevention of Recurrent Venous Thromboembolism Trial is stopped early because treatment with low-dose warfarin to prevent recurrence of deep vein thrombosis and pulmonary embolism was so beneficial.

April 2003. Results of the MSH Patients’ Follow-Up Study show that the adult patients who took hydroxyurea over a 9-year period experienced a 40 percent reduction in deaths. Survival was related to fetal hemoglobin levels and frequency of vaso-occlusive events.

April 23, 2003. Results of the PREMIER trial of behavioral lifestyle interventions for blood pressure control show that individuals with prehypertension or stage I hypertension can lower their blood pressure by making multiple lifestyle changes.

May 14, 2003. The *Seventh Report of the Joint National Committee on the Prevention, Detection,*

Evaluation, and Treatment of High Blood Pressure (JNC VII) is released.

May 22, 2003. The NETT finds that lung volume reduction surgery (LVRS) benefits emphysema patients with certain clinical characteristics. The findings will be useful in the determination of Medicare coverage policy.

July 2003. The NHLBI and Gen-Probe Corporation succeed in developing a test to screen donated blood for the West Nile Virus.

August 2003. The NHLBI establishes a partnership with the Canadian Institutes of Health Research (CIHR) to advance research on cardiovascular, respiratory, and blood diseases.

November 2003. The Public Access Defibrillation Trial demonstrates that use of an automated external defibrillator and CPR by trained community volunteers can increase survival for victims of sudden cardiac arrest.

March 2004. The NIH stops the estrogen-alone component of the WHI early due to the increased risk of stroke and deep vein thrombosis. Estrogen does not appear to affect heart disease.

March 2004. Preliminary results of the Sudden Cardiac Death in Heart Failure Trial demonstrate that an implantable cardiac defibrillator can reduce death in heart failure patients.

July 2004. The NHLBI releases an update to the 2001 NCEP ATP III guidelines on the treatment of high blood cholesterol in adults.

August 2004. The NHBPEP Working Group on High Blood Pressure in Children and Adolescents releases the *Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents*.

August 2004. An NHLBI-funded study shows that nucleic acid amplification testing for HIV-1 and hepatitis C virus (HCV) further safeguards the Nation's blood supply.

October 2004. Results from a new study of adults with mild asthma by researchers participating in the ACRN demonstrate that genes affect patient response, over time, to daily doses of inhaled albuterol, a drug used for relief of acute asthma symptoms. A few weeks of its regular use improves overall asthma control in

individuals with one form of the gene, but stopping all use of albuterol eventually improves asthma control in those with another form of the gene. The findings could lead to better ways to individualize asthma therapy.

November 2004. Results of the Prevention of Events With Angiotensin Converting Enzyme Inhibition (PEACE) demonstrate that many heart disease patients who are already receiving state-of-the-art therapy do not gain extra cardiovascular protection from ACE inhibitors.

December 2004. The NHLBI stops early the Stroke Prevention in Sickle Cell Anemia Trial II (STOP II) so that physicians who treat children with sickle cell anemia can be alerted to its findings. STOP II, which is a study to determine whether children with sickle cell anemia and at high risk for stroke could at some point safely stop receiving the periodic blood transfusions that prevent strokes, shows that children revert to high risk for stroke when transfusions are stopped.

January 2005. The NHLBI issues new guidelines for managing asthma during pregnancy.

January 2005. Results from Sudden Cardiac Death in Heart Failure (SCD-HeFT) show that patients with class II or class III heart failure and left ventricular ejection fraction of 35 percent or less have improved survival with implantable cardiac defibrillators. There is no benefit with amiodarone.

January 26, 2005. Dr. Elizabeth G. Nabel is appointed Director of the NHLBI. She succeeds Dr. Claude Lenfant.

February 2005. NHLBI-supported scientists identify two genetic mutations common in individuals of African descent that are associated with a 40 percent reduction in LDL cholesterol.

June 1, 2005. HHS Secretary Mike Leavitt announces the launch of We Can!, Ways to Enhance Children's Activity & Nutrition, a national education program from the NIH to prevent overweight and obesity among youth ages 8–13 years.

February 15, 2006. Results from the WHI Calcium and Vitamin D Trial show that calcium and vitamin D supplements in healthy postmenopausal women provide a modest improvement in bone mass preservation and prevent hip fractures in certain groups, including older women, but do not prevent other types of fractures or colorectal cancer.

May 10, 2006. Results from the Childhood Asthma Research and Education (CARE) Network show that daily treatment with inhaled corticosteroids can reduce breathing problems in preschool-aged children at high risk for asthma, but does not prevent them from developing persistent asthma.

May 31, 2006. The Prospective Investigation of Pulmonary Embolism Diagnosis (PIOPED) II finds that the ability to diagnose pulmonary embolism is improved when a commonly used imaging test of the chest to detect potentially deadly blood clots in the lung is complemented by an extension of the scan to the legs—where the clots typically originate—or by a standard clinical assessment.

June 6, 2006. Results from the Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock (SHOCK) trial show that treating heart attack patients who have a life-threatening complication called cardiogenic shock with emergency angioplasty or bypass surgery greatly improves their long-term survival.

July 18, 2006. NHLBI scientists find that a hormone called brain natriuretic peptide or BNP, which can be detected in a simple blood test, can identify patients with SCD who have developed a life-threatening complication called pulmonary hypertension. The hormone is also a predictor of death in adult sickle cell patients.

July 26, 2006. Results from two randomized clinical trials demonstrate that inhaled nitric oxide administered within the first few weeks of life helps prevent chronic lung disease in some low birthweight premature infants. Moreover, when administered within 48 hours after birth, it appears to protect some premature newborns from brain injury.

September 19, 2006. The NHLBI launches a peripheral artery disease awareness and education campaign, “Stay in Circulation: Take Steps To Learn About P.A.D.” (peripheral artery disease).

January 18, 2007. The NHLBI launches the Learn More Breathe Better campaign to increase COPD awareness among primary care physicians and the public.

August 29, 2007. The NAEPP issues the *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma—Full Report 2007*, an update of the latest scientific evidence and recommendations for clinical practice on asthma care.

October 1, 2007. The NHLBI launches an open access dataset for researchers worldwide. Known as SNP Health Association Resource (SHARe), the Web-based dataset will enable qualified researchers to access data from large population-based studies, starting with the landmark Framingham Heart Study. It is expected to accelerate discoveries linking genes and health, thereby advancing understanding of the causes and prevention of CVD and other disorders.

October 8, 2007. Mario Capecchi and Oliver Smithies, who are researchers supported by the NHLBI, are awarded the Nobel Prize in Physiology or Medicine for their creation of a gene-targeting technique that allows scientists to create transgenic mice that are genetically modified to develop human diseases.

December 3, 2007. The NHLBI announces a new strategic plan to guide its next decade of research, training, and education to reduce the national burden of cardiovascular, lung, and blood diseases and sleep disorders.

December 10, 2007. Results of the Occluded Artery Trial (OAT) are incorporated into practice guidelines: The American College of Cardiology/American Heart Association’s *2007 Focused Update of the 2004 Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction*. The guidelines discourage percutaneous coronary intervention of a totally occluded artery late in the course of myocardial infarction in the absence of symptoms if patients are stable and do not have evidence of severe ischemia.

January 28, 2008. Results from the ALLHAT demonstrate that in people—especially blacks—who have high blood pressure as part of metabolic syndrome, diuretics offer greater protection against CVD, including heart failure, and are at least as effective for lowering blood pressure as newer, more expensive medications.

February 2008. The NHLBI stops one treatment arm of the Action to Control Cardiovascular Risk in Diabetes (ACCORD) clinical trial of adults who have type 2 diabetes at high risk for heart attack and stroke after a review of available data showed that participants following a medical strategy to lower blood glucose below current recommendations to near-normal levels increased the risk of death compared with a standard treatment strategy. All participants now follow a medical strategy to reach the standard blood sugar levels while the lipid and blood pressure components of the study continue.

February 2008. An independent panel convened by the NIH concludes that the use of hydroxyurea for treating SCD should be increased among adolescents and adults who have the disease.

February 29, 2008. The NHLBI issues the first U.S. guidelines for the diagnosis and management of von Willebrand Disease, the most common inherited bleeding disorder.

March 2008. The NHLBI announces a comprehensive restructuring of its SCD research program to take advantage of new scientific opportunities and make SCD resources more widely available.

March 4, 2008. The WHI Follow-up Study confirms that the health risks of long-term combination hormone therapy outweigh the benefits for postmenopausal women. Researchers report that about 3 years after women stopped taking combination hormone therapy, many of the health effects of hormones—such as increased risk of heart disease—are diminished but overall risks of stroke, blood clots, and cancer remain high.

March 5, 2008. Scientists report that they have identified the variants of the gene *VKORC1* that determine a patient's initial response to treatment with the blood-thinning (anticoagulant) drug warfarin. The finding is expected to enhance the ability of physicians to tailor the dosage of warfarin for individual patients.

April 2008. NHLBI-supported researchers identify gene variants associated with increased susceptibility to asthma and reduced lung function in three study populations. Risk for developing asthma is linked to variants in a gene called *CHI3L1*, which can be measured by checking levels of an inherited blood protein that it regulates.

April 8, 2008. Results from the Stop Atherosclerosis in Native Diabetic Study (SANDS) show that aggressively lowering cholesterol and blood pressure levels below current targets in adults with type 2 diabetes may help to prevent, and possibly reverse, hardening of the arteries.

April 14, 2008. The NHLBI, along with the NCI and National Institute of General Medical Sciences (NIGMS), signs a letter of intent with the Center for Genomic Medicine in Japan to create a Global Alliance for Pharmacogenomics to identify genetic factors that contribute to individual responses to medicines, including rare and dangerous side effects. Research results

will eventually allow physicians to ensure the safety and optimize the effectiveness of drugs for each patient.

August 18, 2008. The NHLBI launches an educational Web site, "Children and Clinical Studies," which features documentary videos, text, and graphics designed to promote a better understanding of research in children for health care professionals and the public.

September 15, 2008. The Surgeon General's *Call to Action To Prevent Deep Vein Thrombosis and Pulmonary Embolism* is released. The *Call to Action*, which urges a coordinated, multifaceted plan to reduce the number of cases of deep vein thrombosis and pulmonary embolism nationwide, resulted from a Surgeon General's Workshop on Deep Vein Thrombosis co-sponsored by the NHLBI.

September 25, 2008. Researchers announce that they have developed a genetically altered animal model for CF that closely matches the characteristics of the disease in humans.

October 6, 2008. NIH scientists show that tipifarnib, an experimental anticancer drug, can prevent, and even reverse, potentially fatal cardiovascular damage in a mouse model of progeria (rare genetic disorder that causes the most dramatic form of human premature aging).

December 15, 2008. The NHLBI expands its open-access dataset of genetic and clinical data to include information collected from three NHLBI-funded asthma research networks: ACRN, CAMP, and CARE.

December 19, 2008. Researchers identify a gene that directly affects the production of a form of hemoglobin that is instrumental in modifying the severity of SCD and thalassemia.

March 29, 2009. Results from the Surgical Treatment for Ischemic Heart Failure (STICH) study show that surgery to reshape the scarred left ventricle, the main pumping chamber of the heart, often performed in conjunction with coronary bypass surgery, fails to reduce deaths and hospitalizations in heart failure patients and does not improve quality of life compared with bypass alone.

June 5, 2009. Results from the Bypass Angioplasty Revascularization in Type 2 Diabetics (BARI 2D) study in patients with diabetes and stable coronary artery disease indicate that while revascularization can be delayed for many patients receiving optimal medical therapy, patients with extensive coronary artery disease do better with prompt bypass surgery than with medical therapy alone.

June 10, 2009. The NHLBI joins with UnitedHealth Group's Chronic Disease Initiative to launch a world-wide network of research and training centers to build institutional and community capacity to prevent and control chronic diseases globally

July 28, 2009. The NHLBI stops the Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension study after an interim review of the safety data shows that participants who are taking sildenafil are significantly more likely to have serious medical problems (e.g., severe pain called sickle cell crises) compared with participants on placebo.

August 16, 2009. Results from the Exome Project demonstrate the feasibility and value of isolating and sequencing all exons for identifying relatively rare genetic variants that may cause or contribute to disease. By focusing on the exome, important information about an individual can be obtained at a much lower cost than sequencing a person's entire genome.

August 19, 2009. Results from Sleep Heart Health Study show that moderate to severe obstructive sleep apnea

is associated with an increased risk of death in middle-aged adults, especially men.

October 2009. The Division of Cardiovascular Sciences is created by combining two previously existing divisions, the Division of Cardiovascular Diseases and the Division of Prevention and Population Sciences, so that the administrative structure better matches the dynamic interaction that exists among basic, clinical, and population sciences.

December 9, 2009. Scientists, using a modified blood adult stem-cell transplant regimen, reverse SCD in 9 of 10 adults who had been severely affected by the disease.

May 2010. The NHLBI launches the National Asthma Control Initiative to improve asthma control in patients by bringing asthma care in line with evidence-based recommendations from the *Expert Panel Report 3—Guidelines for the Diagnosis and Management of Asthma* and its companion document, *Guidelines Implementation Panel Report—Partners Putting Guidelines Into Action*.



4. Disease Statistics

Cardiovascular, lung, and blood diseases constitute a large morbidity, mortality, and economic burden on individuals, families, and the Nation. Common forms are atherosclerosis, hypertension, COPD, and blood-clotting disorders—embolisms and thromboses. The most serious atherosclerotic diseases are CHD, as manifested by heart attack and angina pectoris, and cerebrovascular disease, as manifested by stroke.

In 2007, cardiovascular, lung, and blood diseases accounted for 1,037,000 deaths and 43 percent of all deaths in the United States (p. 35). The estimated economic cost in 2007 for these diseases was \$382 billion, 22 percent of the total economic costs of illness, injuries, and death (p. 52). Of all diseases, heart disease is the leading cause of death, cerebrovascular disease is third (behind cancer), and COPD (including asthma) ranks fourth (p. 38). Cardiovascular and lung diseases account for 3 of the 4 leading causes of death (p. 38) and 4 of the 10 leading causes of infant death (p. 44). Hypertension, heart disease, asthma, and COPD are especially prevalent and account for substantial morbidity in Americans (p. 47).

The purpose of the biomedical research conducted by the NHLBI is to contribute to the prevention and treatment of cardiovascular, lung, and blood diseases and sleep disorders. National disease statistics show that by midcentury, morbidity and mortality from these diseases had reached record high levels. Since then, however, substantial improvements have been achieved, especially over the past 40 years, as shown by the significant decline in mortality rates. Because many of these diseases begin early in life, their early detection and control can reduce the risk of disability and can delay death. Although important advances have been made in the treatment and control of cardiovascular, lung, and blood diseases, these diseases continue to be a major burden on the Nation.

Mortality statistics in this chapter are for diseases or conditions classified as the underlying cause of death. Heart failure, however, is never truly an underlying cause even though 56,565 deaths in 2007 were nominally coded to it as the underlying cause.

Therefore, in this chapter, mortality statistics attributed to any mention of heart failure represent it as either the underlying cause or a contributing cause of death.

Cardiovascular Diseases

- In 2007, CVD caused 814,000 deaths—34 percent of all deaths (p. 35).
- Heart disease is the leading cause of death; the main form, CHD, caused 406,000 deaths in 2007 (pp. 36, 38).
- The annual number of deaths from CVD increased substantially from 1900 to 1970 and remains high (p. 37).
- The death rate (not age-adjusted) for CVD increased from 1920 until it peaked in 1968. Since then, the trend has been downward. In 2007, for the first time, the rate was below the all-time low in 1900 (p. 37).
- Cerebrovascular disease, the third leading cause of death, accounted for 136,000 deaths in 2007 (pp. 36, 38).
- Heart disease is second only to all cancers combined in years of potential life lost (p. 38).
- Heart disease is the leading cause of death in blacks, Hispanics, and American Indians, but second to cancer in Asians. Stroke ranks as the third or fourth leading cause of death in the minority groups, except in American Indians, where it ranks seventh (p. 38).
- Deaths with heart failure as the underlying or contributing cause increased from 1970 to 1993 and then remained constant to 2007 (p. 39).
- From 1999 to 2007, death rates for CHD and stroke declined in men and women of all racial/ethnic groups. CHD mortality remained highest in the black population and lowest in the Asian population. Stroke mortality continues to be highest in the black population (p. 40).
- Because of the rapid decline in mortality from CHD since the peak in 1968, there were 1,137,000 fewer deaths from CHD in 2007 than would have occurred if there had been no decline (p. 41).
- Substantial improvements have been made in the treatment of CVD. Since 1975 or 1985, the

percent of hospitalizations for AMI, stroke, heart failure, and cardiac dysrhythmias that were discharged dead declined appreciably (p. 41).

- The decline in CHD mortality began earlier in the United States than in most countries and outpaced that in most countries until the 1990s (only selected countries are shown) (p. 42).
- From 1999 to 2007, the percentage decline in death rates for CHD and stroke was slightly greater for whites than for blacks (p. 43).
- In 2008, an estimated 82.6 million persons in the United States had CVD, including 76.4 million with hypertension and 16.3 million with CHD (p. 47).
- Since the 1960s, there has been a substantial reduction in the prevalence of CVD risk factors: hypertension, smoking, and high cholesterol, but not overweight. The large decline in prevalence of hypertension from 1976–1980 to 1988–1994 was followed by a slightly higher prevalence in 1999–2004 and 2005–2008 (p. 48).
- From 1976–1980 to 2005–2008, the percentage of persons with hypertension who were aware of their condition, on treatment for it, and having their blood pressure under control increased substantially (p. 49).
- A 2005–2008 national survey showed only about 48 percent of hypertensive patients (systolic BP \geq 140 mmHg or diastolic BP \geq 90 mmHg or on antihypertensive medication) had their condition under control (p. 49).
- Hospitalization rates for heart failure in those aged 45 to 64 years increased from 1971 to 1993 and remained stable to 2007. Rates for those aged 65 years and older increased from 1971 to 1998 and remained relatively stable to 2007 (p. 50).
- The estimated economic cost of CVD for 2007 was \$286 billion:
 - \$167 billion in direct health expenditures
 - \$119 billion in indirect cost of mortality (p. 52).

Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 225,000 deaths in 2007 (p. 35).
- COPD caused 124,000 deaths in 2007 and is the fourth leading cause of death (pp. 36, 38).
- From 1999 to 2007, death rates for COPD and asthma decreased in both black and white men and women (p. 43).
- From 1980 to 2007, infant death rates for various lung diseases declined markedly (p. 43).
- Of the 10 leading causes of infant mortality, 4 are lung diseases or have a lung disease component (p. 44). From 1997 to 2007, changes in mortality for the causes were:
 - Congenital anomalies (-9 percent)
 - Disorders of short gestation (0.4 percent)
 - Sudden infant death syndrome (-30 percent)
 - Respiratory distress syndrome (-41 percent).
- About one in six deaths in children under 1 year of age is due to a lung disease (p. 44).
- From 1980 to 2007, the COPD death rate for women in the United States increased appreciably compared with the rates in several other countries (p. 45).
- From 1999 to 2007, death rates for COPD decreased slightly for Asian and Hispanic women but were stable for non-Hispanic white and non-Hispanic black women. For men, the rates decreased in all racial/ethnic groups (p. 46).
- Among the sleep disorders, sleep apnea is increasingly being recognized as an important health problem, which can lead to serious consequences. From 1990 to 2008, physician office visits for sleep apnea increased from 108,000 to 2.3 million (p. 46).
- Asthma is a common chronic condition, particularly in children (pp. 47, 48, 50).
- The economic cost of asthma, COPD, and pneumonia was \$85 billion in 2007:
 - \$66 billion in direct health expenditures
 - \$19 billion in indirect cost of mortality (p. 51).

Blood Diseases

- Almost 10,000 deaths were attributed to blood diseases in 2007 (p. 35). These include the following:
 - 4,800 due to anemias
 - 1,800 due to coagulation defects
 - 800 due to purpura
 - 2,500 due to other blood diseases.
- A large proportion of deaths from AMI, cerebrovascular disease, and peripheral artery disease involve blood-clotting problems (no estimate available).
- In 2007, blood diseases cost the Nation's economy \$10 billion:
 - \$7 billion in direct health expenditures
 - \$3 billion in indirect cost of mortality (p. 52).

Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1987 and 2007

Cause of Death	1987		2007	
	Number of Deaths	Percent of Total	Number of Deaths	Percent of Total
All Causes	2,123,323	100	2,423,712	100
All Cardiovascular, Lung, and Blood Diseases	1,161,275	55	1,036,520	43
Cardiovascular Diseases	974,045	46	813,804	34
Blood	8,430*	<1	9,947*	<1
Lung	191,389**	9	225,259†	9
All Other Causes	962,048	45	1,387,192	57

* Deaths from blood diseases not including blood-clotting disorders.

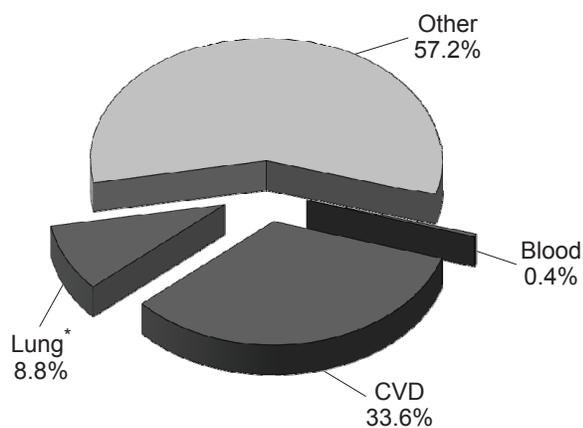
** Includes 12,589 CVD deaths due to pulmonary heart disease.

† Includes 12,490 CVD deaths due to pulmonary heart disease.

Note: Numbers may not sum to 100 percent due to rounding.

Source: Vital Statistics of the United States, National Center for Health Statistics (NCHS).

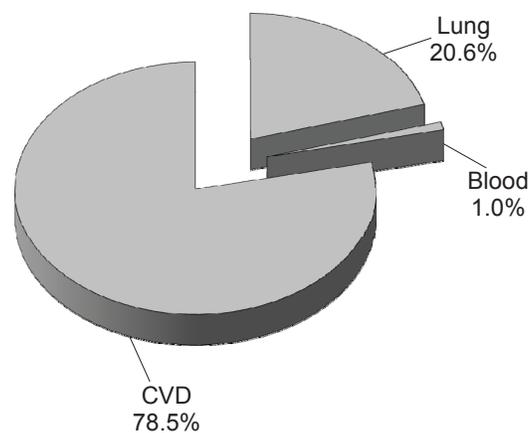
Deaths by Major Causes, U.S., 2007



■ Total Cardiovascular, Lung, and Blood Diseases 42.8%

* Excludes 12,490 deaths from pulmonary heart disease (0.5%).

Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 2007



Note: Numbers may not sum to 100 percent due to rounding.

Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 2007

Cause of Death	Deaths (Thousands)		
	Cardiovascular	Lung	Blood
Acute Myocardial Infarction	133	—	—*
Other Coronary Heart Disease	273	—	—
Cerebrovascular Diseases (Stroke)	136	—	—*
Other Atherosclerosis	30	—	—
Pulmonary Embolism	7	7**	—*
Deep Vein Thrombosis	2	—	—*
Other Cardiovascular Diseases	232	5**	—
Bleeding and Red Blood Cell Diseases†	—	—	10
Chronic Obstructive Pulmonary Disease	—	124	—
Asthma	—	3	—
Pneumonia	—	53	—
Neonatal Pulmonary Disorders	—	5	—
Interstitial Lung Diseases	—	6	—
Lung Diseases Due to External Agents	—	18	—
Other Lung Diseases	—	4	—
Total	814‡	225	10†

* Most deaths from this cardiovascular disease can be classified as a blood-clotting disease. No good estimate is available.

** Deaths from pulmonary disorders also included as cardiovascular deaths.

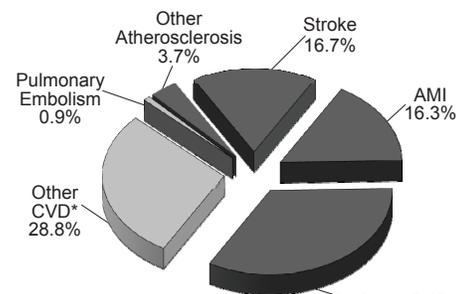
† Deaths from anemias, coagulation defects, purpura, and other blood diseases. Deaths attributed to blood-clotting diseases classified to AMI, stroke, and peripheral artery disease are not included.

‡ Numbers may not sum to the total due to rounding.

Note: Total, excluding overlap, is 1,036,520.

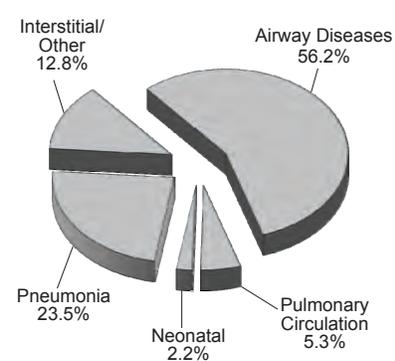
Source: Prepared by the NHLBI from Vital Statistics of the United States, NCHS.

Deaths From Cardiovascular Diseases, U.S., 2007

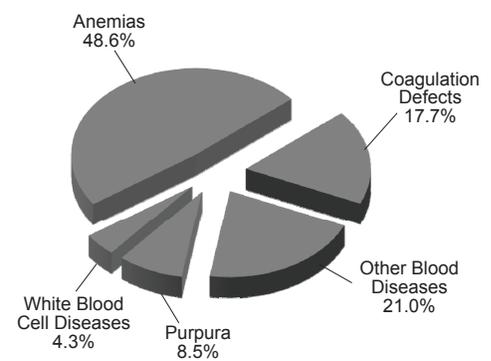


■ Atherosclerosis-related disease 70.4%

Deaths From Lung Diseases, U.S., 2007



Deaths From Blood Diseases, U.S., 2007

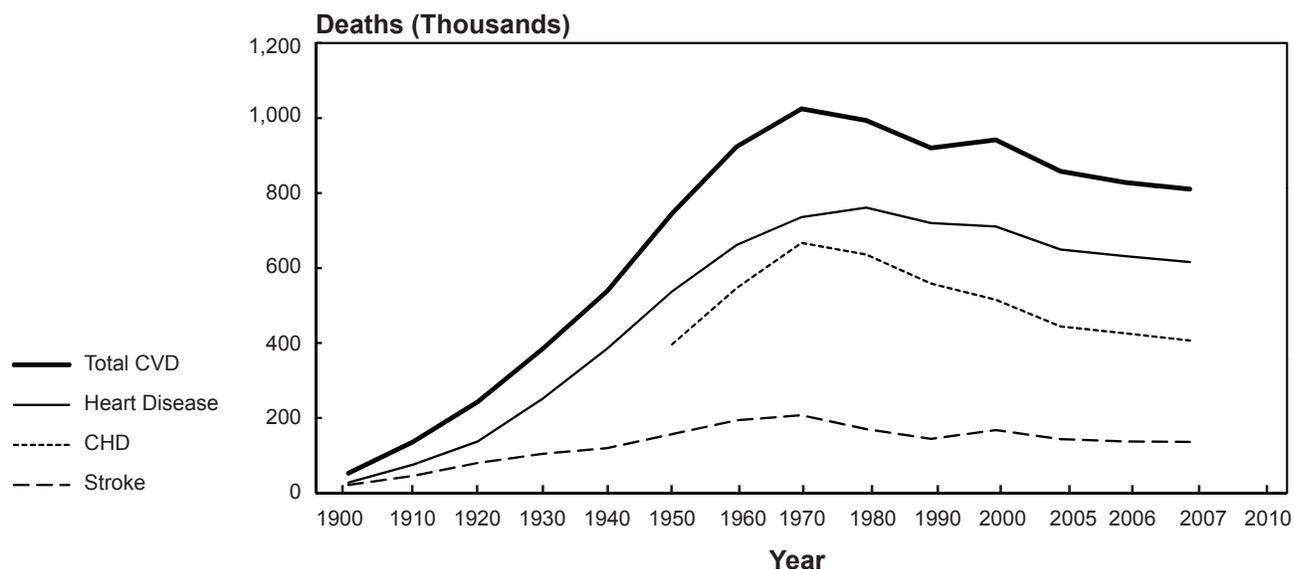


* Includes heart failure, cardiac dysrhythmias, hypertensive disease, deep vein thrombosis, and other heart and blood vessel diseases.

Note: Numbers may not sum to 100 percent due to rounding.

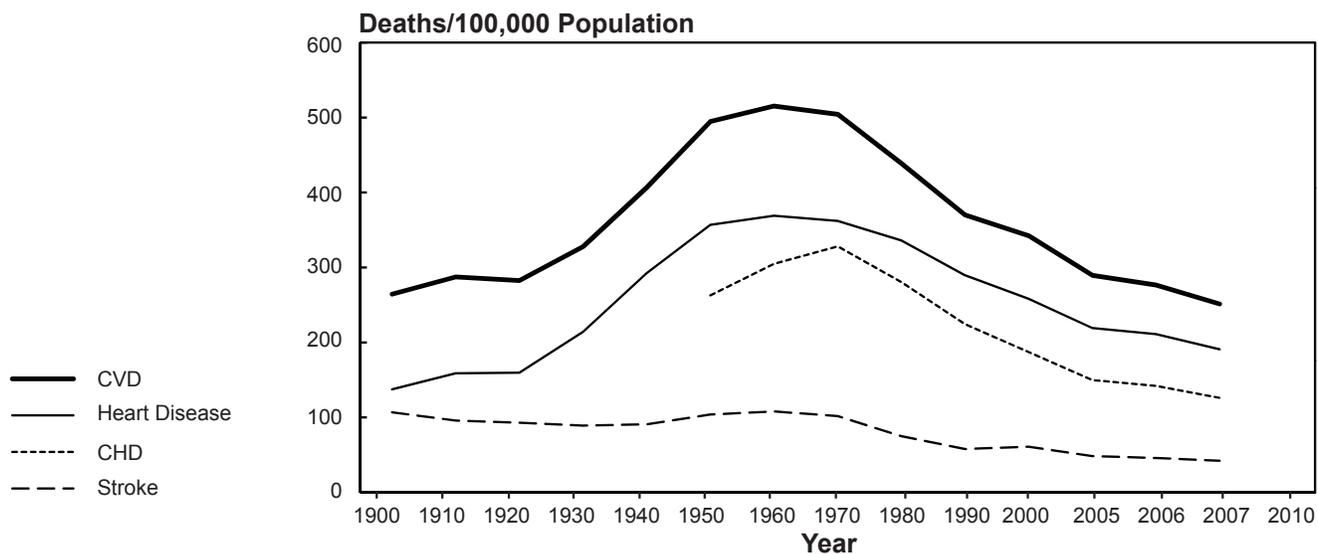
Source: Prepared by the NHLBI from Vital Statistics of the United States, NCHS.

Deaths From Cardiovascular Diseases, U.S., 1900–2007



Source: Vital Statistics of the United States, NCHS.

Death Rates* for Cardiovascular Diseases, U.S., 1900–2007



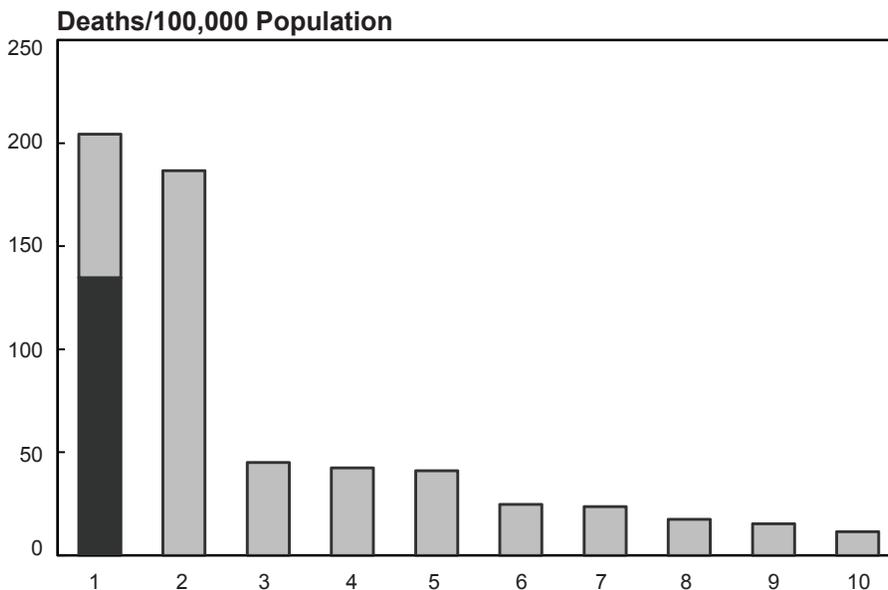
* Not age-adjusted.

Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Death: Death Rates, U.S., 2007

Cause of Death

- 1 = **Heart Disease***
- 2 = **Cancer**
- 3 = **Stroke**
- 4 = **COPD****
- 5 = Accidents
- 6 = Alzheimer's Disease
- 7 = Diabetes
- 8 = Influenza and Pneumonia
- 9 = Nephritis
- 10 = Septicemia



Years of potential life lost (millions) [†]	3.5	4.9	0.6	0.6	3.4	<0.1	0.6	0.2	0.3	0.3
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* Includes 134.7 deaths per 100,000 population from CHD.

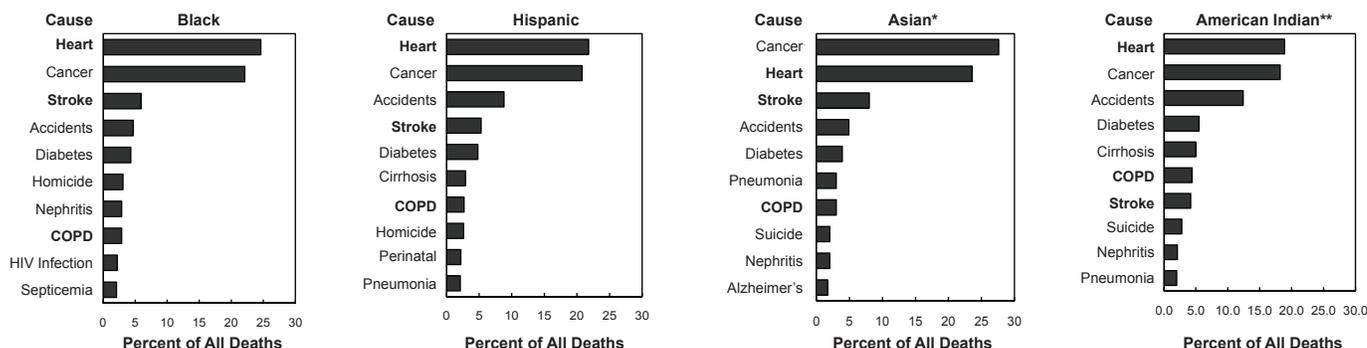
** COPD and allied conditions (including asthma); the term in the ICD/10 is "chronic lower respiratory diseases."

† Based on the average remaining years of life up to age 77 years.

Note: Diseases shown in bold are those addressed in Institute programs.

Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Death Among Minority Groups, U.S., 2007



* Includes deaths among individuals of Asian extraction and Asian-Pacific Islanders.

** Includes deaths among Aleuts and Eskimos.

Note: Causes of death shown in bold are those addressed in Institute programs.

Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Cardiovascular and Noncardiovascular Diseases, U.S., 1963, 1987, and 2007

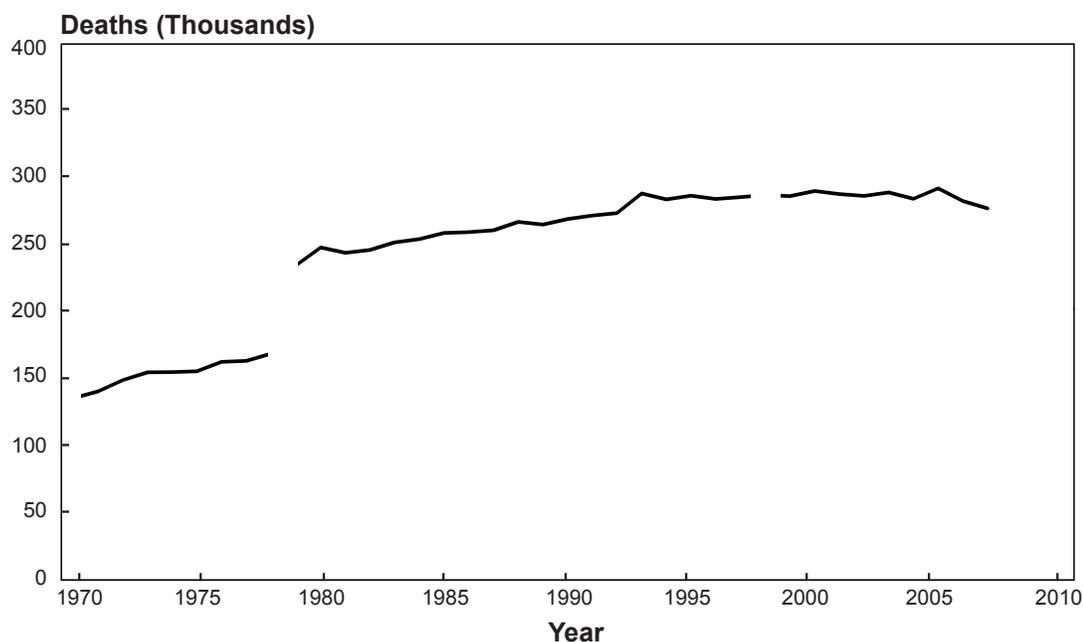
Cause of Death	Deaths/100,000 Population			Percent Change 1963–2007	Percent Change 1987–2007
	1963	1987	2007		
All Causes	1,346	970	760	-44	-22
Cardiovascular Diseases	805	455	251	-69	-45
Coronary Heart Disease	478	239	126	-74	-47
Stroke	174	75*	42	-76	-44
Other	153	140	83	-46	-41
Noncardiovascular Diseases	541	514	509	-6	-1
COPD and Asthma	16	36**	41	147	12
Other	524	478	468	-11	-2

* ICD 10/9 comparability ratio (1.0502) applied.

** ICD 10/9 comparability ratio (1.0411) applied.

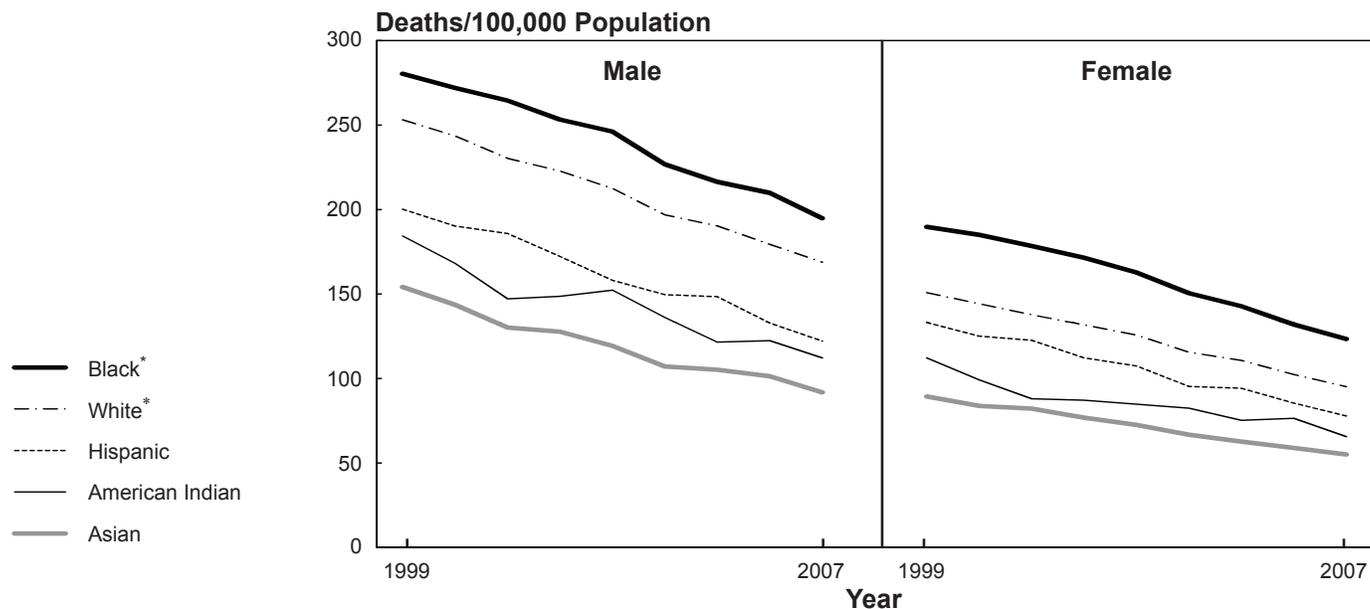
Source: Vital Statistics of the United States, NCHS.

Deaths Attributed to Heart Failure,* U.S., 1970–2007



* Any mention of heart failure on the death certificate.
Note: Breaks in trend line indicate change in ICD codes.
Source: Vital Statistics of the United States, NCHS.

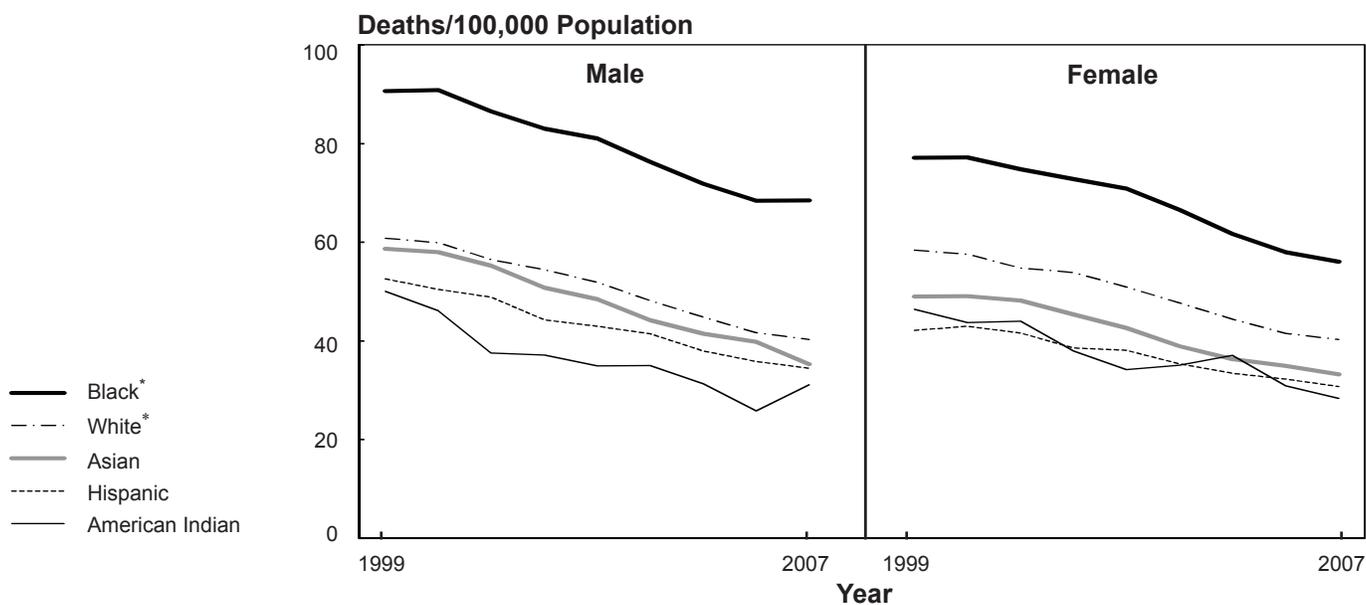
Age-Adjusted Death Rates for Coronary Heart Disease by Race/Ethnicity and Sex, U.S., 1999–2007



* Non-Hispanic.

Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Stroke by Race/Ethnicity and Sex, U.S., 1999–2007

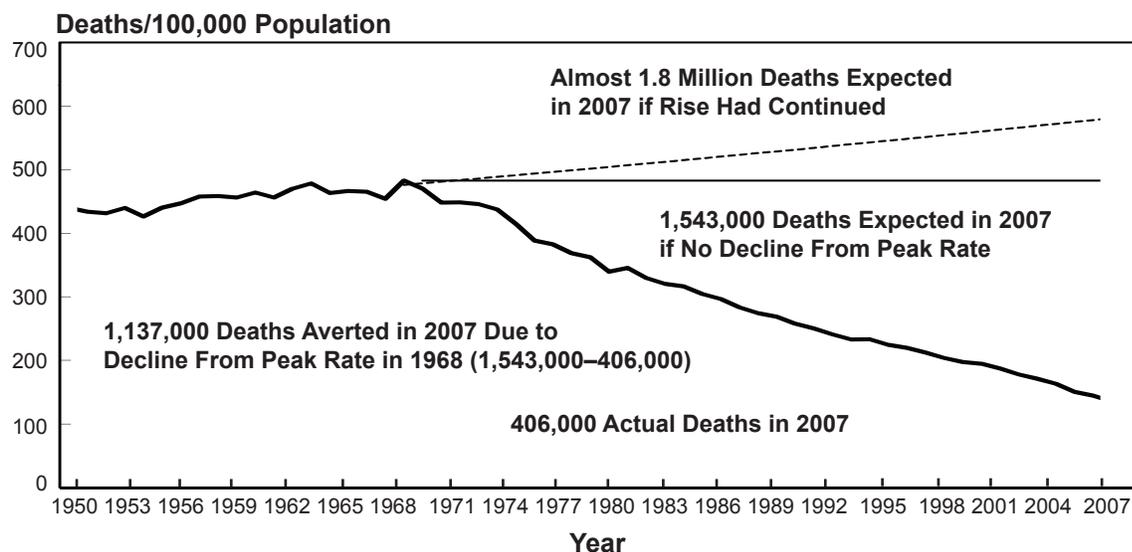


* Non-Hispanic.

Source: Vital Statistics of the United States, NCHS.

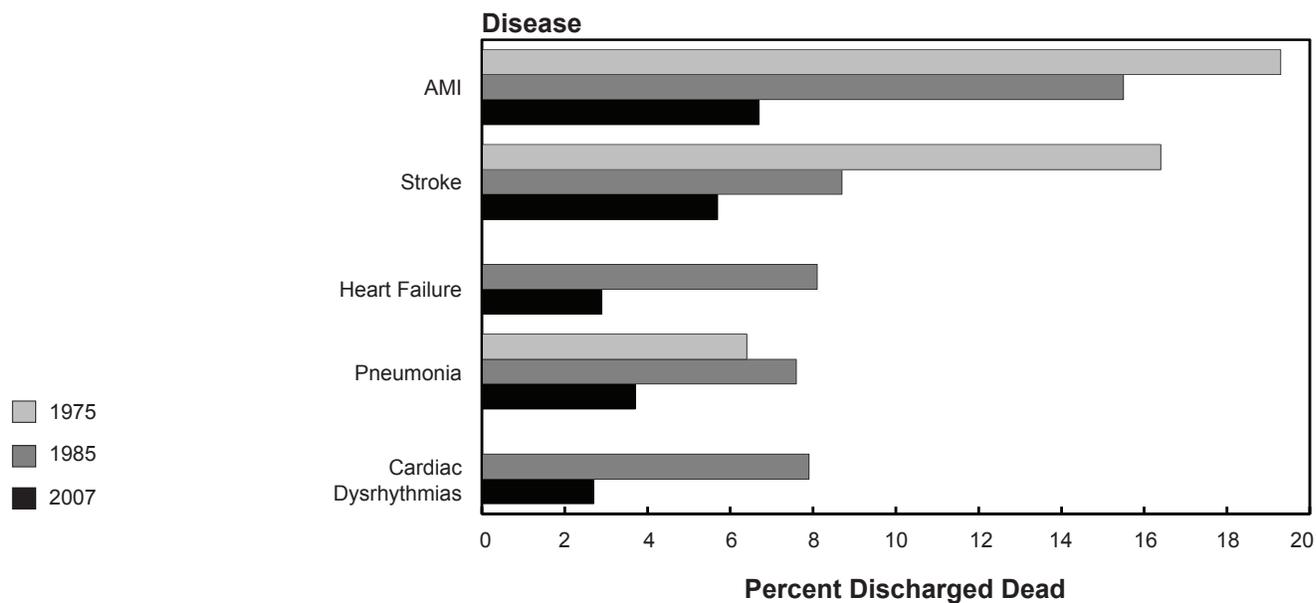
Age-Adjusted Death Rates for Coronary Heart Disease, U.S., 1950–2007

Actual Rate and Expected Rates if Rise Had Continued or Reached a Plateau



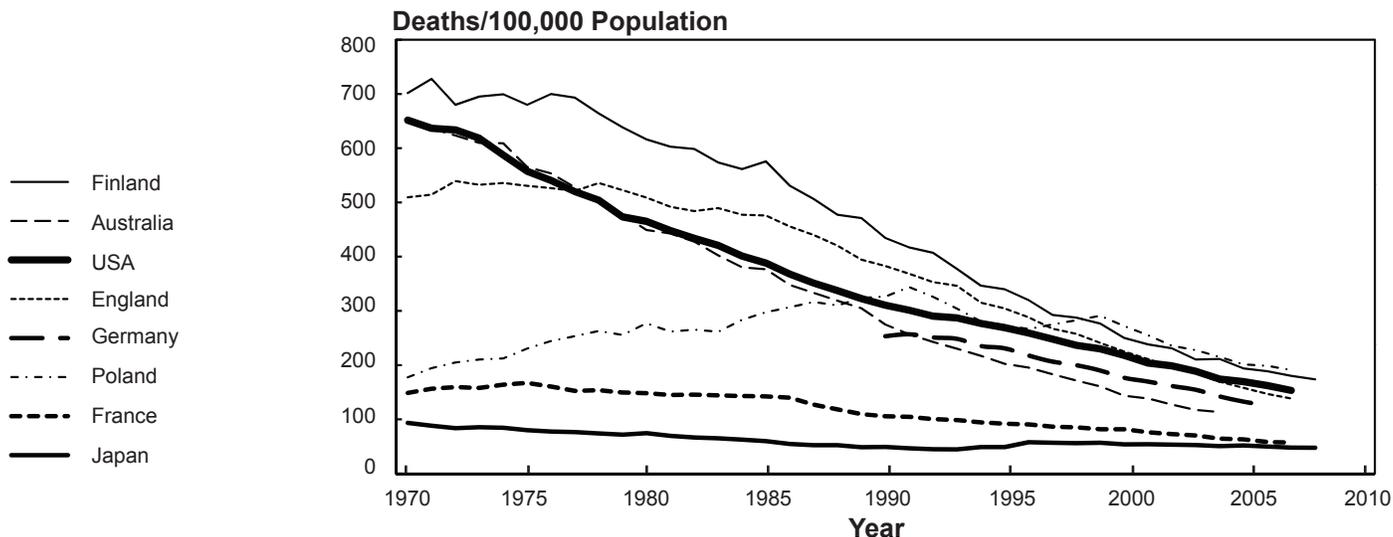
Source: Vital Statistics of the United States, NCHS.

Common Cardiovascular and Lung Diseases With High Percentage Discharged Dead From Hospitals, U.S., 1975, 1985, and 2007



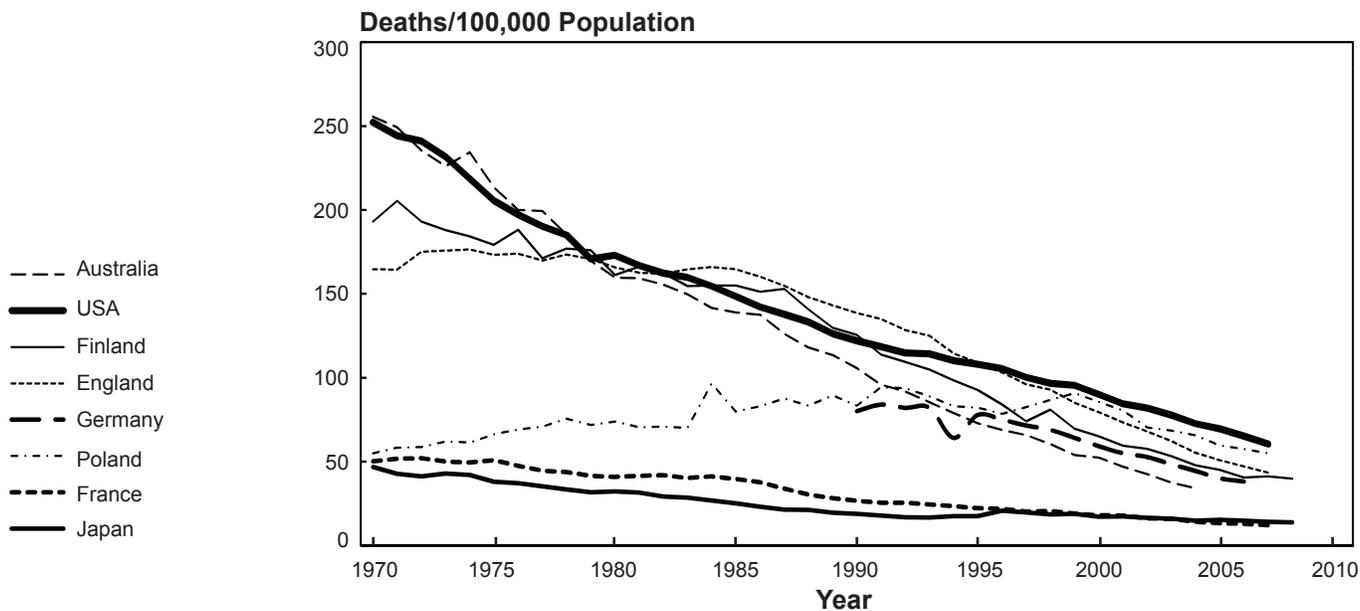
Source: National Hospital Discharge Survey, NCHS.

Death Rates* for Coronary Heart Disease in Men, Ages 35–74, in Selected Countries, 1970–2008



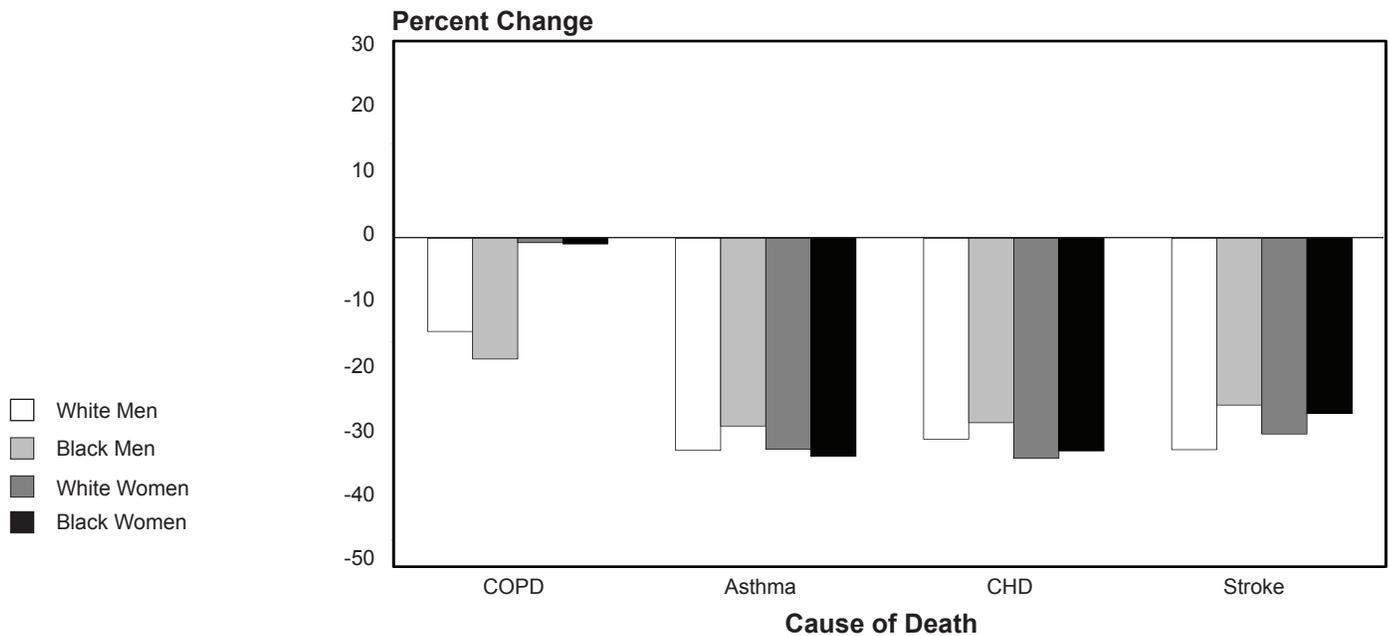
* Age adjusted to the European Standard Population.
 Source: World Health Organization (WHO) Mortality Database.

Death Rates* for Coronary Heart Disease in Women, Ages 35–74, in Selected Countries, 1970–2008



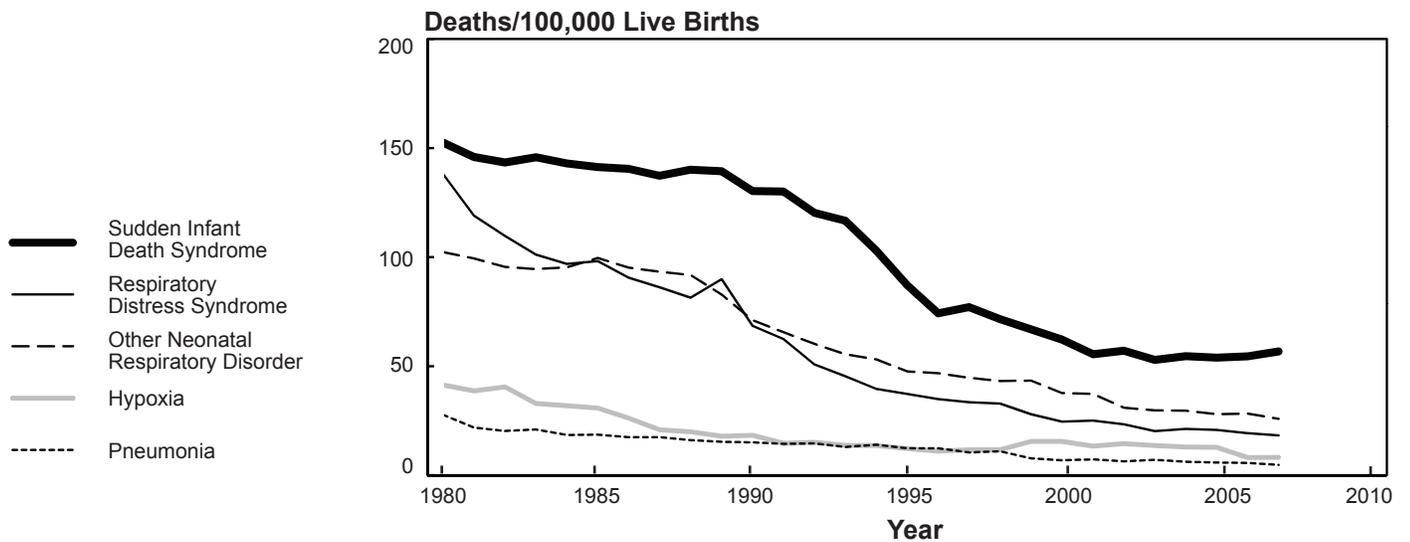
* Age adjusted to the European Standard Population.
 Source: WHO Mortality Database.

Percent Change in Age-Adjusted Death Rates for Selected Causes by Race and Sex, U.S., 1999–2007



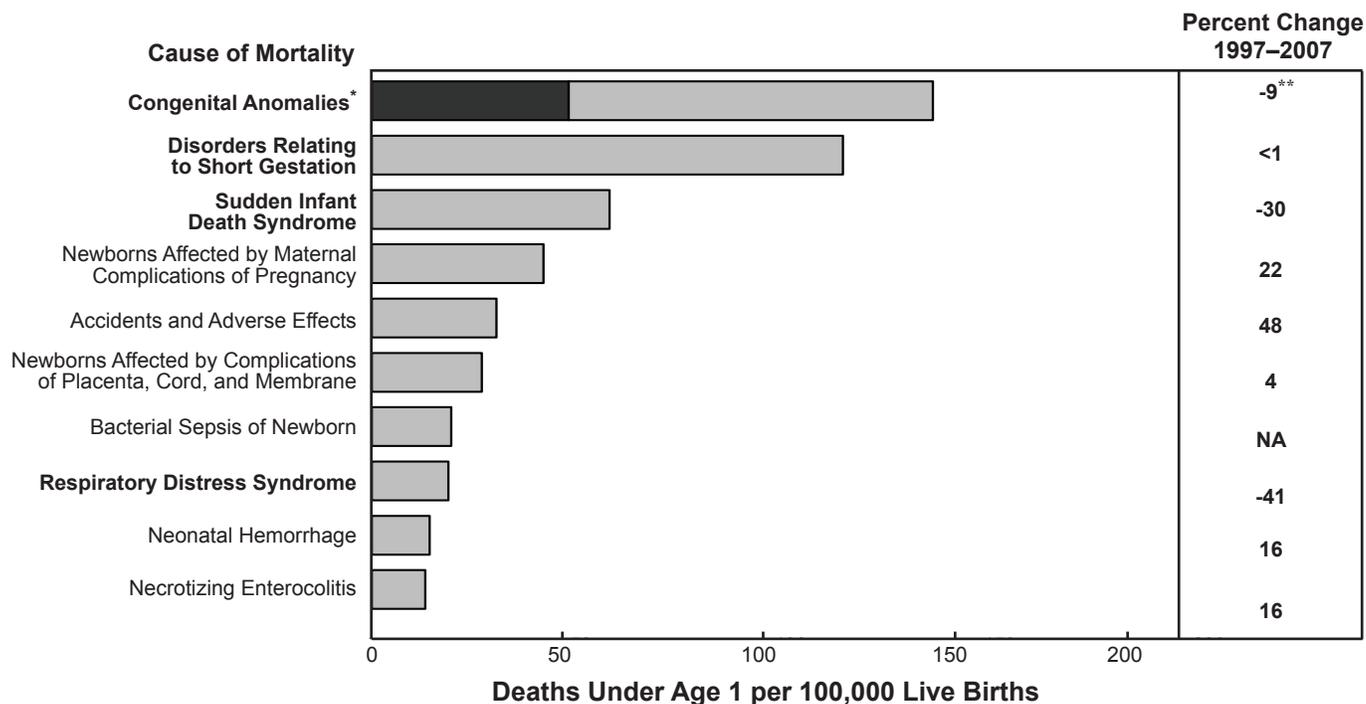
Source: Vital Statistics of the United States, NCHS.

Death Rates for Lung Diseases in Infants, U.S., 1980–2007



Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Infant Mortality, U.S., 2007



* Congenital CVD and congenital respiratory diseases accounted for 47.0 deaths under age 1 per 100,000 live births (black bar), which is 35 percent of infant deaths due to all congenital anomalies.

** From 1997 to 2007, congenital CVD declined 28 percent; congenital anomalies of the respiratory system declined 44 percent; other congenital anomalies increased 19 percent.

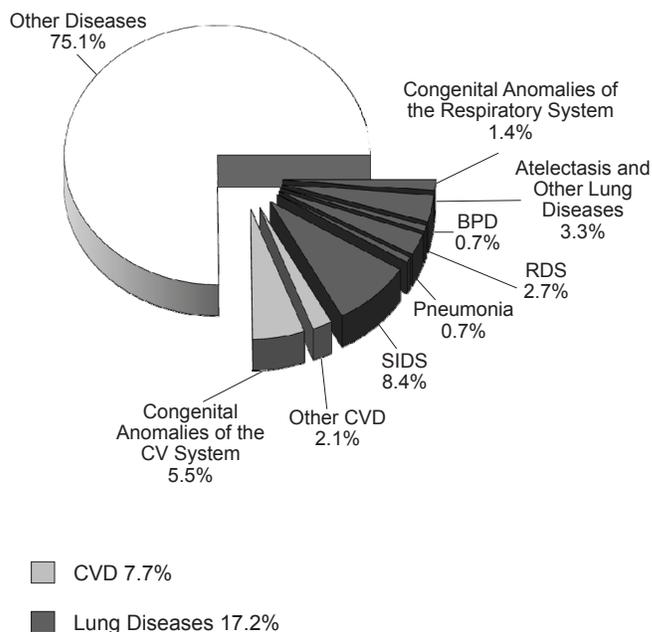
NA: Not available.

Note: Diseases shown in bold are those addressed in Institute programs.

Source: Vital Statistics of the United States, NCHS.

Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 2007

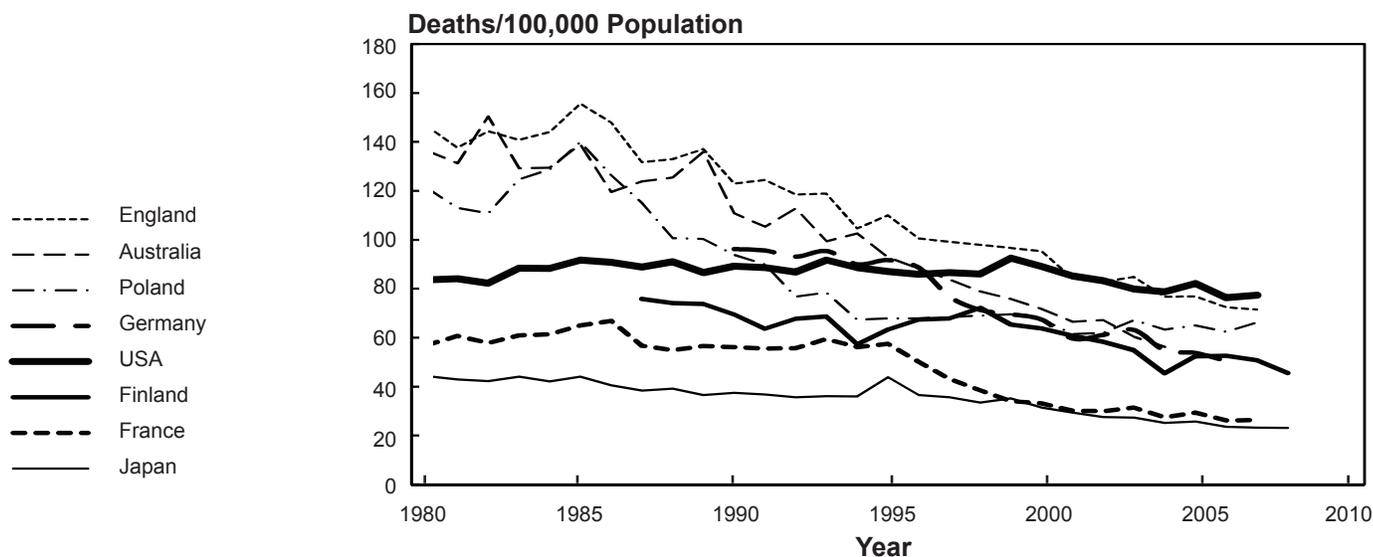
Cause of Death	Deaths Under Age 1
All Causes	29,138
Cardiovascular Diseases	2,241
Congenital Anomalies	1,617
Other	624
Lung Diseases	5,022
Sudden Infant Death Syndrome	2,453
Respiratory Distress Syndrome	789
Pneumonia	209
Bronchopulmonary Dysplasia (BPD)	201
Atelectasis of Newborn	366
Congenital Anomalies	410
Other Lung Diseases	594
Other Diseases	21,875



Note: Diseases shown in bold are those addressed in Institute programs.

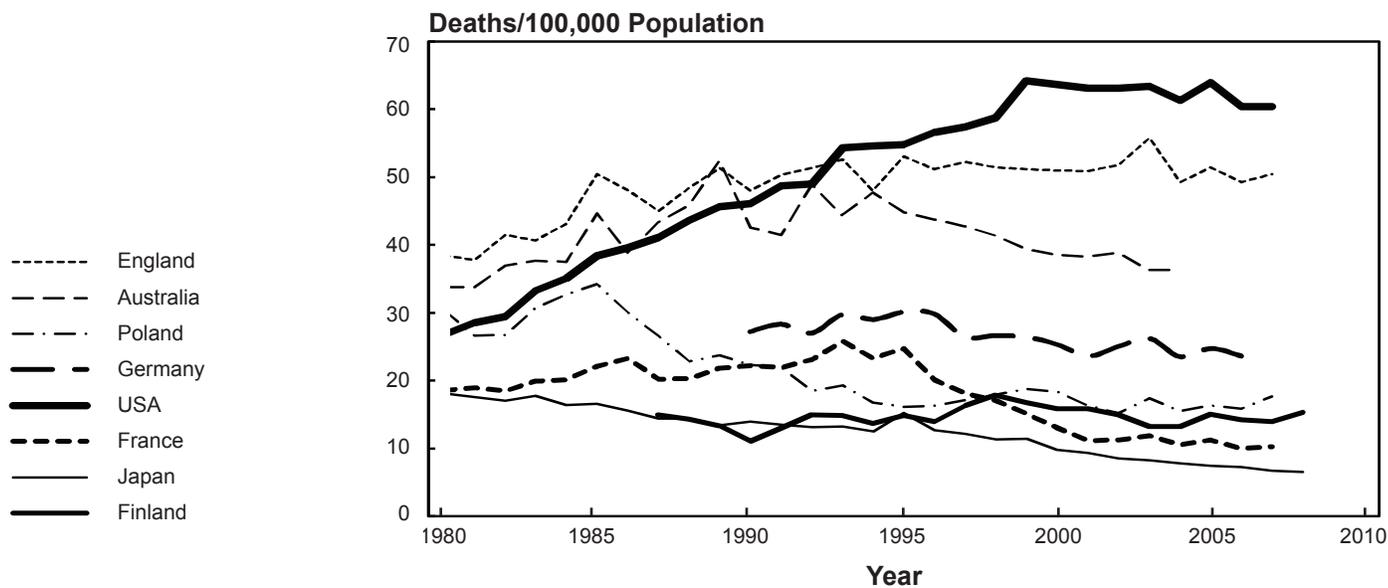
Source: Vital Statistics of the United States, NCHS.

Death Rates* for Chronic Obstructive Pulmonary Disease, Including Asthma, in Men, Ages 35 and Older, in Selected Countries, 1980–2008



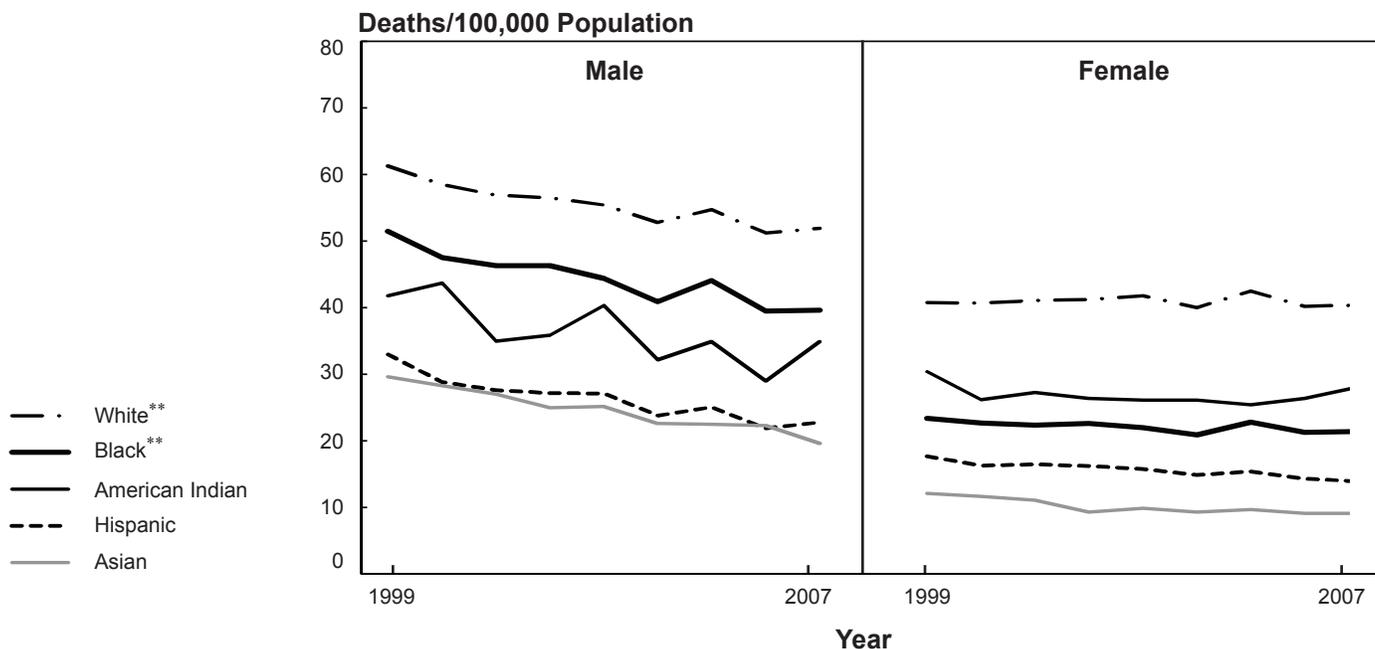
* Age adjusted to the European Standard Population.
Source: WHO Mortality Database.

Death Rates* for Chronic Obstructive Pulmonary Disease, Including Asthma, in Women, Ages 35 and Older, in Selected Countries, 1980–2008



* Age adjusted to the European Standard Population.
Source: WHO Mortality Database.

Age-Adjusted Death Rates for Chronic Obstructive Pulmonary Disease* by Race/Ethnicity and Sex, U.S., 1999–2007

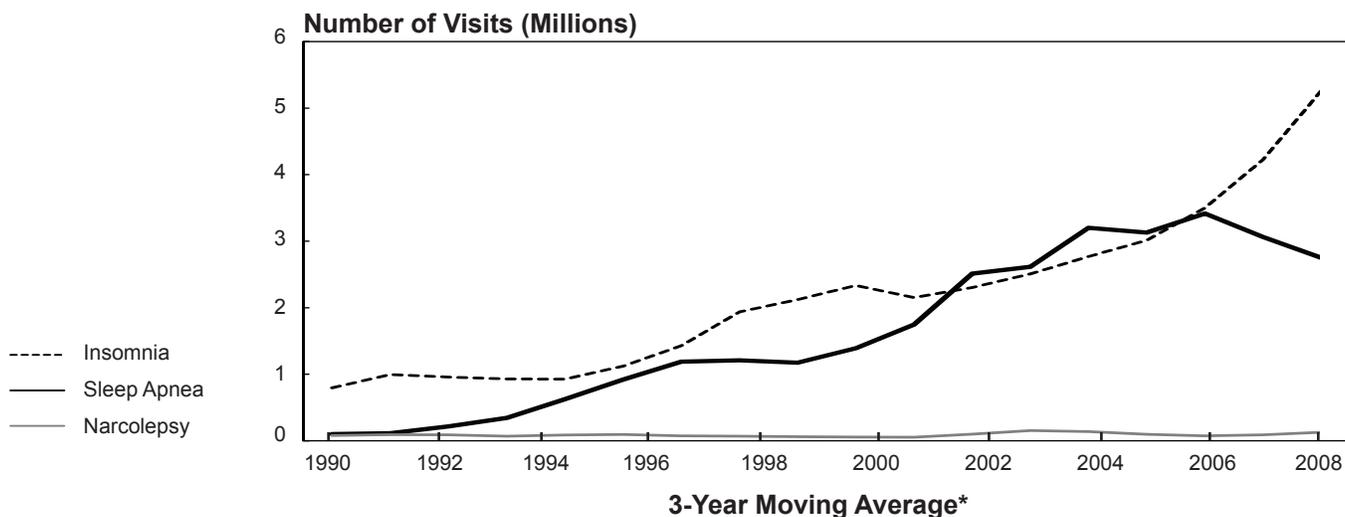


* COPD and allied conditions (including asthma); the term in the ICD/10 is “chronic lower respiratory diseases.”

** Non-Hispanic.

Source: Vital Statistics of the United States, NCHS.

Physician Office Visits for Sleep Disorders, U.S., 1990–2008



* Represents the average number of 3-year visits around the given year.

Note: Primary and secondary diagnoses.

Source: National Ambulatory Medical Care Survey, NCHS.

Prevalence of Common Cardiovascular and Lung Diseases, U.S., 2008–2009

Disease	Number
Cardiovascular Diseases*	82,600,000
Hypertension**	76,400,000
Coronary Heart Disease	16,300,000
Heart Failure	5,700,000
Stroke	7,000,000
Congenital Heart Disease†	1,000,000
Asthma‡	39,930,000
COPD§	14,800,000

* Includes hypertension, CHD, stroke, or heart failure for ages 20 years and older.

** Hypertension is defined as systolic blood pressure \geq 140 mmHg, or diastolic blood pressure \geq 90 mmHg, or being on antihypertensive medication, or being told twice of having hypertension.

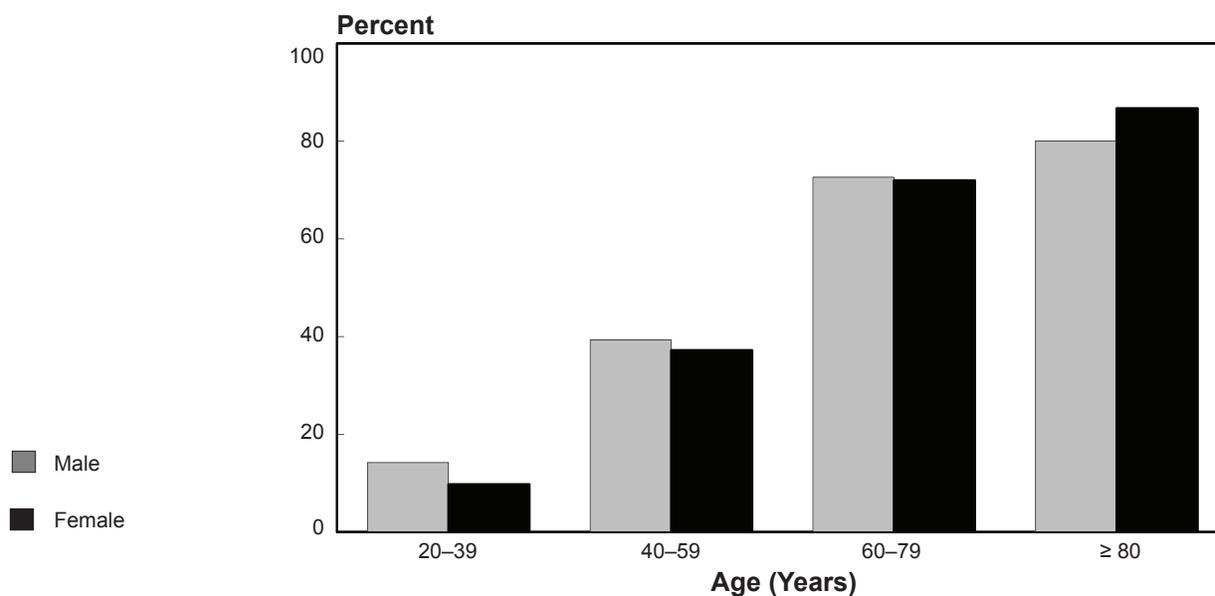
† Range from 650,000 to 1,300,000 for ages 18 years and older (Am Heart J 2004;147:425–439).

‡ 24,567,000 still have asthma and of those, 12,600,000 have had an attack in the past 12 months, for all ages.

§ An estimated 14,800,000 diagnosed (2009) and 12,000,000 undiagnosed (2006), for ages 18 years and older.

Sources: National Health and Nutrition Examination Survey (NHANES) 2005–2008, NCHS and National Health Interview Survey (NHIS) 2009, NCHS.

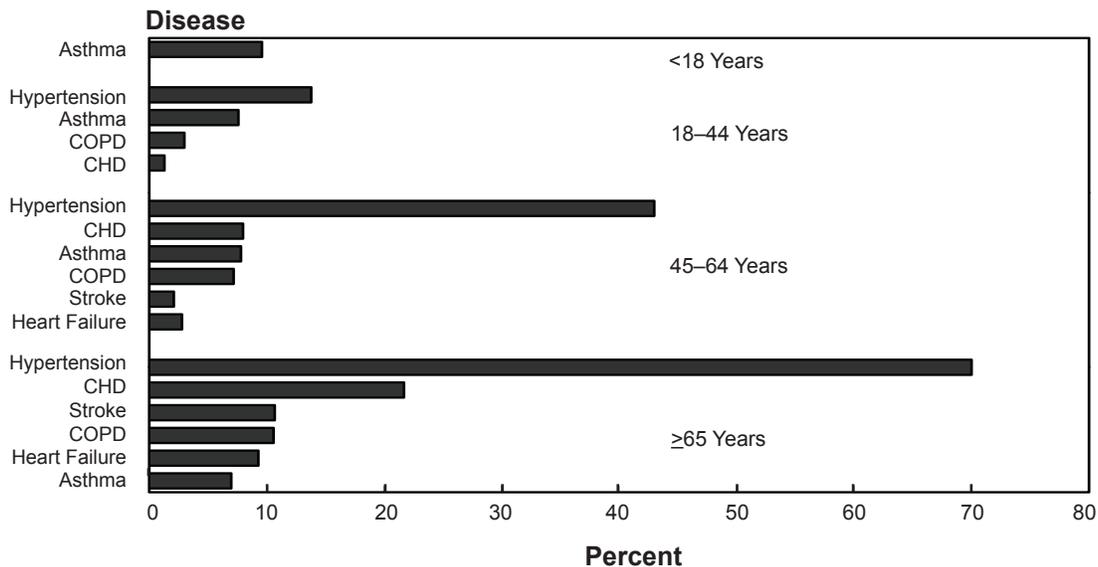
Prevalence of Cardiovascular Diseases* in Adults by Age and Sex, U.S., 2005–2008



* Hypertension, CHD, stroke, or heart failure. Hypertension is defined as systolic blood pressure \geq 140 mmHg, or diastolic blood pressure \geq 90 mmHg, or being on antihypertensive medication.

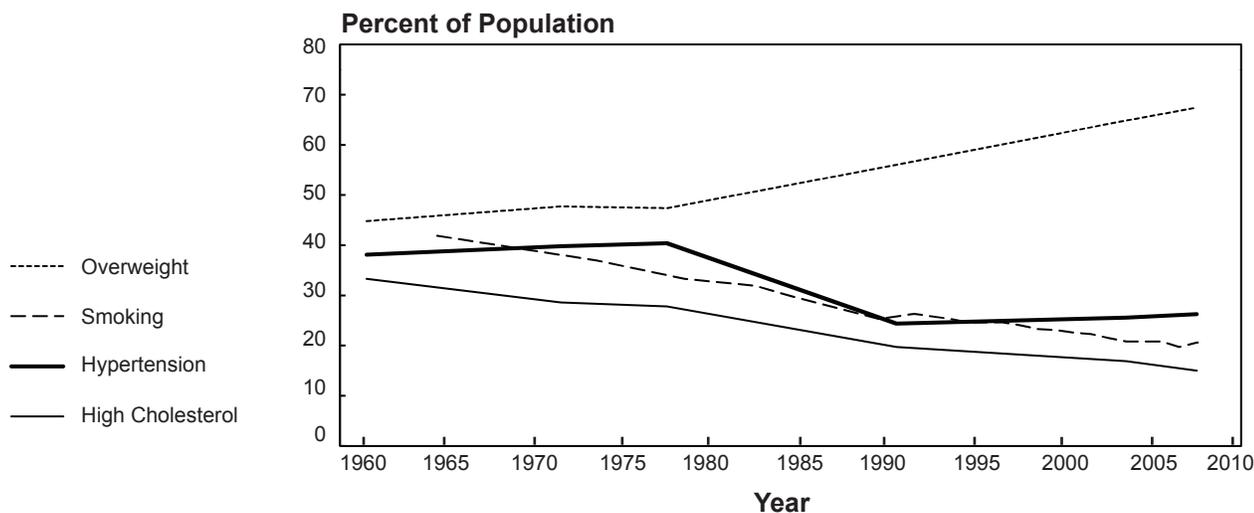
Source: NHANES, 2005–2008, NCHS.

Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 2008–2009



Sources: NHIS and NHANES, NCHS.

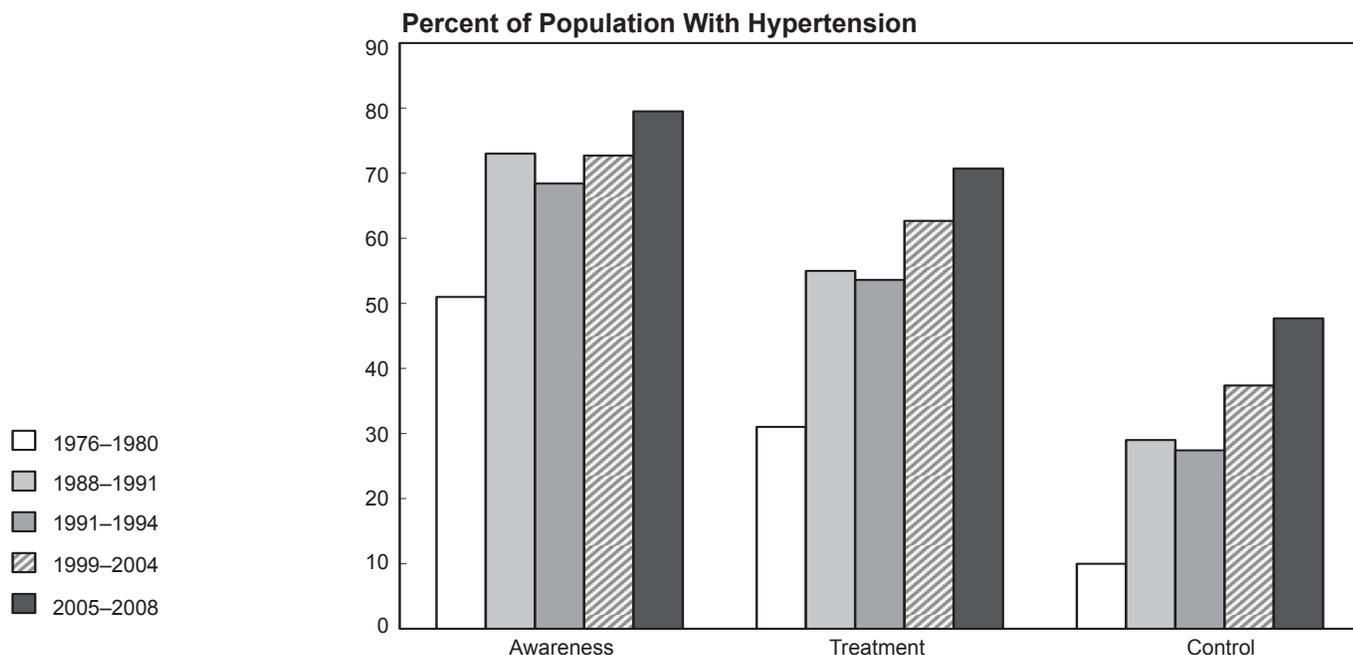
Age-Adjusted Prevalence of Cardiovascular Disease Risk Factors in Adults, U.S., 1961–2009



Notes: Hypertension is defined as systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication. High cholesterol is ≥ 240 mg/dL. Overweight is BMI ≥ 25 kg/m³. Data were collected at six time periods: 1960–1961 (plotted at 1961), 1971–1974 (plotted at 1972), 1976–1980 (plotted at 1978), 1988–1994 (plotted at 1991), 1999–2004 (plotted at 2004), and 2005–2008 (plotted at 2008).

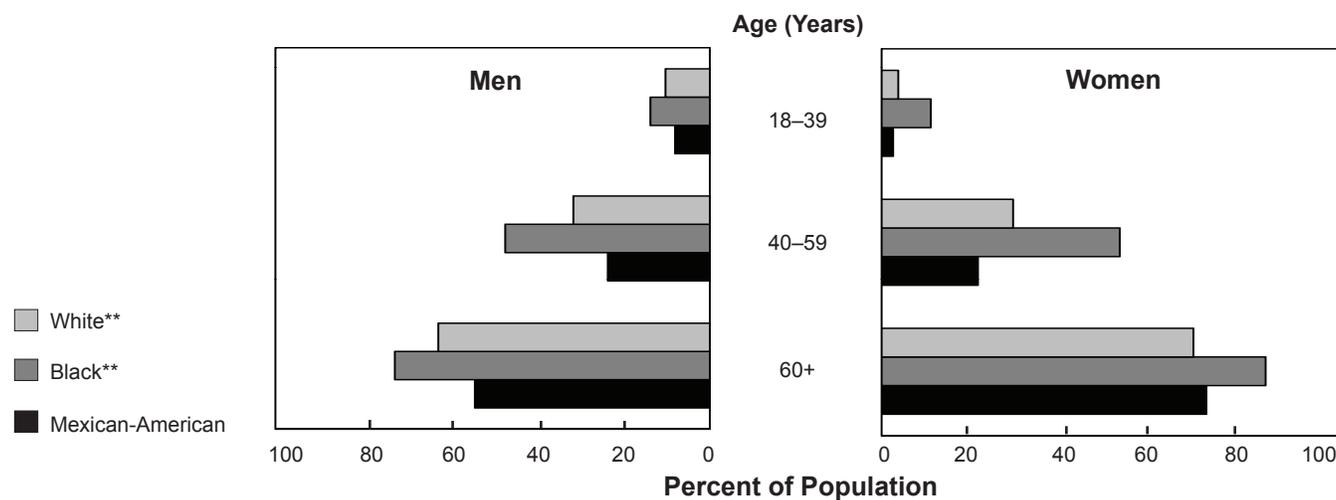
Sources: NHIS for smoking, ages ≥ 18 , NCHS; NHANES for the other risk factors, ages 20–74, NCHS.

Hypertensive* Population Aware, Treated, and Controlled, Ages 18 and Older, U.S., 1976–1980 to 2005–2008



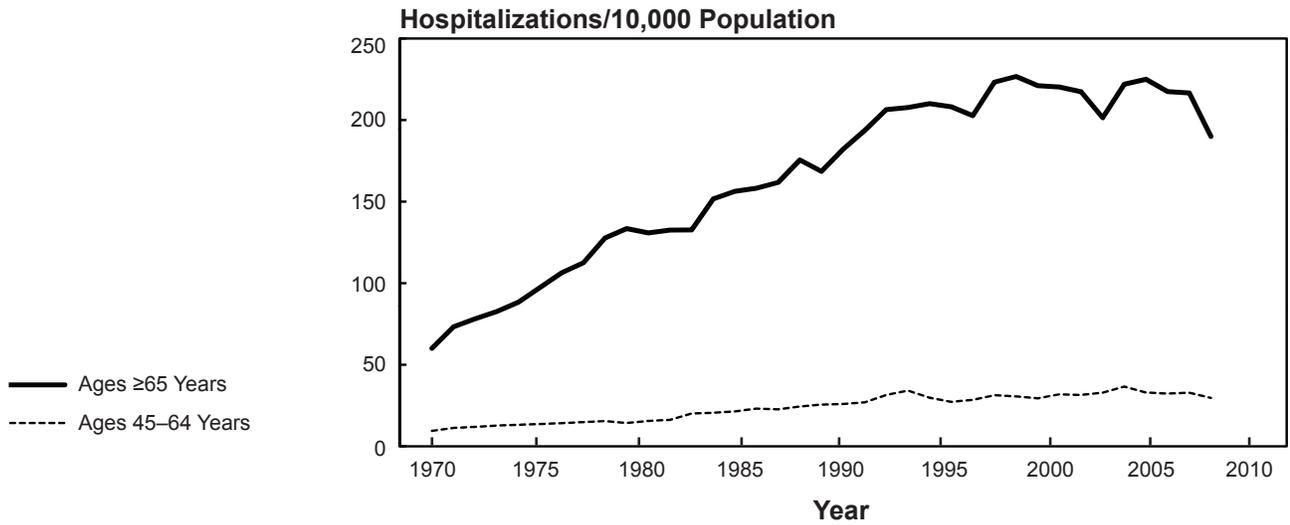
* Hypertension is defined as systolic blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication.
Source: NHANES, NCHS.

Adult Population With Hypertension* by Age, Race/Ethnicity, and Sex, U.S., 2005–2008



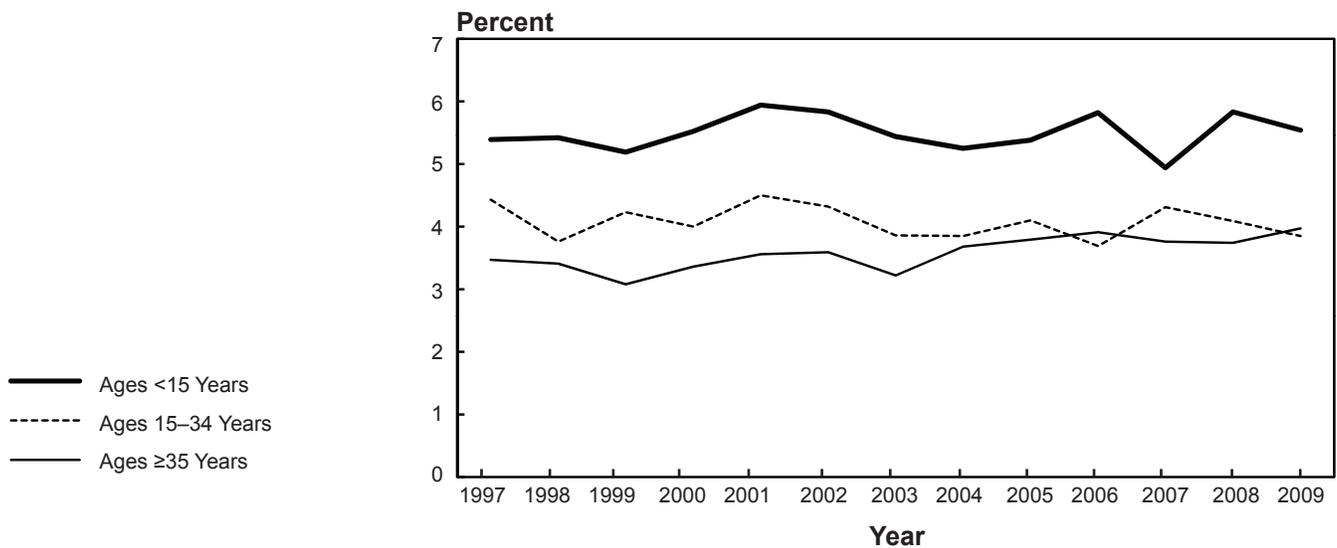
* Hypertension is systolic blood pressure ≥ 140 mmHg, diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication.
** Non-Hispanic.
Source: NHANES, NCHS.

Hospitalization Rates for Heart Failure, Ages 45–64 and 65 and Older, U.S., 1971–2007



Source: National Hospital Discharge Survey, NCHS.

Persons Experiencing Asthma Episodes in Previous 12 Months by Age, U.S., 1997–2009



Source: NHIS, NCHS.

Economic Cost Estimates

The economic cost estimates presented on pages 51 and 52 are not comparable to those in the FY 2009 Fact Book due to the following changes:

- The estimates of direct costs in the table on page 52 are obtained from the Medical Expenditure Panel Survey (MEPS) of the Agency for Healthcare Research and Quality (AHRQ) Web site. They replace estimates for previous years that were based on recent projections of total healthcare expenditures from the Centers for Medicare and Medicaid Services (CMS) for which the breakdown into the major diagnostic groups was based entirely on an increasingly out-of-date cost analysis for 1995.
- For analogous reasons, the estimates of indirect morbidity costs are being discontinued starting with the FY 2010 Fact Book.
- All estimates in the table on page 50 are for 2007. Direct and indirect costs are no longer projected to the current year.

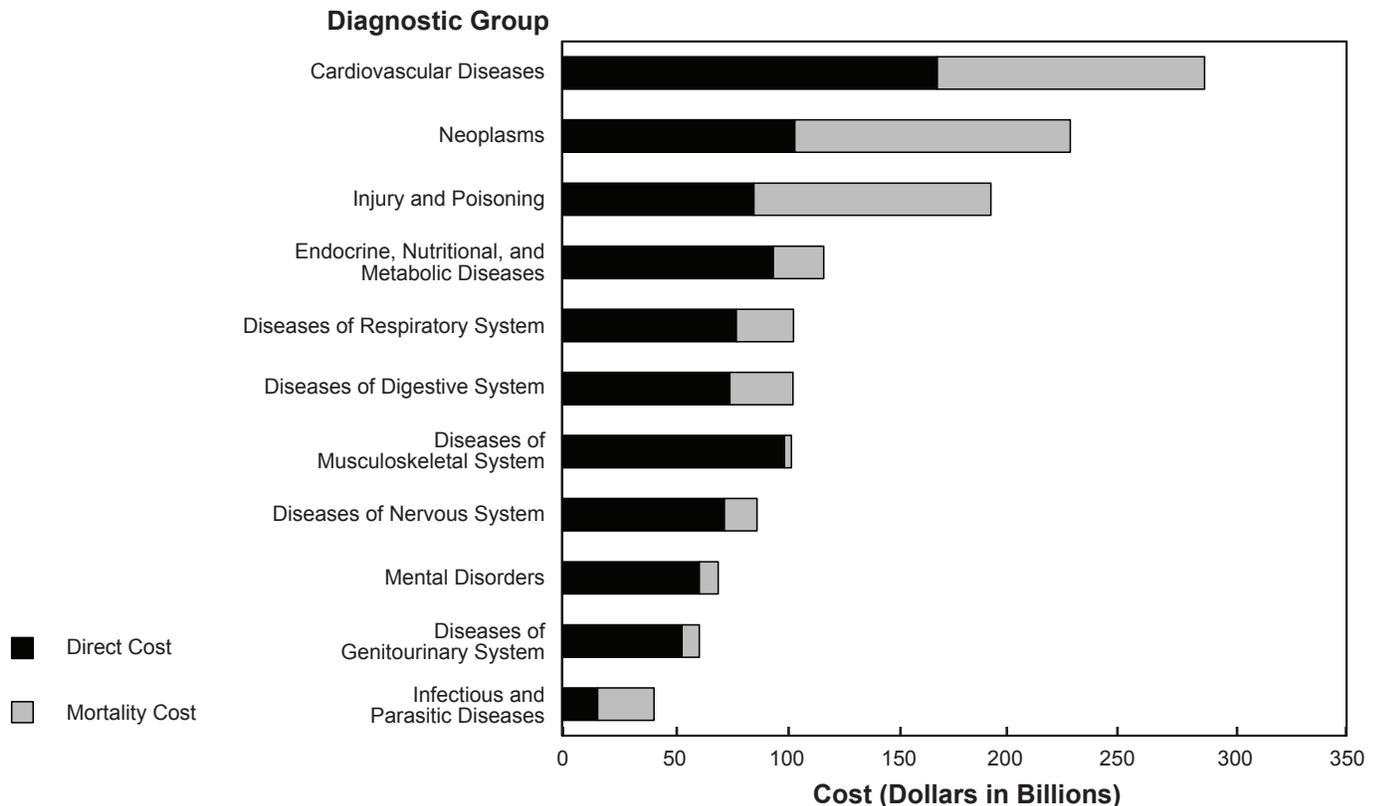
MEPS estimates offer the following advantages:

- The estimates are based on a nationally representative, person-level survey that links health care costs directly to patient care events and specific medical conditions.
- They are readily available on the Web, updated annually, and available with demographic breakdowns and standard errors.
- They are used extensively in scientific publications and reports.

MEPS estimates also have some disadvantages:

- They are based on the noninstitutionalized population (i.e., cost data pertaining to nursing homes are not included in the estimates).
- The scope of costs used to make the estimates is narrower than those within the CMS projections.
- The estimates are based on household reports that are subject to underreporting and misreporting.

Total Economic Costs of the Leading Diagnostic Groups, U.S., 2007



Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2007

	Amount (Dollars in Billions)			Percent Distribution		
	Direct Costs*	Indirect Costs of Mortality**	Total	Direct Costs	Indirect Costs of Mortality	Total
Cardiovascular Disease	\$167.4	\$119.2	\$286.6	14.8%	20.0%	16.6%
COPD, Asthma, Pneumonia	66.0	19.0	85.0	5.8	3.2	4.9
Blood Diseases	7.0	3.0	10.0	0.6	0.5	0.6
Subtotal	240.4	141.2	381.6	21.3	23.7	22.1
Neoplasms	103.8	123.0	226.8	9.2	20.7	13.1
Injury and Poisoning	85.6	105.7	191.3	7.6	17.8	11.1
Endocrine, Nutritional, and Metabolic Diseases	94.3	22.5	116.8	8.3	3.8	6.8
Diseases of the Digestive System	74.9	28.1	103.0	6.6	4.7	6.0
Diseases of the Respiratory System†	77.8	25.5	103.3	6.9	4.3	6.0
Diseases of the Musculoskeletal System	99.2	3.1	102.3	8.8	0.5	5.9
Diseases of the Nervous System	72.5	14.5	87.0	6.4	2.4	5.0
Mental Disorders	61.3	8.4	69.7	5.4	1.4	4.0
Diseases of the Genitourinary System	53.6	7.7	61.3	4.7	1.3	3.6
Infectious and Parasitic Diseases	15.9	25.2	41.1	1.4	4.2	2.4
Normal Live Birth	33.4	0.0	33.4	3.0	0.0	1.9
Diseases of the Skin	22.3	0.7	23.0	2.0	0.1	1.3
Other and Not Linked to Specific Condition	161.0	108.3	269.3	14.2	18.2	15.6
Total	\$1,130.0	\$594.9	\$1,724.9	100%	100%	100%

* Direct costs are personal health care expenditures for hospital and professional services care, prescribed medications, and home care reported by the MEPS, AHRQ, by diagnosis, excluding nursing home care costs and costs due to comorbidities.

** The mortality cost for each disease group was estimated for 2007 by multiplying the number of deaths by age, sex, and cause of death in 2007 by the 2005 present value of lifetime earnings (latest available) discounted at 3 percent and projected to 2007 based on a 2005 to 2007 inflation factor measured from mean earnings reported by the U.S. Census Bureau.

† Includes costs for COPD, asthma, and pneumonia.

Note: Estimates are not available for total lung diseases and blood clotting disorders.

Source: Prepared by NHLBI from direct costs on the MEPS Web site; numbers of deaths from NCHS; present value of lifetime earnings from the Institute for Health and Aging, University of California; and mean earnings from the U.S. Census Bureau.



5. Institute-Initiated Programs Starting in FY 2010

More than two-thirds of the research supported by the NHLBI is initiated by individual investigators; the remainder is initiated by the Institute. Institute-initiated programs are developed in response to evolving national needs, Congressional mandates, and advances in scientific knowledge. Each initiative represents the outcome of extensive discussions and thorough reviews by representatives of the scientific community, Institute advisory committees, the Board of Extramural Experts (BEE), and the National Heart, Lung, and Blood Advisory Council (NHLBAC). The advisory committees and the BEE, together with professional societies and NHLBI staff, continually review the progress of research within the NHLBI program areas, assess newly acquired knowledge, and identify research topics that offer the best opportunities or constitute the greatest needs. This planning process contributes to policy development at the national level by setting priorities among programs and establishing budgets for individual programs and projects.

Initiatives generally emanate as Requests for Applications (RFAs) for grants, including cooperative agreements, or Requests for Proposals (RFPs) for contracts. Other initiatives take the form of Program Announcements (PAs). Applications and proposals submitted in response to RFAs and RFPs compete among themselves for specific “set-aside” funds. Applications submitted in response to PAs generally compete with other investigator-initiated applications for funding.

RFA, RFP, and PA concepts prepared by the Institute are presented to the BEE, which reviews and prioritizes them. The concepts, along with the comments from the BEE, are then sent to the NHLBAC for review, comment, and concurrence. Initiatives that receive the concurrence of the NHLBAC are considered further by the NHLBI Director in the context of the Institute’s budget, program priorities, review workload, and proposed mechanisms. These considerations guide the Director’s subsequent decisions to approve initiatives for release. RFAs, RFPs, and PAs are announced in the *NIH Guide to Grants and Contracts*.

Applications and proposals submitted in response to RFAs and RFPs are reviewed by the NHLBI. Applications submitted in response to PAs are reviewed by the NIH Center for Scientific Review.

Descriptions of the Institute-initiated programs that began or were renewed (i.e., were funded) in FY 2010 are presented below according to NHLBI scientific programs. Also described are trans-NIH, trans-PHS, and interagency initiatives in which the NHLBI participates.

Heart and Vascular Diseases Program

Initiatives Being Renewed

NHLBI Programs of Excellence in Nanotechnology

The purpose of this renewal is to develop nanotechnology-based tools for diagnosing and treating heart, lung, and blood diseases.

Proteomics Initiative

The purpose of this renewal is to develop and enhance proteomic technologies to achieve a greater understanding of physiological pathways, molecular interactions, and regulatory signals that are associated with heart, lung, and blood diseases and sleep disorders.

New Initiatives

Cardiac Translational Research Implementation Program

The purpose of this RFA is to conduct Stage 1 exploratory studies to determine the efficacy and safety of promising new therapeutic interventions derived from fundamental research discoveries for treating and preventing heart failure or arrhythmias.

Cellular and Molecular Mechanisms of Arterial Stiffening and Its Relationship to the Development of Hypertension

The purpose of this RFA is to elucidate the cellular and molecular mechanisms underlying large conduit artery stiffening and to determine the temporal relationship between arterial stiffening and the development of hypertension in animal models.

Center for Cardiovascular Outcomes Research

The purpose of this RFA is to conduct cardiovascular outcomes and comparative effectiveness research that focuses on patient- and clinician-relevant outcomes of health care and their determinants.

Pumps for Kids, Infants, and Neonates

The purpose of this RFP is to complete preclinical testing of investigational mechanical circulatory support devices (MCSDs) and to conduct clinical studies of the devices in infants and young children with congenital and acquired CVD who experience cardiopulmonary failure and circulatory collapse.

Role of Cardiomyocyte in Heart Disease: An Integrated Approach

The purpose of this RFA is to develop an integrated understanding of cardiomyocyte mitochondria and their contributions to myocardial adaptations and heart disease progression by combining functional data with information derived from advanced technologies.

Systems Biology Collaborations

The purpose of this PA with review is to promote the use of collaborative teams of investigators to develop a coordinated systems biology approach to understand normal physiology and perturbations associated with heart, lung, and blood diseases and sleep disorders.

Lung Diseases Program

New Initiatives

Functional Modeling of Pediatric Upper Airway Disorders

The purpose of this RFA is to determine the biological and structural components that limit airflow in congenital or acquired disorders of the pediatric upper airway. Scientists seek to develop innovative approaches that will identify targets for intervention to correct obstruction of airflow through the upper airway.

Lung Transplantation: Planning Grants for Clinical Trials of Novel Therapies

The purpose of this RFA is to develop preclinical trials to test important new strategies to enhance the quality of lungs available for transplant and improve management and long-term outcomes of lung transplant recipients.

Novel Therapies for Lung Diseases—Phase II

The purpose of this RFA is to conduct Phase II clinical trials of innovative agents for lung diseases and sleep disorders.

Prematurity and Respiratory Outcomes Program

The purpose of this RFA is to examine molecular mechanisms that contribute to acute and chronic respiratory morbidity in premature infants. The well-phenotyped populations developed in this program will significantly increase the chance of studying groups with common pathophysiology and lay the groundwork for biomarker discovery.

Systems Biology Approach to the Mechanisms of TB Latency and Reactivation

The purpose of this RFA is to apply a collaborative systems biology approach to study mechanisms of latency and reactivation of TB in host lung cells. The goal is to develop better TB drugs, more effective vaccines, and better diagnostics.

Trans-NHLBI

Initiatives Being Renewed

Production Assistance for Cellular Therapies

The purpose of this renewal is to advance cellular therapy research in the regeneration of damaged or diseased tissues, organs, and biologic systems and targeted treatments for severe diseases that are currently lacking effective therapies.

Directed Stem Cell Differentiation for Cell-Based Therapies for Heart, Lung, and Blood Diseases

The purpose of this renewal is to identify factors that control differentiation of stem cells in vitro or in vivo. The goal is to develop methods that direct differentiation of stem cells to yield replacement cells for clinical use or stimulate differentiation of resident stem cells in vivo for regeneration or repair of the heart, blood vessels, lungs, and blood.

Mentored Career Award for Faculty at Minority Serving Institutions

The purpose of this renewal is to support eligible faculty members at minority-serving institutions to undertake specialized study and supervised research under a mentor who is an accomplished investigator in the area proposed and has experience in developing independent investigators.

Mentored Career Development Award To Promote Faculty Diversity/Re-Entry in Biomedical Research

The purpose of this renewal is to increase the number of highly trained investigators who are from diverse backgrounds or who have experienced an interruption in their research career and whose basic and clinical research interests involve advanced methods and experimental approaches that are needed to solve problems related to cardiovascular, lung, and blood diseases and sleep disorders.

Minority Institutional Research Training Program

The purpose of this renewal is to support training of predoctoral and health professional students and individuals in postdoctoral training at minority-serving institutions in cardiovascular, lung, and blood diseases and sleep disorders research.

Programs To Increase Diversity Among Individuals Engaged in Health-Related Research

The purpose of this renewal is to establish summer institutes for junior faculty and scientists from underrepresented racial and ethnic groups and those with disabilities to augment their research skills and knowledge, which in turn will enhance their career development as faculty members or scientists.

Short-Term Research Education Program To Increase Diversity in Health-Related Research

The purpose of this renewal is to promote diversity in undergraduate and health professional student populations by providing short-term research education support to stimulate career development in cardiovascular, lung, and blood diseases and sleep disorders research.

New Initiative

Reducing Cardiovascular Disease Risk Through Treatment of Obstructive Sleep Apnea

The purpose of this RFA is to conduct preliminary studies to obtain information to guide the design of a Phase III clinical trial on the efficacy of positive airway pressure (PAP) treatment of obstructive sleep apnea as a means to reduce cardiovascular events. The goals are to determine the feasibility of long-term (12 to 18 months) PAP treatment in patients at risk of CVD and to determine the effects of PAP on surrogate or intermediate markers of cardiovascular risk and cardiovascular risk factors.

Trans-NIH

Initiatives Being Renewed

Exploratory/Developmental Clinical Research Grants in Obesity

The purpose of this renewal is to encourage exploratory/developmental clinical research that will accelerate the development of effective interventions for preventing or treating overweight or obesity in adults and children.

Improving Diet and Physical Activity Assessment

The purpose of this renewal is to improve diet and physical activity measurement through the development of innovative assessment approaches, improved data collection instruments, new technologies, or statistical and analytical techniques.

National Registry of Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions

The purpose of this renewal is to increase the value and effectiveness of the NHLBI-supported national registry that was established to advance the clinical management of genetic thoracic aortic aneurysms and other cardiovascular complications that are associated with connective tissue diseases.

National Research Service Awards for Senior Fellows

The purpose of this renewal is to enable experienced scientists who have at least 7 years of research experience beyond the doctorate and who have progressed to the stage of independent investigator to make major changes in the direction of their research career or broaden their scientific background. The program will support 2 years of full-time training for senior fellows at the NIH or at other institutions.

Pediatric HIV/AIDS Cohort Study (Limited Competition)

The purpose of this renewal is to continue support for collecting data that will enable scientists to understand more fully the effect of HIV on sexual maturation, pubertal development, and socialization of perinatally HIV-infected preadolescents and adolescents and to determine the long-term safety of fetal and infant exposure to prophylactic antiretroviral agents.

Pharmacogenomics Research Network

The purpose of this renewal is to identify genes, pathways, and systems that produce interindividual differences in drug responses and establish the mechanistic basis for them.

Stem Cell Research: Career Enhancement Award

The purpose of this renewal is to provide investigators with the opportunity to acquire research capabilities in the use of human or animal embryonic, adult, or cord blood stem cells.

New Initiatives

Application of Metabolomics for Translational and Biological Research

The purpose of this PA is to apply metabolomic technologies for translational research in health and disease to enable and improve disease detection, diagnosis, and risk assessment and the prognosis and prediction of therapeutic responses.

Bariatric Surgery: Pilot Studies for Studying Mechanisms of Improvement on Cardiovascular, Lung, and Sleep Diseases

The purpose of this RFA is to determine the optimal research design for a randomized clinical trial of the effects of bariatric surgery on patients with cardiovascular or lung diseases or sleep disorders.

Centers for Population Health and Health Disparities

The purpose of this RFA is to promote transdisciplinary research in health disparities to improve health outcomes and quality of life for populations at high risk for CVD. Focus is on understanding the pathways that result in disparate health outcomes and developing comprehensive models of the effect of various social, economic, cultural, environmental, biological, behavioral, physiological, and genetic factors on individual health outcomes and their distribution in populations.

Childhood Obesity Prevention and Treatment Research

The purpose of this RFA is to evaluate the efficacy of innovative interventions to prevent excess weight gain in normal weight children ages 1–10 years, prevent additional weight gain in obese youth ages 11–18 years, and facilitate weight loss in obese youth ages 11–18 years.

Effectiveness Research on Smoking Cessation in Hospitalized Patients

The purpose of this RFA is to evaluate the translation of successful smoking cessation strategies, begun during hospitalization and continued post-discharge, into effective programs that can be widely used in routine clinical practice and assess the cost-effectiveness of the interventions.

Health Behaviors in School-Age Children—A Longitudinal Study

The purposes of this intra-agency agreement are to increase the understanding of adolescent health behaviors and lifestyle (i.e., influences of diets, physical activity, and obesity on cardiovascular health) and to use the information to develop effective preventive programs.

Nutrition and Physical Activity Research To Promote Cardiovascular and Pulmonary Health

The purpose of this PA is to study the role of nutrition and physical activity in the development, prevention, and management of CVD and pulmonary diseases, such as asthma and COPD. Research findings will be used to refine public health recommendations and clinical guidelines regarding lifestyle behaviors and to develop and test strategies that will improve adoption of the recommendations.

Physical Activity To Prevent Disability Trial

The purpose of this RFA is to compare the long-term effectiveness and practicality of two interventions, a physical activity program and a successful aging health education program, to prevent or delay the declining ability of older adults to walk.

Safe and Effective Instruments and Devices for Use in the Neonatal Intensive Care Units

The purpose of this SBIR/STTR is to develop or improve safe and effective devices and instruments for monitoring and treating infants in neonatal intensive care units.

Trans-PHS

Initiatives Being Renewed

Individual Predoctoral Fellowships To Promote Diversity in Health-Related Research

The purpose of this renewal is to increase the diversity of the health-related research workforce by supporting the training of predoctoral students from groups that have been shown to be underrepresented (e.g., individuals from underrepresented racial and ethnic groups, individuals

with disabilities, and individuals from disadvantaged backgrounds).

Interagency Registry for Mechanical Circulatory Support

The purpose of this renewal is to continue support for a national registry of patients receiving an MCS to treat advanced heart failure.

National Longitudinal Mortality Study

The purpose of this renewal is to develop a database to study the effects of demographic and socioeconomic differentials on mortality rates in the United States.

Interagency

Initiative Being Renewed

Clinical Research Consortium To Improve Resuscitation Outcomes

The purpose of this renewal is to continue support for clinical trials that focus on early field delivery of lifesaving interventions by emergency medical service teams to optimize patient survival.

New Initiative

Community-Based Partnerships for Childhood Obesity Prevention and Control Research

The purpose of this PA is to stimulate childhood obesity research through community-based partnerships that

include local, state, and regional teams of researchers, policymakers, and other relevant stakeholders—such as community representatives, public health practitioners, and educators.

Private–Public Partnership

New Initiatives

Studying Community Programs To Reduce Childhood Obesity

The purpose of this RFP is to examine outcomes associated with existing community programs designed to reduce childhood obesity by improving the diet and physical activity behaviors of children.

Randomized Evaluation of VAD Intervention Before Inotropic Therapy Feasibility Trial

The purpose of this RFP is to explore the potential benefit of mechanical circulatory support therapy using ventricular assist devices (VADs) in functionally impaired advanced heart failure patients who have not yet developed serious consequences from their disease. The feasibility study will permit the design of a trial directed at a large and growing patient population for whom VADs could offer substantial benefit before the need for inotropic intravenous drug therapy.



6. Institute Public Advisory Committees

National Heart, Lung, and Blood Advisory Council

Structure

Chair: Susan B. Shurin, M.D., Acting Director, NHLBI

Executive Secretary: Stephen C. Mockrin, Ph.D., Director, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-0260

The Secretary of HHS appoints 18 members: 12 members are leading representatives of the health and scientific disciplines (including public health and behavioral or social sciences), and 6 are from the general public and are leaders in the fields of public policy, law, health policy, economics, and management.

Members are appointed for overlapping terms of 4 years.

The Council includes the following ex officio members:

- Secretary, HHS
- Director, NIH
- Director, NHLBI
- Chief Medical Director, Veterans Affairs, or Designee
- Assistant Secretary of Defense for Health Affairs, or Designee
- Designee, Centers for Disease Control and Prevention

Functions

The NHLBAC reviews applications for research grants, cooperative agreements, and training grants in heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources, and

recommends scientific projects that merit support to the Director, NHLBI.

The Council advises the Secretary, HHS; the Assistant Secretary for Health, HHS; and the Directors, NIH and NHLBI on matters relating to causes, prevention, diagnosis, and treatment of diseases and resources within the purview of the Institute. The Council also may review any grant, contract, or cooperative agreement proposed to be made or entered into by the Institute; may make recommendations to the Director of the Institute respecting research conducted at the Institute; may collect, by correspondence or by personal investigation, information as to studies that are being carried on in the United States or any other country with respect to the cause, prevention, diagnosis, and treatment of heart, blood vessel, lung, and blood diseases, and to the use of blood and blood products and the management of blood resources and, with the approval of the Director of the Institute, make available such information through appropriate publications for the benefit of public and private health entities and health professions personnel and scientists and for the information of the general public; and may assemble ad hoc working groups, appoint subcommittees, and convene workshops and conferences.

The Council may also make recommendations to the Director, NIH and other authorized officials regarding the acceptance of conditional gifts pursuant to section 231 of the Public Health Service Act, as amended.

Meetings

The Chair convenes meetings not fewer than four times a year and approves the agenda.

National Heart, Lung, and Blood Advisory Council Membership*

Susan B. Shurin, M.D.

Chair

National Heart, Lung, and Blood Institute

Jeanine Arden Ornt, J.D. (2010)

Case Western Reserve University

C. Noel Bairey Merz, M.D. (2011)

Cedars-Sinai Medical Center

Ingrid B. Borecki, Ph.D. (2012)

Washington University in St. Louis

Barry S. Coller, M.D. (2012)

The Rockefeller University

Shaun R. Coughlin, M.D., Ph.D. (2010)

University of California, San Francisco

Jack A. Elias, M.D. (2012)

Yale University School of Medicine

Joe G. N. Garcia, M.D. (2010)

University of Chicago

Gary H. Gibbons, M.D. (2013)

Morehouse School of Medicine

Beverly W. Hogan (2012)

Tougaloo College

Lanetta B. Jordan, M.D. (2013)

Memorial Healthcare System

Talmadge E. King, M.D. (2013)

University of California, San Francisco

Andrew R. Marks, M.D. (2011)

Columbia University

Michael S. Parmacek, M.D. (2012)

University of Pennsylvania School of Medicine

Paula Y. Polite (2010)

Division of General Services, Memphis

Marlene Rabinovitch, M.D. (2011)

Stanford University

Steven D. Shapiro, M.D. (2010)

University of Pittsburgh

Leslee J. Shaw, Ph.D. (2013)

Emory University

Ex Officio Members

Francis S. Collins, M.D., Ph.D.

National Institutes of Health

William H. Dietz, M.D., Ph.D.

Centers for Disease Control and Prevention

Robert L. Jesse, M.D., Ph.D.

McGuire Veterans Affairs Medical Center

Cdr. Richard T. Mahon, M.D.

Naval Medical Research Center

Kathleen Sebelius, M.P.A.

Department of Health and Human Services

* Current as of October 2010. The current roster, containing full addresses for the NHLBI Advisory Council and Committees, can be obtained from the Internet at <http://www.nhlbi.nih.gov/meetings/nhlbac/roster.htm>.

Program Advisory and Review Committee

Sickle Cell Disease Advisory Committee

Chair: Edward J. Benz, M.D., Dana-Farber Cancer Institute

Executive Secretary: W. Keith Hoots, M.D., Director, Division of Blood Diseases and Resources, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-0080

The Sickle Cell Disease Advisory Committee advises the Secretary and the Assistant Secretary for Health, HHS and the Directors of the NIH, the NHLBI, and the DBDR on matters related to the Sickle Cell Disease Program and makes recommendations concerning planning, execution, and evaluation of all aspects of the program.

Membership*

Thomas D. Coates, M.D. (2013)
University of Southern California

Elaine K. Gallin, Ph.D. (2012)
Doris Duke Charitable Foundation

Nigel S. Key, M.D. (2013)
University of North Carolina at Chapel Hill

Roberto F. Machado, M.D. (2012)
University of Illinois, Chicago

Punam Malik, M.D. (2012)
Cincinnati Children's Hospital Medical Center

Leslie V. Parise, Ph.D. (2012)
University of North Carolina

Susan P. Perrine, M.D. (2011)
Boston University

Yogen Sauntharajah, M.D. (2011)
Cleveland Clinic

Wally R. Smith, M.D. (2011)
Virginia Commonwealth University

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Health Resources and Services Administration

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Madigan Army Medical Center

Sleep Disorders Research Advisory Board

Chair: Charles A. Czeisler, M.D., Ph.D., Harvard Medical School

Executive Secretary: Michael J. Twery, Ph.D., Director, National Center on Sleep Disorders Research, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-0202

The Sleep Disorders Research Advisory Board advises the Directors of the NIH, the NHLBI, and the NCSDR on matters related to the scientific activities carried out by and through the Center and policies regarding such activities, including the identification of research priorities for coordination of sleep and sleep disorders research by the NIH and other Federal, professional, and voluntary organizations.

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Mercedes R. Carnethon, Ph.D. (2013)
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Ronald D. Chervin, M.D. (2012)
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* Current as of October 2010.

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Andrea L. Piani
U.S. Census Bureau

Michael J. Twery, Ph.D.
NCSDR, National Institutes of Health

Marian Willinger, Ph.D.
NICHD, National Institutes of Health

Heart, Lung, and Blood Initial Review Group

Scientific Review Officer: Jeffery H. Hurst, Ph.D.,
Health Science Administrator, Division of Extramural
Research Activities, NHLBI, National Institutes of
Health, Bethesda, MD 20892; 301-435-0303

The Heart, Lung, and Blood Initial Review Group provides initial technical merit review for the NHLBAC and the Director, NHLBI. This group consists of three subcommittees: the Heart, Lung, and Blood Program Project Review Committee; the Clinical Trials Review Committee; and the NHLBI Institutional Training Mechanism Review Committee.

Heart, Lung, and Blood Program Project Review Committee

Chair: Curt D. Sigmund, Ph.D., University of Iowa

Scientific Review Officer: Jeffery H. Hurst, Ph.D.,
Health Scientist Administrator, Division of Extramural
Research Activities, NHLBI, National Institutes of
Health, Bethesda, MD 20892; 301-435-0303

The Heart, Lung, and Blood Program Project Review Committee provides initial technical merit review for the NHLBAC and the Director, NHLBI on program project applications proposing research in the areas of heart, lung, and blood diseases and resources.

Membership*

David Atkinson, Ph.D. (2012)
Boston University School of Medicine

Karen E. Bornfeldt, Ph.D. (2011)
University of Washington

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University of Colorado

Catherine C. Hedrick, Ph.D. (2011)
La Jolla Institute for Allergy and Immunology

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New York Medical College

Jay K. Kolls, M.D. (2014)
LSU Health Sciences Center

* Current as of October 2010.

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Lucy Liaw, Ph.D. (2014)
Maine Medical Center Research Institute

Nigel Mackman, Ph.D. (2013)
University of North Carolina at Chapel Hill

Catherine S. Manno, M.D. (2013)
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University of Arizona

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Cleveland Clinic Foundation

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University of Pittsburgh

Nancy Speck, Ph.D. (2013)
University of Pennsylvania School of Medicine

Arun Srivastava, Ph.D. (2011)
University of Florida

Clinical Trials Review Committee

Chair: Julio A. Panza, M.D., Washington Hospital Center

Scientific Review Officer: Keary A. Cope, Ph.D., Health Science Administrator, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-2222

The Clinical Trials Review Committee provides initial technical merit review for the NHLBAC and the Director of the NHLBI on clinical trial applications for the support of studies to evaluate preventive or therapeutic measures of blood, cardiovascular, or lung diseases.

Membership*

Roberta A. Ballard, M.D. (2014)
University of California, San Francisco

Bruce A. Barton, Ph.D. (2014)
University of Massachusetts Medical School

Carlos Arturo Camargo, M.D., Dr.P.H. (2012)
Massachusetts General Hospital

Jeffrey L. Carson, M.D. (2014)
University of Medicine and Dentistry of New Jersey

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Case Western Reserve University

Gerard J. Criner, M.D. (2014)
Temple University School of Medicine

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Washington University School of Medicine

Wendy J. Mack, Ph.D. (2011)
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Karen L. Margolis, M.D. (2012)
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Amy Dana Shapiro, M.D. (2012)
Indiana Hemophilia and Thrombosis Center, Inc.

* Current as of October 2010.

Stanley J. Szeffler, M.D. (2012)
National Jewish Health Medical & Research Center

NHLBI Institutional Training Mechanism Review Committee

Chair: William C. Balke, M.D., University of California, San Francisco

Scientific Review Officer: Charles Joyce, Ph.D., Health Science Administrator, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-0291

The NHLBI Institutional Training Mechanism Review Committee provides initial technical merit review for the NHLBAC and the Director of the NHLBI on training applications that provide predoctoral, post-doctoral, and short-term research training at academic institutions.

Membership*

Janis L. Abkowitz, M.D. (2013)
University of Washington Medical Center

Ifeanyi J. Arinze, Ph.D. (2012)
Meharry Medical College

Meredith Bond, Ph.D. (2013)
University of Maryland School of Medicine

Linda J. Burns, M.D. (2011)
University of Minnesota

David M. Center, M.D. (2011)
Boston University Medical Campus

Gerardo Heiss, M.D., Ph.D. (2014)
University of North Carolina at Chapel Hill

Gary W. Hunninghake, M.D. (2013)
University of Iowa

Kirk U. Knowlton, M.D. (2013)
University of California, San Diego

Alice H. Lichtenstein, D.Sc. (2013)
Tufts University

Russell V. Luepker, M.D. (2012)
University of Minnesota

Jonathan C. Makielski, M.D. (2012)
University of Wisconsin Hospitals and Clinics

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University of Utah

Robin Shandas, Ph.D. (2012)
University of Colorado Health Sciences Center

Brian Smith, M.D. (2011)
Yale University School of Medicine

Mary I. Townsley, Ph.D. (2012)
University of South Alabama

Donna H. Wang, M.D. (2011)
Michigan State University

Scott T. Weiss, M.D. (2011)
Brigham and Women's Hospital

Reen Wu, Ph.D. (2011)
University of California at Davis

National Heart, Lung, and Blood Institute Special Emphasis Panel

The Institute has established the NHLBI Special Emphasis Panel (SEP) to carry out initial peer review of applications and proposals that were previously handled by ad hoc committees. Concept review, previously handled by divisional program advisory committees, has also been incorporated into the SEP system. The SEP, which has neither a fixed membership nor a set meeting schedule, is constituted to provide required peer review expertise at precisely the time that it is needed.

Board of Scientific Counselors

Chair: Vacant

Executive Secretary: Robert S. Balaban, Ph.D., Director, Division of Intramural Research, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-496-2116

* Current as of October 2010.

The Board of Scientific Counselors advises the Director and the Deputy Director for Intramural Research, NIH, and the Directors of NHLBI and the Division of Intramural Research, NHLBI, on the intramural research programs of the NHLBI.

Membership*

Stephen Black, Ph.D. (2011)
Medical College of Georgia

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Massachusetts General Hospital

Michael I. Kotlikoff, V.M.D., Ph.D. (2013)
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Aldons Jake Lusic, Ph.D. (2013)
University of California, Los Angeles

David J. Sahn, M.D. (2014)
Oregon Health and Science University

Douglas C. Wallace, Ph.D. (2014)
University of California, Irvine

* Current as of October 2010.



7. Fiscal Year 2010 Budget Overview

NHLBI Obligations by Funding Mechanism: Fiscal Year 2010

Funding Mechanism	Obligated Dollars* (Thousands)	Percent of Total NHLBI Budget
Research Project Grants**	\$2,108,524	68.2%
SCCOR and NIH Centers	57,278	1.9
Sickle Cell Centers	2,300	0.1
Centers for AIDS Research	3,368	0.3
Other Research Centers Grants	9,620	0.1
Other Research Grants	129,244	4.2
<i>Research Careers Programs</i> †	81,544	2.6
Training Programs	97,963	3.2
Research and Development Contracts	379,892	12.3
Intramural Laboratory and Clinical Research	186,249	6.0
Research Management and Support‡	119,063	3.8
Total Obligations	\$3,093,501	100.0%

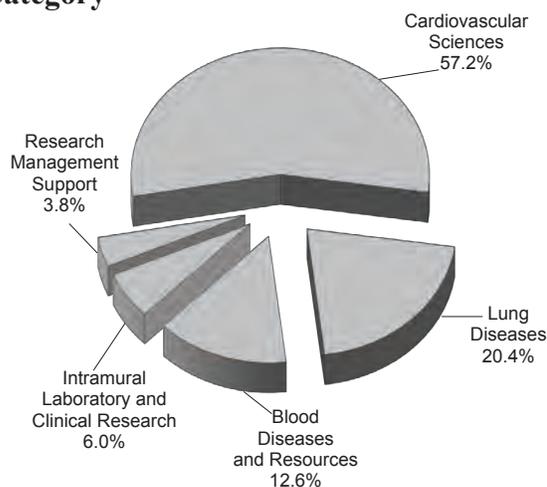
* Excludes funds provided by other Agencies by means of a reimbursable agreement.

** Includes \$75,919 for Small Business Innovation Research (SBIR) Grants/Small Business Technology Transfer (STTR) Grants.

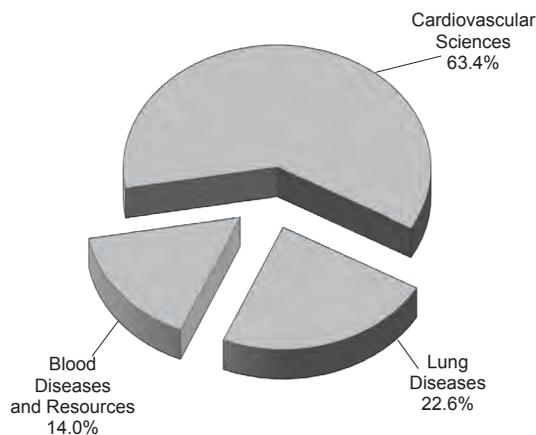
† Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.

‡ Excludes OD and DIR research contracts, which are included in R&D contracts.

NHLBI Total Obligations by Budget Category



NHLBI Extramural Obligations by Program



For detailed data on FY 2010:

- Research grants, see Chapters 9 and 11.
- Research and development contracts, see Chapters 10 and 11.
- Research training and career development, see Chapter 13.
- Geographic distribution of awards, see Chapter 14.

NHLBI Extramural Obligations by Program: Fiscal Year 2010

Program	Obligated Dollars (Thousands)	Percent of NHLBI Extramural Budget
Cardiovascular Sciences	\$1,769,079	63.4%
Lung Diseases	629,938	22.6
Blood Diseases and Resources	389,172	14.0
Total, Extramural Obligations	\$2,788,189	100%

NHLBI Cardiovascular Sciences Program Obligations by Funding Mechanism: Fiscal Year 2010

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$1,320,126	74.6%
SCCOR and NIH Centers	22,371	1.3
Other Research Centers Grants	9,365	0.5
Other Research Grants	58,283	3.3
<i>Research Career Programs</i> *	37,214	2.1
Training Programs	56,751	3.2
Research and Development Contracts	302,183	17.1
Total, Cardiovascular Sciences	\$1,769,079	100%

NHLBI Lung Diseases Program Obligations by Funding Mechanism: Fiscal Year 2010

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$478,414	75.9%
SCCORs	26,336	4.2
Other Research Centers Grants	256	0.0
Other Research Grants	52,242	8.3
<i>Research Career Programs</i> *	29,109	4.6
Training Programs	25,131	4.0
Research and Development Contracts	47,559	7.5
Total, Lung Diseases	\$629,938	100%

NHLBI Blood Diseases and Resources Program Obligations by Funding Mechanism: Fiscal Year 2010

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$309,984	79.7%
SCCOR	8,570	2.2
Sickle Cell Centers	2,300	0.6
Centers for AIDS Research	3,368	0.9
Other Research Grants	18,719	4.8
<i>Research Career Programs</i> *	15,221	3.9
Training Programs	16,081	4.1
Research and Development Contracts	30,150	7.7
Total, Blood Diseases and Resources	\$389,172	100%

* Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.



8. Long-Term Trends

Budget History of the NHLBI: Fiscal Years 1950–2010

Dollars (Thousands)

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation	Obligations	Cumulative Fiscal Year Obligations
1950	\$ 34,630	\$ 11,575	\$ 29,117	\$ 16,075	\$ 15,768	\$ 15,768
1951	8,800	8,800	9,400	9,400	8,497	24,265
1952	10,237	10,074	10,156	10,083	9,850	34,115
1953	9,779	9,623	12,000	12,000	11,398	45,513
1954	11,040	12,000	15,418	15,168	14,952	60,465
1955	14,570	16,168	17,168	16,668	16,595	77,060
1956	17,454	17,398	23,976	18,808	18,838	95,898
1957	22,106	25,106	33,396	33,396	32,392	128,290
1958	33,436	33,436	38,784	35,936	35,973	164,263
1959	34,820	36,212	49,529	45,613	45,468	209,731
1960	45,594	52,744	89,500	62,237	61,565	271,296
1961	63,162	71,762	125,166	86,900	86,239	357,535
1962	97,073	105,723	160,000	132,912	110,849	468,384
1963	126,898	143,398	149,498	147,398	120,597	588,981
1964	130,108	129,325	130,545	132,404	117,551	706,532
1965	125,640	124,521	125,171	124,824	124,412	830,944
1966	141,412	146,212	143,462	141,462	141,171	972,115
1967	148,407	154,770	164,770	164,770	164,342	1,136,457
1968	167,954	167,954	177,954	167,954	162,134	1,298,591
1969	169,735	164,120	172,120	166,928	161,834	1,460,425
1970	160,513	160,513	182,000	171,257	160,433	1,620,858
1971	171,747	178,479	203,479	194,901	194,826	1,815,684
1972	195,492	211,624	252,590	232,627	232,577	2,048,261
1973	255,280	300,000	350,000	300,000	255,722	2,303,983
1974	265,000	281,415	320,000	302,915	327,270	2,631,253
1975	309,299	321,196	330,000	327,996	327,953	2,959,206
1976	324,934	329,079	379,059	370,096	368,648	3,327,854
TQ ^A	59,715	58,015	58,015	58,763	60,639	3,388,493
1977	342,855	380,661	420,661	396,661	396,857	3,785,350
1978	403,642	432,642	456,000	447,901	447,968	4,233,318
1979	454,336	485,584	485,584	510,134	510,080	4,743,398
1980	507,344	527,544	527,544	527,544	527,248	5,270,646
1981	532,799	560,264	565,264	549,693	550,072	5,820,718
1982	579,602	583,831	587,741	559,637	559,800	6,380,518
1983	577,143	620,947	624,542	624,259	624,260	7,004,778
1984	639,774	665,859	683,489	704,939	705,064	7,709,842
1985	718,852	764,135	807,149	805,269	803,810	8,513,652
1986	775,254	856,388	863,652	859,239	821,901	9,335,553
1987	785,697	921,410	921,502	930,001	929,982	10,265,535
1988	821,887	990,808	1,000,349	965,536	965,283	11,230,818
1989	1,054,503	1,018,983	1,056,003	1,045,985	1,045,508	12,276,326
1990	1,039,846	1,090,930	1,091,597	1,072,354	1,070,683	13,347,009

A TQ=Transition Quarter, July 1–September 30, 1976.

Budget History of the NHLBI: Fiscal Years 1950–2010 (Continued)

Dollars (Thousands)

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation	Obligations	Cumulative Fiscal Year Obligations
1991	1,112,502	1,135,589	1,137,235	1,126,942	1,125,915	14,472,924
1992	1,209,924	1,202,398	1,190,396	1,191,500	1,190,070	15,662,994
1993	1,245,396	1,228,455	1,228,455	1,214,693	1,214,693	16,877,687
1994	1,198,402	1,277,880	1,277,880	1,277,880	1,277,852	18,155,539
1995	1,266,961	1,259,590	1,259,590	1,258,472	1,314,969	19,470,508
1996	1,337,021	1,355,866	1,320,254 ^B	1,355,866	1,351,422 ^C	20,821,930
1997	1,320,555 ^D	1,438,265	1,344,742 ^D	1,432,529 ^E	1,431,821	22,253,751
1998	1,467,189	1,513,004	1,531,898	1,531,061 ^F	1,526,276	23,780,027
1999	1,709,328 ^G	1,720,344	1,793,697	1,793,697 ^F	1,788,008	25,568,035
2000	1,759,806	1,937,404	2,001,185	2,040,291 ^F	2,027,286	27,595,321
2001	2,069,582	2,328,102	2,328,105	2,299,866 ^H	2,298,035	29,893,356
2002	2,567,429	2,547,675	2,618,966	2,576,125 ^I	2,569,794	32,463,150
2003	2,791,411	2,812,011	2,818,684	2,812,011 ^J	2,793,681	35,256,831
2004	2,867,995	2,867,995	2,897,595	2,882,715 ^K	2,882,601	38,139,432
2005	2,963,953	2,963,953	2,985,900	2,965,453	2,922,573 ^L	41,062,005
2006	2,951,270	2,951,270	3,023,381	2,951,270 ^J	2,893,527	43,955,532
2007	2,901,012	2,901,012	2,924,299	2,921,757	2,922,322 ^L	46,877,854
2008	2,894,341	2,965,775	2,992,197	2,974,900 ^E	2,937,333	49,815,187
2009	2,924,942	3,025,500	3,006,344	3,015,689	3,014,552	52,829,739
2010	3,050,356	3,123,403	3,066,827	3,096,916	3,093,501	55,923,240

B Senate Allowance reflects the Institute share of the Government-wide rescission and the HHS rescission.

C Obligations reflect the Institute share of the Government-wide rescission, the HHS rescission, and a transfer to other NIH Institutes through the NIH Director's 1 percent transfer authority.

D Excludes funds for AIDS research activities consolidated in the NIH Office of AIDS Research (OAR).

E Excludes enacted administrative reduction.

F Excludes Director transfer, Secretary transfer, and rescission.

G Includes Bioterrorism reduction.

H Excludes Office of Human Research Protection transfer, Secretary transfer, and rescission.

I Excludes Government-wide rescission, Labor/HHS/Education rescission, from HHS to OMB rescission, and Secretary 1 percent transfer.

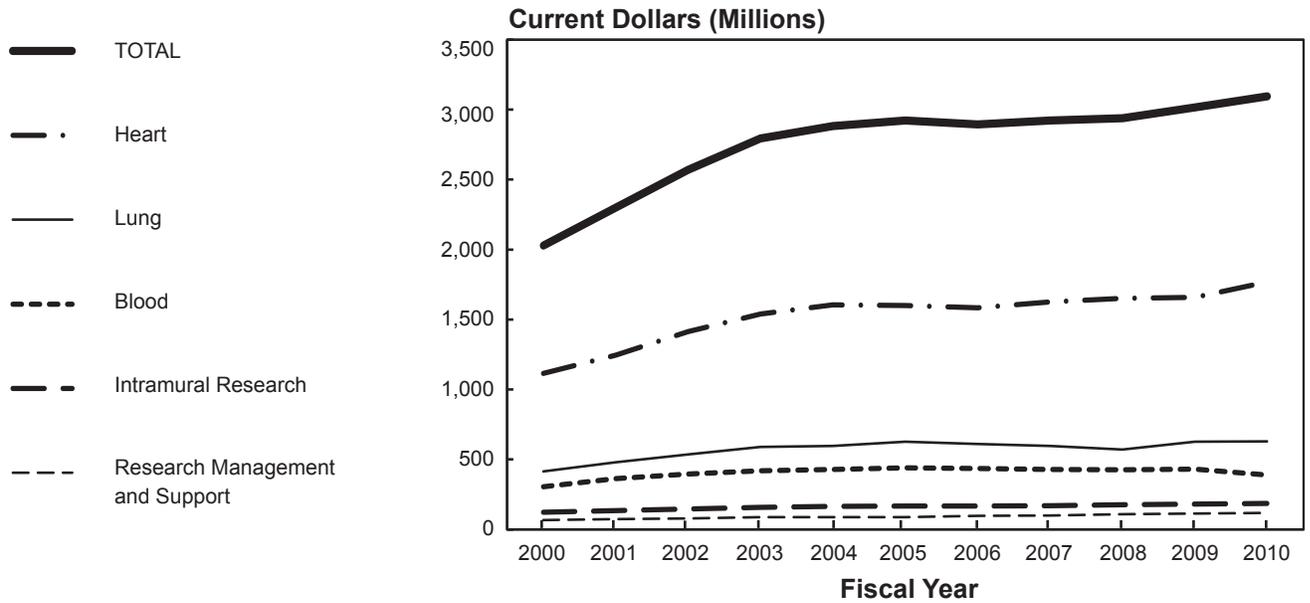
J Excludes Government-wide rescission.

K Includes Roadmap adjustments.

L Includes Roadmap Transfer and Government-wide rescission.

NHLBI Total Obligations by Budget Category: Fiscal Years 2000–2010

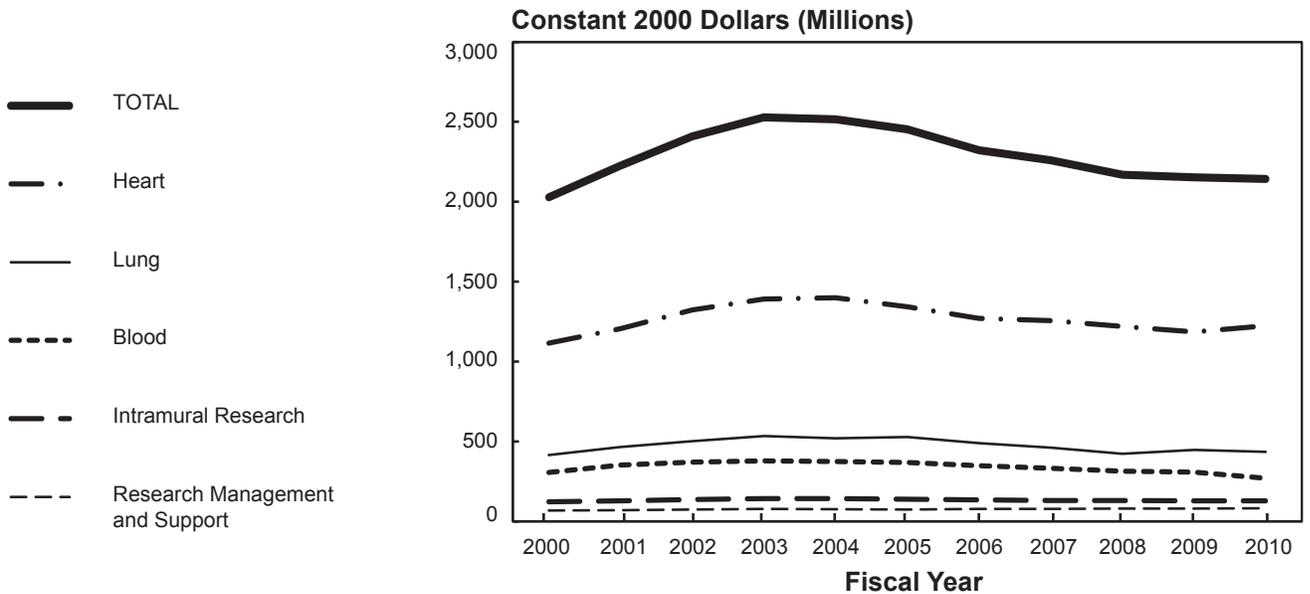
Current Dollars



Note: Beginning in 2007, the WHI funds are included in the “Heart” category and the Sleep Disorders Research funds are included in the “Lung” category. Previously they were reported separately.

NHLBI Total Obligations by Budget Category: Fiscal Years 2000–2010*

Constant 2000 Dollars



* This chart is based on the Biomedical Research & Development Price Index through 2010.

Note: Beginning in 2007, the WHI funds are included in the “Heart” category and the Sleep Disorders Research funds are included in the “Lung” category. Previously they were reported separately.

NHLBI Total Obligations by Budget Category: Fiscal Years 2000–2010

Current Dollars (Millions)											
Budget Category	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Extramural Research											
Heart	\$1,115.7	\$1,245.8	\$1,412.4	\$1,538.8	\$1,604.7	\$1,599.6	\$1,582.7	\$1,624.9	\$1,652.2	\$1,659.2	\$1,769.1
Lung	415.5	481.0	535.2	590.5	596.0	628.2	610.3	597.6	572.2	627.8	629.9
Blood	305.9	364.0	396.0	419.3	429.2	439.5	434.9	429.7	426.2	431.7	389.2
Intramural Research	122.3	133.7	146.7	157.8	164.2	166.3	168.3	169.5	177.5	181.7	186.2
Research Management and Support	67.9	73.5	79.4	87.3	88.5	89.0	97.2	100.6	109.2	114.1	119.1
Total	\$2,027.3	\$2,298.0	\$2,569.7	\$2,793.7	\$2,882.6	\$2,922.6	\$2,893.4	\$2,922.3	\$2,937.3	\$3,014.5	\$3,093.5

Note: From 1999 to 2006, the WHI was reported separately. In this table, it has been incorporated into the “Heart” line. The Sleep Disorders Research was reported separately from 1996 to 2006. In this table, it has been incorporated into the “Lung” line.

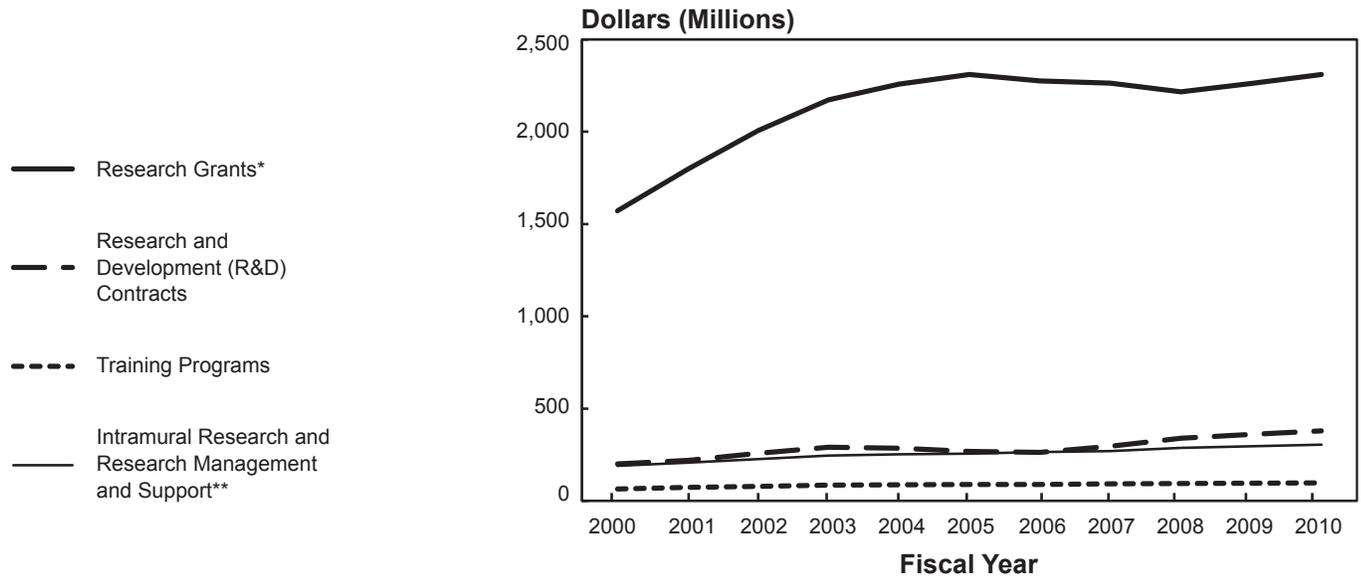
NHLBI Total Obligations by Budget Category: Fiscal Years 2000–2010

Constant 2000 Dollars (Millions)											
Budget Category	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Extramural Research											
Heart	\$1,115.7	\$1,206.0	\$1,323.7	\$1,392.6	\$1,400.3	\$1,343.1	\$1,270.2	\$1,256.7	\$1,220.2	\$1,185.1	\$1,225.1
Lung	415.5	465.6	501.6	534.4	520.1	527.5	489.8	462.2	422.6	448.4	436.2
Blood	305.9	352.4	371.1	379.5	374.5	369.0	349.1	332.3	314.8	308.4	269.5
Intramural Research	122.3	129.4	137.5	142.8	143.3	139.6	135.1	131.1	131.1	129.8	128.9
Research Management and Support	67.9	71.2	74.4	79.0	77.2	74.7	78.0	77.8	80.6	81.5	82.5
Total	\$2,027.3	\$2,224.6	\$2,408.3	\$2,528.2	\$2,515.4	\$2,453.9	\$2,322.2	\$2,260.1	\$2,169.4	\$2,153.2	\$2,142.3

* This chart is based on the Biomedical Research & Development Price Index through 2010.

Note: From 1999 to 2006, the WHI was reported separately. In this table, it has been incorporated into the “Heart” line. The Sleep Disorders Research was reported separately from 1996 to 2006. In this table, it has been incorporated into the “Lung” line.

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 2000–2010



* Includes Research Career Programs.

** Excludes Office of the Director and DIR research contracts, which are included in R&D contracts.

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 2000–2010

Funding Mechanism	Dollars (Millions)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Research Grants*	\$1,570.5	\$1,796.9	\$2,006.2	\$2,172.3	\$2,257.3	\$2,310.2	\$2,275.9	\$2,263.1	\$2,216.9	\$2,261.0	\$2,310.3
Research and Development (R&D) Contracts	201.3	220.1	258.3	290.5	285.5	268.6	262.8	295.8	338.8	361.1	379.9
Training Programs	65.4	73.7	79.2	85.8	87.1	88.4	89.2	93.3	94.9	96.6	98.0
Intramural Research and Research Management and Support**	190.1	207.3	226.1	245.1	252.7	255.4	265.6	270.1	286.7	295.8	305.3
Total	\$2,027.3	\$2,298.0	\$2,569.8	\$2,793.7	\$2,882.6	\$2,922.6	\$2,893.5	\$2,922.3	\$2,937.3	\$3,014.5	\$3,093.5

* Includes Research Career Programs.

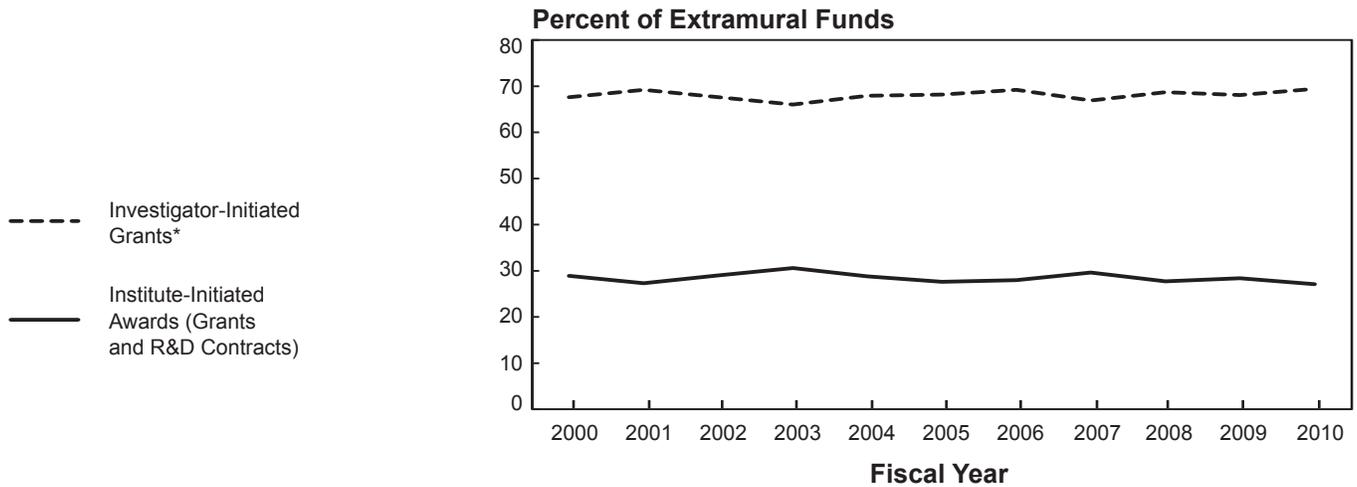
** Excludes Office of the Director and DIR research contracts, which are included in R&D contracts.

NHLBI Employment: Fiscal Years 2000–2010

Staff	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
FTEs*	865	868	880	880	861	796	797	814	846	856	876

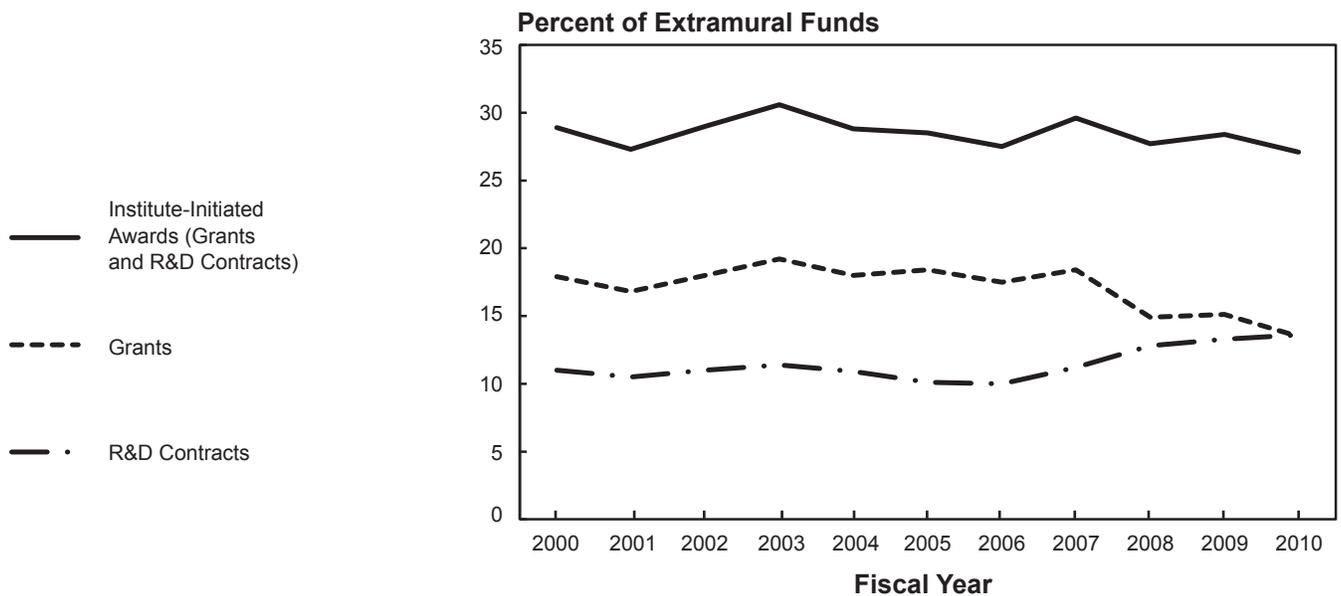
* Full-time equivalents.

NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 2000–2010



* Includes Research Career Programs.

NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 2000–2010



NHLBI Extramural Programs: Fiscal Years 2000–2010

Funding Mechanism	Dollars (Millions)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Investigator-Initiated Awards											
Investigator-Initiated Grants*	\$1,187.4	\$1,388.8	\$1,521.4	\$1,616.1	\$1,716.8	\$1,747.2	\$1,747.0	\$1,719.3	\$1,742.1	\$1,765.5	\$1,865.9
Research Career Programs	54.2	57.5	63.5	65.8	67.8	71.0	70.4	55.4	78.7	84.6	68.0
Subtotal, Investigator-Initiated Awards	1,241.6	1,446.3	1,584.9	1,681.9	1,784.6	1,818.2	1,817.3	1,774.7	1,820.8	1,850.1	1933.9
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	328.9	350.7	421.3	490.4	472.5	492.1	458.6	488.2	396.1	410.9	376.4
Centers**	123.8	127.2	128.2	138.9	140.6	151.5	141.1	141.0	107.3	90.1	72.6
R&D Contracts (RFP)	201.3	220.1	258.3	290.5	285.5	268.6	262.9	295.8	338.8	361.1	379.9
Subtotal, Institute-Initiated Awards	530.2	570.8	679.6	780.9	758.0	760.7	721.4	784.0	734.9	772.0	756.3
Training											
Individual Awards	8.9	8.9	9.5	8.6	8.8	9.7	10.0	8.2	9.0	10.3	11.7
Institutional Awards	56.5	64.8	69.7	77.2	78.4	78.7	79.1	85.1	85.8	86.2	86.3
Subtotal, Training	65.4	73.7	79.2	85.8	87.2	88.4	89.2	93.3	94.8	96.5	98.0
Total, Extramural	\$1,837.2	\$2,090.8	\$2,343.7	\$2,548.6	\$2,629.8	\$2,667.3	\$2,628.0	\$2,652.0	\$2,650.5	\$2,718.6	\$2,788.2

* Includes all R18s.

** Centers are a subset of Institute-Initiated Grants (RFAs) and are not added to the Institute-Initiated Awards subtotal as a distinct category.

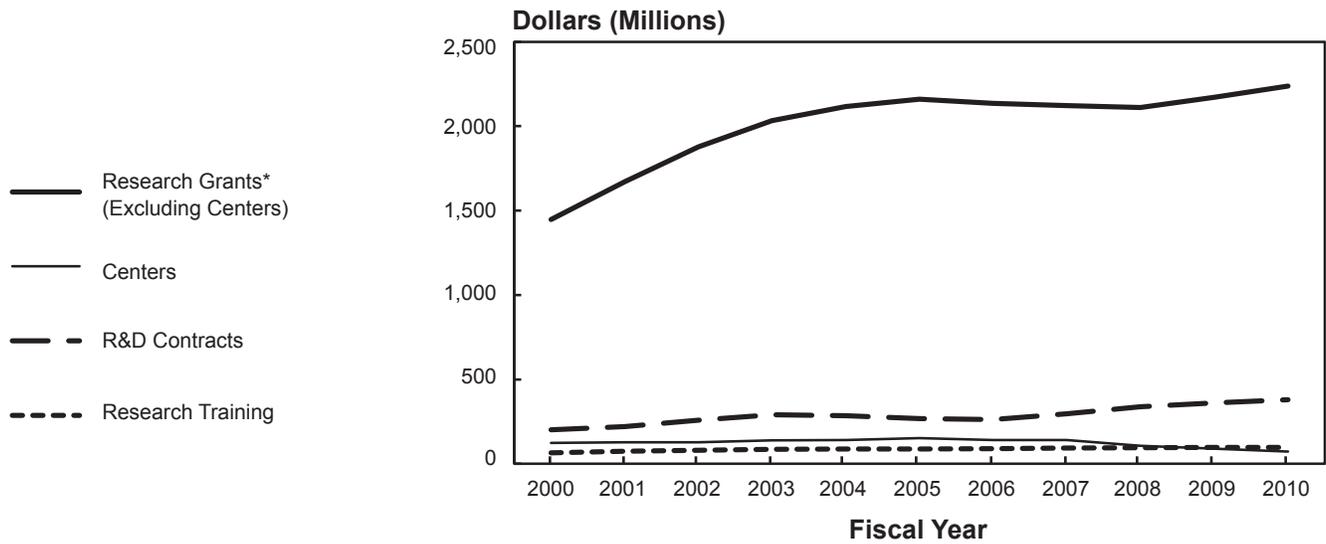
NHLBI Extramural Programs: Fiscal Years 2000–2010

Funding Mechanism	Percent of Total Extramural Budget										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Investigator-Initiated Awards											
Investigator-Initiated Grants*	64.6%	66.4%	64.9%	63.4%	65.3%	65.5%	66.5%	64.8%	65.7%	64.9%	66.9%
Research Career Programs (K04, K06)	3.0	2.8	2.7	2.6	2.6	2.7	2.7	2.1	3.0	3.1	2.4
Subtotal, Investigator-Initiated Awards	67.6	69.2	67.6	66.0	67.9	68.2	69.2	66.9	68.7	68.1	69.4
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	17.9	16.8	18.0	19.2	18.0	18.4	17.5	18.4	14.9	15.1	13.5
Centers**	6.7	6.1	5.5	5.5	5.3	5.7	5.4	5.3	4.0	3.3	2.6
R&D Contracts (RFP)	11.0	10.5	11.0	11.4	10.9	10.1	10.0	11.2	12.8	13.3	13.6
Subtotal, Institute-Initiated Awards	28.9	27.3	29.0	30.6	28.8	28.5	27.5	29.6	27.7	28.4	27.1
Training											
Individual Awards	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4
Institutional Awards	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.2	3.2	3.2	3.1
Subtotal, Training	3.6	3.5	3.4	3.4	3.3	3.3	3.4	3.5	3.6	3.5	3.5
Total, Extramural	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

* Includes all R18s.

** Centers are a subset of Institute-Initiated Grants (RFAs) and are not added to the Institute-Initiated Awards subtotal as a distinct category.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 2000–2010



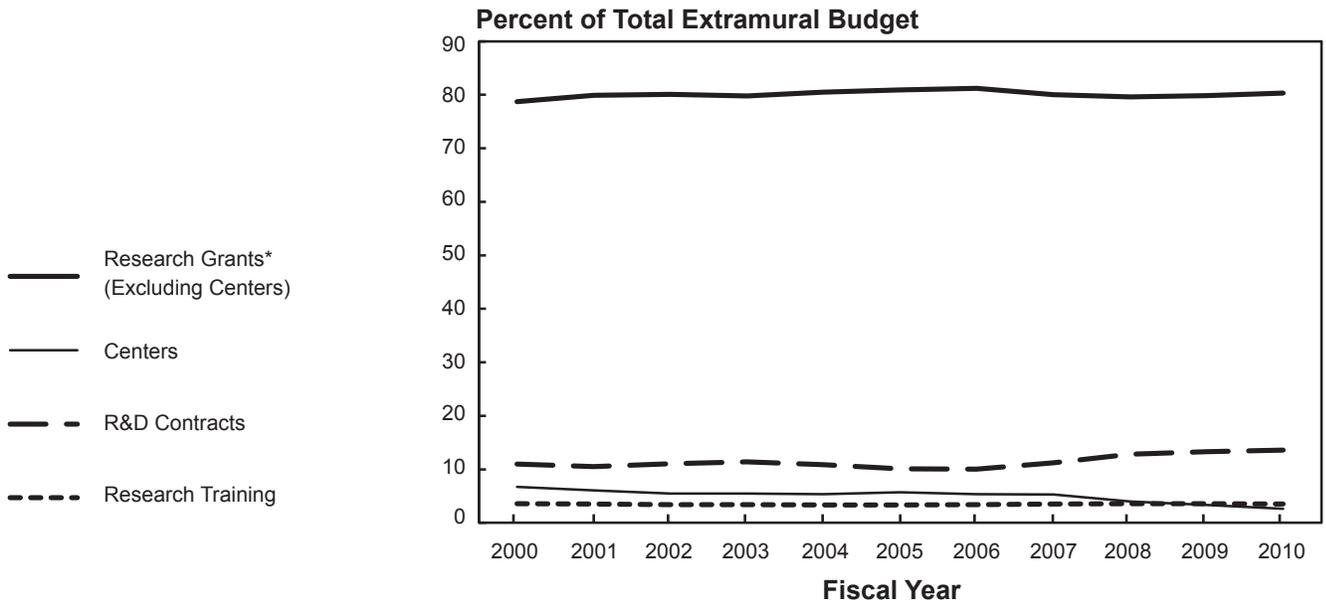
* Includes Research Career Programs; does not include Centers.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 2000–2010

Funding Mechanism	Dollars (Millions)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Research Grants*	\$1,446.7	\$1,669.8	\$1,878.0	\$2,033.4	\$2,116.5	\$2,158.8	\$2,134.9	\$2,121.9	\$2,109.6	\$2,170.9	\$2,237.7
Centers	123.8	127.2	128.2	138.9	140.6	151.5	141.1	141.0	107.3	90.1	72.6
R&D Contracts	201.3	220.1	258.3	290.5	285.5	268.6	262.9	295.8	338.8	361.1	379.9
Research Training	65.4	73.7	79.2	85.8	87.2	88.4	89.2	93.3	94.8	96.5	98.0
Total, Extramural	\$1,837.2	\$2,090.8	\$2,343.7	\$2,548.6	\$2,629.8	\$2,667.3	\$2,628.0	\$2,652.0	\$2,650.5	\$2,718.6	\$2,788.2

* Includes Research Career Programs; does not include Centers.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 2000–2010



* Includes Research Career Programs; does not include Centers.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 2000–2010

Percent of Total Extramural Budget

Funding Mechanism	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Research Grants*	78.7%	79.9%	80.1%	79.8%	80.5%	80.9%	81.2%	80.0%	79.6%	79.9%	80.3%
Centers	6.7	6.1	5.5	5.5	5.3	5.7	5.4	5.3	4.0	3.3	2.6
R&D Contracts (RFP)	11.0	10.5	11.0	11.4	10.9	10.1	10.0	11.2	12.8	13.3	13.6
Research Training	3.6	3.5	3.4	3.4	3.3	3.3	3.4	3.5	3.6	3.5	3.5
Total, Extramural	100%										

* Includes Research Career Programs; does not include Centers.
Note: Numbers may not add to total due to rounding.

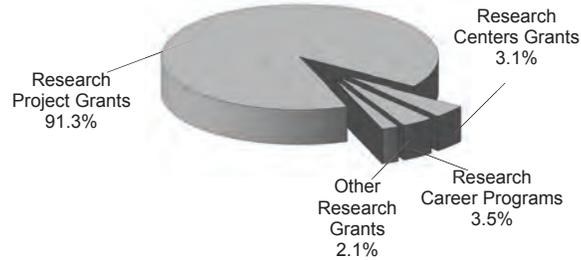


9. Research Grants

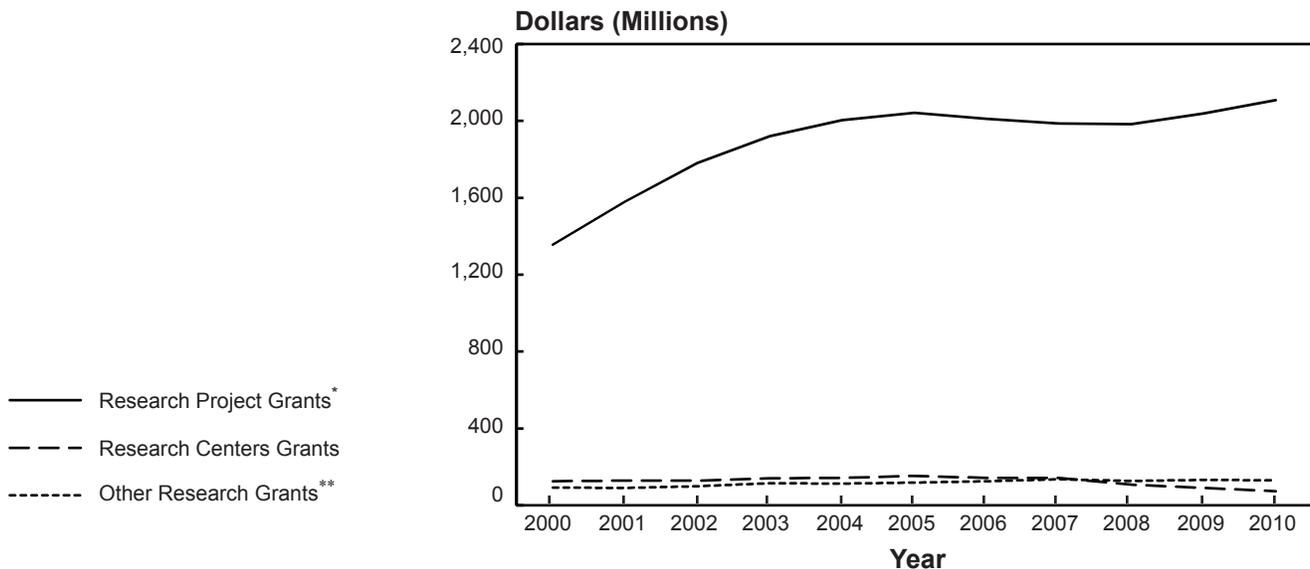
NHLBI Research Grants by Funding Mechanism: Fiscal Year 2010

	Number of Grants	Total Cost (Dollars in Thousands)	Percent of Total NHLBI Research Grant Dollars
Research Project Grants (RPGs)			
Research Project Grants (Excluding Small Business RPGs)			
Regular Research Grants (R01)	3,086	\$1,382,729	59.85%
Program Project Grants (P01)	146	306,980	13.29
Cooperative Agreements (U01)	210	213,376	9.24
Explorative Developmental Grant (R21)	256	55,032	2.38
Method to Extend Research in Time (R37)	73	31,681	1.37
Exploratory/Developmental Grants Phase II (R33)	15	5,695	0.25
Clinical Trial Planning Grant (R34)	2	1,500	0.06
Clinical Planning Grant Cooperative Agreement (U34)	2	1,630	0.07
Academic Research Enhancement Award (R15)	11	2,960	0.13
NIH Director's Pioneer Award (DP1)	3	2,790	0.12
NIH Director's New Innovator's Award (DP2)	4	9,363	0.41
Research Transition Award (R00)	51	12,662	0.55
Cooperative Agreements (U19)	3	6,148	0.27
Linked Research Grant (RL1)	—	59	—
Subtotal, Research Project Grants (Excluding Small Business RPGs)	3,862	2,032,605	88.0
Small Business Research Project Grants			
Small Business Technology Transfer (STTR Phase I) (R41)	11	2,836	0.12
Small Business Technology Transfer (STTR Phase II) (R42)	12	5,570	0.24
Small Business Innovation Research (SBIR Phase I) (R43)	64	12,578	0.54
Small Business Innovation Research (SBIR Phase II) (R44)	78	54,935	2.38
Subtotal, Small Business Research Project Grants	165	75,919	3.28
Subtotal, Research Project Grants	4,027	2,108,524	91.28
Research Centers Grants			
Centers of Research Programs (P50)	22	57,278	2.48
Sickle Cell Centers (U54)	4	2,300	0.10
Centers for AIDS Research (P30)	—	3,368	0.15
Specialized Centers (Cooperative Agreements) (U54)	—	400	0.02
National Swine Research and Resource Center (U42)	—	555	0.02
Exploratory Grants (P20)	12	8,665	0.38
Subtotal, Research Centers Grants	38	72,566	3.14
Research Career Programs			
Mentored Research Development Award for Minority Faculty (K01)	6	804	0.03
Minority Institution Faculty Mentored Research Scientist Award (K01)	47	6,089	0.26
Mentored Scientist Development Award in Research Ethics (K01)	—	61	—
Independent Scientist Award (K02)	19	1,847	0.08
Pediatric Transfusion Medicine Academic Award (K07)	4	486	0.02
Cultural Competence and Health Disparities Academic Award (K07)	4	562	0.02
Clinical Investigator Scientist Award (K08)	218	28,165	1.22
Clinical Hematology Research Career Development Program (K12)	6	2,371	0.10
Genetics and Genomics of Lung Disease Career Development Program (K12)	8	3,194	0.14
Career Enhancement Award for Stem Cell Research (K18)	4	706	0.03
Career Transition Award (K22)	1	162	0.01
Mentored Patient-Oriented Research Career Development Award (K23)	160	22,368	0.97
Midcareer Investigator Award in Patient-Oriented Research (K24)	35	5,942	0.26
Mentored Quantitative Research Career Development Award (K25)	15	2,135	0.09
Career Transition Award (K99)	64	6,652	0.29
Subtotal, Research Career Programs	591	81,544	3.53
Other Research Grants			
Cooperative Clinical Research (U10, R10)	11	19,150	0.83
Minority Biomedical Research Support (S06, SC1, SC2)	11	2,540	0.11
Other (R13, R18, R24, R25, T15, U24, UH1)	120	26,011	1.13
Subtotal, Other Research Grants	142	47,701	2.06
Total, NHLBI Research Grants	4,798	\$2,310,335	100%

NHLBI Total Research Grants by Category



NHLBI Research Project Grants, Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 2000–2010



* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; and R34 and U34 beginning in 2010.

** Includes Research Career Programs; excludes General Research Support Grants.

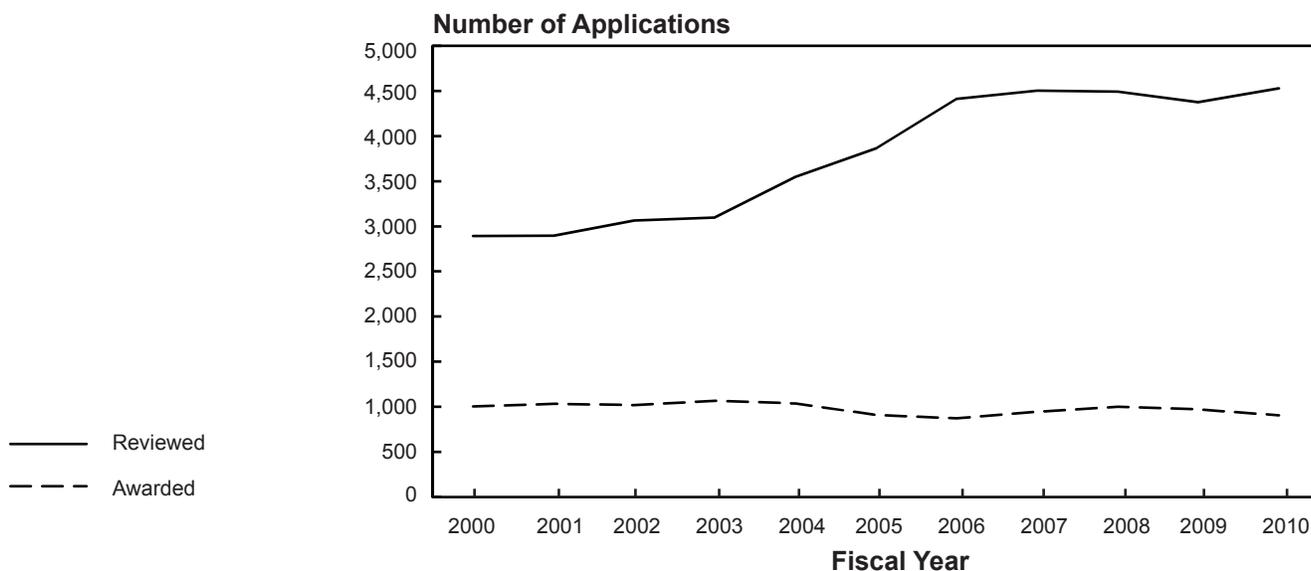
NHLBI Research Project Grants, Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 2000–2010

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Research Project Grants*	\$1,356,034	\$1,580,751	\$1,779,573	\$1,920,201	\$2,003,769	\$2,042,050	\$2,011,049	\$1,986,692	\$1,983,633	\$2,039,861	\$2,108,524
Research Centers Grants	123,803	127,232	128,161	138,941	140,600	151,495	141,086	141,034	107,393	90,152	72,566
Other Research Grants**	90,666	88,958	98,460	113,172	112,785	116,713	123,802	135,284	125,942	131,001	129,245
Total	\$1,570,503	\$1,796,941	\$2,006,194	\$2,172,314	\$2,257,154	\$2,310,258	\$2,275,937	\$2,263,010	\$2,216,968	\$2,261,014	\$2,310,335

* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; and R34 and U34 beginning in 2010.

** Includes Research Career Programs; excludes General Research Support Grants.

NHLBI Competing Research Project Grant Applications:^{*} Fiscal Years 2000–2010 Number Reviewed and Awarded

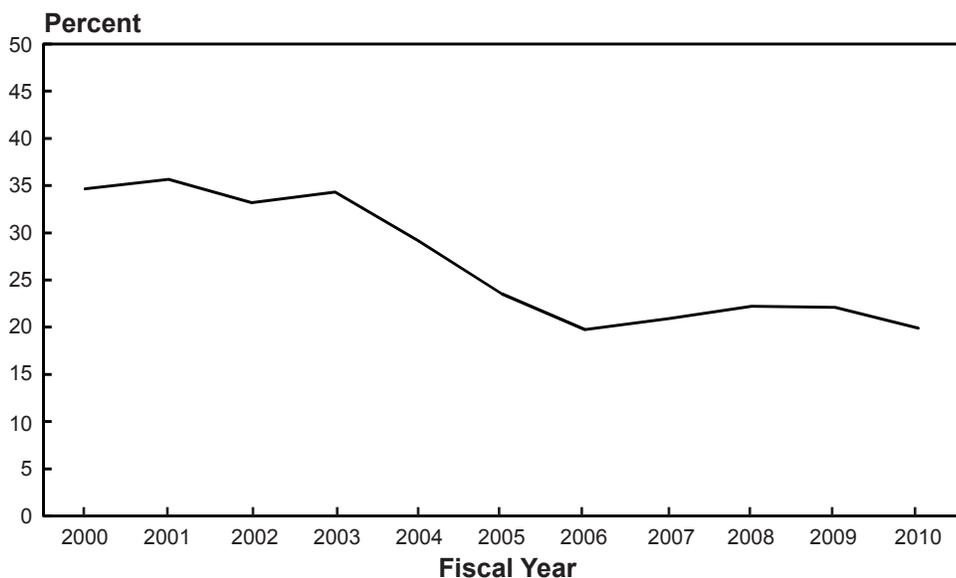


Number Reviewed and Awarded and Percent Funded

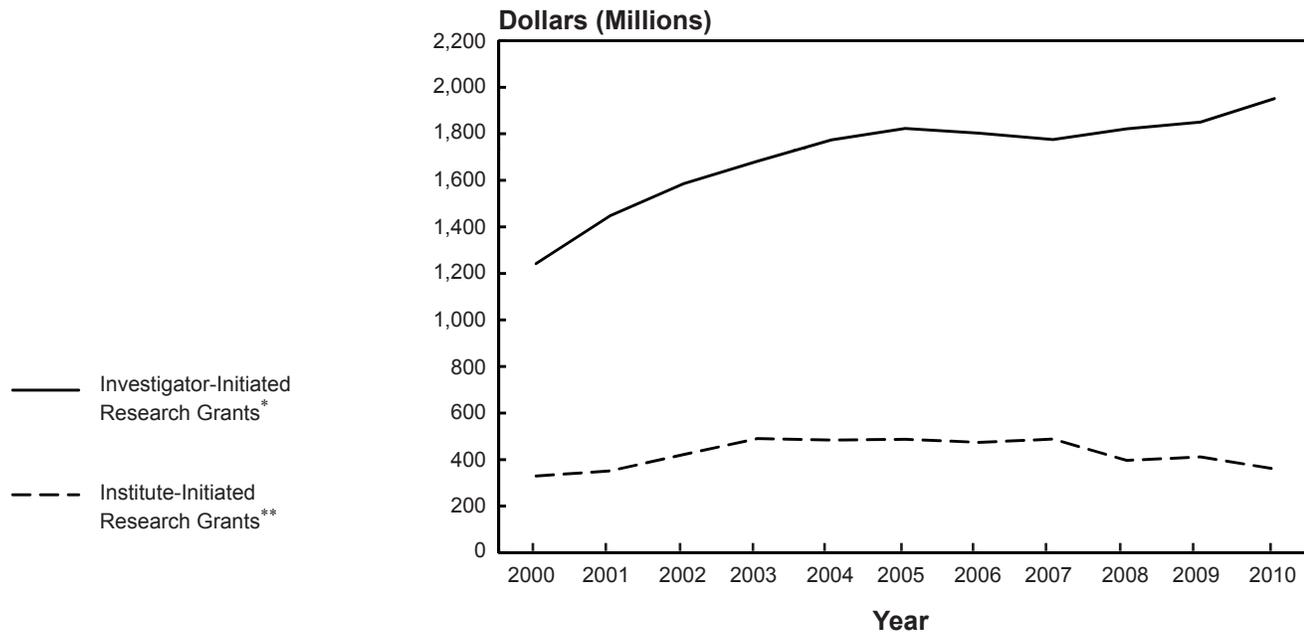
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Applications Reviewed	2,893	2,895	3,064	3,098	3,548	3,865	4,412	4,504	4,492	4,373	4,528
Applications Awarded	1,003	1,033	1,018	1,064	1,034	909	871	943	997	968	903
Percent Funded (Success Rate)	34.7	35.7	33.2	34.3	29.1	23.5	19.7	20.9	22.2	22.1	19.9

* Includes R01, U01, P01, R03, R15, R21, R29, and R37; R33 beginning in 2001; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; and R34 and U34 beginning in 2010.

Percent of Reviewed Applications Funded (Success Rate)



NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 2000–2010



* Includes RPGs, SBIRs/STTRs, Research Career Programs, and Other Research.

** Includes RPGs, Centers Grants, Research Career Programs, Other Research, and Cooperative Agreement RFAs.

NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 2000–2010

	Dollars (Millions)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Investigator-Initiated*	\$1,241.6	\$1,446.2	\$1,584.9	\$1,681.9	\$1,773.4	\$1,822.9	\$1,802.1	\$1,774.8	\$1,820.8	\$1,850.1	\$1,950.9
Institute-Initiated**	328.9	350.7	421.3	490.4	483.8	487.3	473.8	488.2	396.1	410.9	359.5
Total	\$1,570.5	\$1,796.9	\$2,006.2	\$2,172.3	\$2,257.2	\$2,310.2	\$2,275.9	\$2,263.0	\$2,216.9	\$2,261.0	\$2,310.4

* Includes RPGs, SBIRs/STTRs, Research Career Programs, and Other Research.

** Includes RPGs, Centers Grants, Research Career Programs, Other Research, and Cooperative Agreement RFAs.

NHLBI Research Project Grants: * Amount Funded by Type of Award, Fiscal Years 2000–2010

	Dollars (Millions)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Competing											
New Competing	\$ 266.4	\$ 280.0	\$ 291.2	\$ 285.5	\$ 290.5	\$ 270.0	\$ 242.9	\$ 330.9	\$ 314.2	\$ 340.2	\$ 330.5
Renewal Competing	152.0	143.9	143.9	177.2	185.5	176.1	168.3	169.4	196.9	172.6	171.6
Competing Supplements	0.9	0.4	2.3	1.0	1.3	1.7	0.4	—	1.7	0.3	0.3
Subtotal, Competing	419.3	424.3	437.4	463.7	477.3	447.8	411.6	500.3	512.8	513.1	501.8
Noncompeting											
Subtotal, Noncompeting	889.3	1,101.5	1,281.3	1,390.3	1,454.9	1,520.0	1,527.0	1,486.4	1,470.8	1,526.8	1,606.7
Total, Competing and Noncompeting	\$1,308.6	\$1,525.8	\$1,718.7	\$1,854.0	\$1,932.2	\$1,967.8	\$1,938.6	\$1,986.7	\$1,983.6	\$2,039.9	\$2,108.5

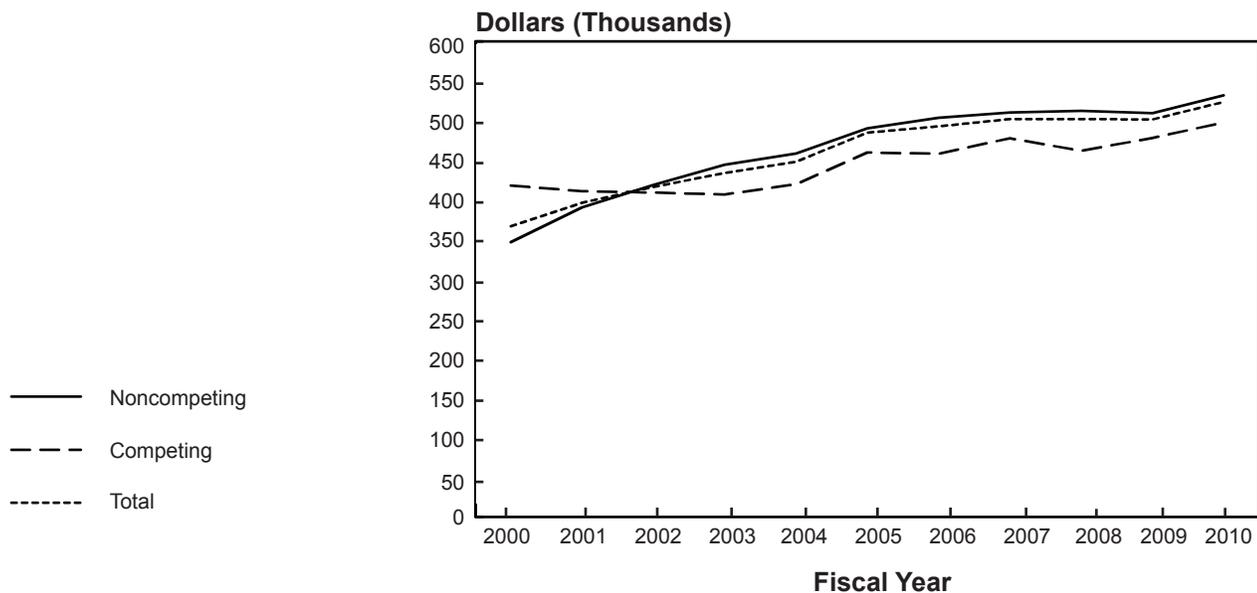
* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; and R34 and U34 beginning in 2010.

Facility and Administrative (F&A) Costs of NHLBI Research Project Grants: * Fiscal Years 2000–2010

Fiscal Year	Dollars (Thousands)			
	Direct Cost	F&A Cost	Total Cost	F&A Cost as a Percent of Direct Cost
2000	891,244	417,312	1,308,556	46.8
2001	1,045,144	480,673	1,525,817	46.0
2002	1,182,408	536,324	1,718,732	45.4
2003	1,276,819	577,131	1,853,950	45.2
2004	1,329,106	603,133	1,932,239	45.4
2005	1,355,803	612,007	1,967,810	45.1
2006	1,334,406	604,183	1,938,589	45.3
2007	1,378,134	608,558	1,986,692	44.2
2008	1,376,276	607,357	1,983,633	44.1
2009	1,410,033	629,828	2,039,861	44.7
2010	1,459,211	649,313	2,108,524	44.5

* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; and R34 and U34 beginning in 2010.

NHLBI Research Project Grants: * Average Costs, Fiscal Years 2000–2010



* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; and R34 and U34 beginning in 2010.

NHLBI Research Project Grants: * Average Costs, Fiscal Years 2000–2010

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Noncompeting	\$346.6	\$390.7	\$418.8	\$444.4	\$458.7	\$490.6	\$503.9	\$510.3	\$512.4	\$509.8	\$532.2
Competing	418.0	410.8	409.1	406.7	419.7	459.9	458.1	477.8	462.0	478.2	497.9
Total	\$366.6	\$396.1	\$416.2	\$433.8	\$447.9	\$484.8	\$492.8	\$501.7	\$501.8	\$501.4	\$523.6

* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; and R34 and U34 beginning in 2010.

NHLBI Cooperative Agreements (U01, U10, U19) Programs

Cooperative Agreements were instituted to support discrete, circumscribed projects in areas of an investigator's specific interest and competency with substantial programmatic participation by the NHLBI during performance of the activity.

	Total Obligations Prior to FY 2010	Total FY 2010 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
AIM HIGH: Niacin Plus Statin To Prevent Vascular Events	\$ 15,518,128	\$ 5,568,478	\$ 21,086,606
ARIC Neurocognitive Study (ARIC-NCS)	—	4,024,211	4,024,211
Cardiovascular Cell Therapy Research Network	18,219,368	6,199,959	24,419,327
Cardiovascular Health Study (CHS) Events Follow-Up Study	5,857,326	1,247,777	7,105,103
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)	21,413,274	4,413,950	25,827,224
Catheter Ablation Versus Antiarrhythmic Drug Therapy for Atrial Fibrillation (CABANA) Trial	2,940,676	3,044,967	5,985,643
Center for Cardiovascular Outcomes Research	—	5,203,594	5,203,594
Childhood Obesity Prevention and Treatment Research (COPTR)	—	4,058,435	4,058,435
Claudication Exercise Versus Endoluminal Revascularization (CLEVER)	6,567,493	1,079,923	7,647,416
Clinical Research Consortium To Improve Resuscitation Outcomes	40,203,762	6,243,690	46,447,452
Community-Responsive Intervention To Reduce Cardiovascular Risk in American Indians and Alaska Natives	8,882,655	2,070,651	10,953,306
Diabetes Prevention Program Outcomes Study—Phase II	1,100,000	1,100,000	2,200,000
Dynamic Evaluation of Percutaneous Coronary Intervention	7,681,543	732,168	8,413,711
Early Adult Reduction of Weight Through Lifestyle Intervention (EARLY) Trials*	4,656,109	5,863,594	10,519,703
Effectiveness Research on Smoking Cessation in Hospitalized Patients	—	3,321,649	3,321,649
Genetics of Coronary Artery Disease in Alaskan Natives (GOCADAN)	17,365,899	138,160	17,504,059
Heart Failure Clinical Research Network	29,194,950	262,170	29,457,120
Improved Measures of Diet and Physical Activity for the Genes and Environment Initiative	7,192,192	1,986,571	9,178,763
Look AHEAD: Action for Health in Diabetes	4,000,000	4,000,000	8,000,000
Network for Cardiothoracic Surgical Investigation in Cardiovascular Medicine	17,900,101	8,078,705	25,978,806
NHLBI Cardiac Development Consortium	1,113,042	7,126,599	8,239,641
NHLBI Pediatric Cardiac Genomics Consortium	1,370,839	3,772,602	5,143,441
NHLBI Pediatric Translational Consortium Administrative Coordinating Center	417,107	10,036,869	10,453,976
NHLBI Progenitor Cell Biology Consortium Research Hubs	22,721,547	24,066,547	46,788,094
Occluded Artery Trial (OAT)	21,223,324	1,032,987	22,256,311
Pediatric Heart Network	55,877,857	7,471,016	63,348,873
Pharmacogenetics Research Network	67,847,214	6,574,122	74,421,336
Practice-Based Opportunity for Weight Reduction (POWER) Trials	13,666,191	2,329,121	15,995,312
Ranolazine in Implantable Defibrillators (RAID) Trial	—	2,279,794	2,279,794
Rule Out Myocardial Infarction Using Computed Assisted Tomography (ROMICAT II)	2,111,994	2,307,194	4,419,188
Strong Heart Study	70,858,608	3,020,433	73,879,041
Surgical Treatment for Ischemic Heart Failure (STICH)	38,807,719	1,233,343	40,041,062
Therapeutic Hypothermia after Pediatric Cardiac Arrest (THAPCA) Trials	3,648,449	2,285,274	5,933,723
Translating Basic Behavior and Social Science Discoveries Into Interventions To Reduce Obesity	5,431,213	5,556,238	10,987,451
Subtotal, Heart and Vascular Diseases	513,788,580	147,730,791	661,519,371
Lung Diseases			
Asthma Networks (AsthmaNet)	8,300,000	15,500,000	23,800,000
Childhood Asthma Management Program—Continuation Study (CAMP-CS)/ Phase III	5,188,779	2,065,318	7,254,097
COPD Clinical Research Network	43,180,386	3,150,000	46,330,386

	Total Obligations Prior to FY 2010	Total FY 2010 Obligations	Total Obligations to Date
Lung Diseases (continued)			
Genetic Epidemiology of COPD	23,297,945	7,731,991	31,029,936
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)	1,469,184	775,690	2,244,874
Microbiome of the Lung and Respiratory Tract in HIV-Infected and in HIV-Uninfected Controls	5,390,250	5,352,755	10,743,005
Novel Therapies for Lung Diseases—Phase II	—	7,593,739	7,593,739
Pharmacogenetics of Asthma Treatment	27,005,538	1,992,800	28,998,338
Prematurity and Respiratory Outcomes Program (PROP)	—	1,597,280	1,597,280
Preterm Birth in Nulliparous Women: An Understudied Population at Great Risk	—	500,000	500,000
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea	8,501,620	1,674,567	10,176,187
Randomized Trial of Antenatal Late Preterm Steroids (ALPS)	—	2,133,947	2,133,947
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma	2,510,256	2,465,649	4,975,905
Sedation Management in Pediatric Patients With Acute Respiratory Failure	4,452,227	3,326,889	7,779,116
Study of Acid Reflux Therapy for Children With Asthma	3,345,010	762,974	4,107,984
Study of Asthma and Nasal Steroids (STAN)	724,724	724,812	1,449,536
Study of Soy Isoflavones in Asthma (SOYA)	774,607	697,247	1,471,854
Trial of Late Surfactant (TOLSURF) To Prevent Bronchopulmonary Dysplasia (BPD)	1,986,898	1,778,953	3,765,851
Subtotal, Lung Diseases	136,127,424	59,824,611	195,952,035
Blood Diseases and Resources			
Acute Venous Thrombosis: Thrombus Removal with Adjunctive Catheter-Directed Thrombolysis (ATTRACT)**	4,178,531	2,094,006	6,272,537
Blood and Marrow Transplant Clinical Research Network	56,563,600	2,507,421	59,071,021
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)	17,852,750	1,778,230	19,630,980
Study of Low Molecular Weight Heparin as a Bridge Before or After Surgery or a Procedure (BRIDGE)†	10,305,131	5,226,772	15,531,903
Transfusion Medicine/Hemostasis Clinical Research Network	50,450,201	6,589,859	57,040,060
Subtotal, Blood Diseases and Resources	139,350,213	18,196,288	157,546,501
Total, NHLBI Cooperative Agreements	\$789,266,217	\$225,751,690	\$1,015,017,907

* Formerly known as Targeted Approaches to Weight Control for Young Adults.

** Formerly known as Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT (ATTRACT) Trial.

† Formerly known as Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial.

Heart and Vascular Diseases Program

AIM HIGH: Niacin Plus Statin To Prevent Vascular Events, Initiated in Fiscal Year 2005

The purpose of this multicenter clinical trial is to determine whether extended-release niacin plus simvastatin is superior to simvastatin alone, at comparable levels of in-treatment LDL cholesterol, for preventing or delaying a major CVD event over a 4-year median follow-up period in patients with atherogenic dyslipidemia. Niacin is used to raise HDL (“good”) cholesterol and simvastatin is used to lower LDL (“bad”) cholesterol.

Obligations

Funding History:

Fiscal Year 2010—\$5,568,478

Fiscal Years 2005–2009—\$15,518,128

Total Funding to Date—\$21,086,606

Current Active Organizations and Grant Numbers

1. University of Washington
Seattle, Washington —HL-081616
2. AXIO Research, LLC
Seattle, Washington —HL-081649

ARIC Neurocognitive Study (ARIC-NCS), Initiated in Fiscal Year 2010

The purpose of this study is to determine whether mid-life vascular risk factors and markers of macrovascular and microvascular disease are predictive of dementia, mild cognitive impairment, and cognitive change in a large biracial prospective ARIC cohort.

Obligations

Funding History:

Fiscal Year 2010—\$4,024,211

Total Funding to Date—\$4,024,211

Current Active Organizations and Grant Numbers

1. Johns Hopkins University
Baltimore, Maryland —HL-096812
2. University of North Carolina
Chapel Hill, North Carolina —HL-096814
3. University of North Carolina
Chapel Hill, North Carolina —HL-096899
4. University of Minnesota
Minneapolis, Minnesota —HL-096902
5. University of Mississippi Medical Center
Jackson, Mississippi —HL-096917

Cardiovascular Cell Therapy Research Network, Initiated in Fiscal Year 2007

See Chapter 11. Clinical Trials.

Cardiovascular Heart Study (CHS) Events Follow-Up Study, Initiated in Fiscal Year 2006

The purpose of this project is to evaluate the incidence and determinants of CHD and health in 1,964 surviving participants aged 80 years and older. The incidence of CVD in the oldest participants will be related to demographic variables; measures of disability, physical functioning, and cognitive function; measures of subclinical disease; and traditional and novel clinical risk factors and their changes over time. Seventeen percent of the participants are from minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$1,247,777

Fiscal Years 2006–2009—\$5,857,326

Total Funding to Date—\$7,105,103

Current Active Organization and Grant Number

1. University of Washington
Seattle, Washington —HL-080295

Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL), Initiated in Fiscal Year 2004

The purpose of this trial is to determine whether revascularization of a stenotic renal artery plus medical therapy is associated with improved clinical outcomes compared with medical therapy alone.

Obligations

Funding History:

Fiscal Year 2010—\$4,413,950

Fiscal Years 2004–2009—\$21,413,274

Total Funding to Date—\$25,827,224

Current Active Organizations and Grant Numbers

1. University of Toledo Health
Sciences Campus
Toledo, Ohio —HL-071556
2. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-072734
3. University of Virginia
Charlottesville, Virginia —HL-072735

4. Mid-America Heart Institute of
St. Luke Hospital
Kansas City, Missouri —HL-072736
5. Beth Israel Deaconess Medical Center
Boston, Massachusetts —HL-072737

Catheter Ablation Versus Antiarrhythmic Drug Therapy for Atrial Fibrillation (CABANA), Initiated in Fiscal Year 2009

The purpose of this trial is to determine whether percutaneous left atrial catheter ablation is superior to current pharmacologic therapy for eliminating atrial fibrillation.

Obligations

Funding History:

Fiscal Year 2010—\$3,044,967

Fiscal Year 2009—\$2,940,676

Total Funding to Date—\$5,985,643

Current Active Organizations and Grant Numbers

1. Mayo Clinic, College of Medicine
Rochester, Minnesota —HL-089645
2. Mayo Clinic, College of Medicine
Rochester, Minnesota —HL-089709
3. Duke University
Durham, North Carolina —HL-089786
4. Duke University
Durham, North Carolina —HL-089907

Center for Cardiovascular Outcomes Research, Initiated in Fiscal Year 2010

The purpose of this program is to conduct cardiovascular outcomes and comparative effectiveness research—natural experiments, quasi-experimental research, and practice-based trials—that focuses on patient- and clinician-relevant outcomes of health care and the determinants of these outcomes. The goal is to directly inform public policy and clinical practice.

Obligations

Funding History:

Fiscal Year 2010—\$5,203,594

Total Funding to Date—\$5,203,594

Current Active Organizations and Grant Numbers

1. University of Massachusetts Medical School
Worcester, Massachusetts —HL-105268

2. Yale University
New Haven, Connecticut —HL-105270
3. Boston Medical Center
Boston, Massachusetts —HL-105342
4. Duke University
Durham, North Carolina —HL-107023

Childhood Obesity Prevention and Treatment Research (COPTR), Initiated in Fiscal Year 2010

See Chapter 11. Clinical Trials.

Claudication: Exercise Versus Endoluminal Revascularization, Initiated in Fiscal Year 2005

The purpose of this study is to test the hypothesis that a strategy of aortoiliac stenting and pharmacotherapy improves maximum walking duration better than a strategy of supervised rehabilitation, exercise, and pharmacotherapy for those with aortoiliac artery obstruction at 6 months. Other objectives are to compare the two treatment groups with a third group, usual care and pharmacotherapy, at 6 months, and to compare maximum walking duration change scores at 18 months, changes in free living daily activity levels, and patient-perceived quality of life among all three groups.

Obligations

Funding History:

Fiscal Year 2010—\$1,079,923

Fiscal Years 2005–2009—\$6,567,493

Total Funding to Date—\$7,647,416

Current Active Organizations and Grant Numbers

1. Rhode Island Hospital
Providence, Rhode Island —HL-077221
2. Beth Israel Deaconess Medical Center
Boston, Massachusetts —HL-081656

Clinical Research Consortium To Improve Resuscitation Outcomes, Initiated in Fiscal Year 2004

See Chapter 11. Clinical Trials.

Community-Responsive Intervention To Reduce Cardiovascular Risk in American Indians and Alaska Natives, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Diabetes Prevention Program Outcomes Study— Phase II, Initiated in Fiscal Year 2009

See Chapter 11. Clinical Trials.

Dynamic Evaluation of Percutaneous Coronary Intervention, Initiated in Fiscal Year 1997

The purpose of this program, which complements prior NHLBI percutaneous transluminal coronary angioplasty (PTCA) registries and the New Approaches to Coronary Intervention Registry, is to evaluate patterns of device usage and the immediate and follow-up outcomes in patients who are undergoing percutaneous transluminal coronary revascularization. Results will provide guidance to the cardiology community in selecting appropriate therapies and designing clinical trials to evaluate competing devices. Twenty-four percent of the patients are from various racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$732,168

Fiscal Years 1997–2009—\$7,681,543

Total Funding to Date—\$8,413,711

Current Active Organization and Grant Number

1. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-033292

Early Adult Reduction of Weight Through Lifestyle Intervention (EARLY) Trials,* Initiated in Fiscal Year 2009

See Chapter 11. Clinical Trials.

Effectiveness Research on Smoking Cessation in Hospitalized Patients, Initiated in Fiscal Year 2010

See Chapter 11. Clinical Trials.

Genetics of Coronary Artery Disease in Alaska Natives (GOCADAN), Initiated in Fiscal Year 2000

The purpose of this study is to document CVD and CVD risk factors in approximately 40 extended families (1,214 members from villages in Northern Alaska).

Scientists seek to identify and characterize genes that contribute to CVD in this unique and understudied population.

Obligations

Funding History:

Fiscal Year 2010—\$138,160

Fiscal Years 2000–2009—\$17,365,899

Total Funding to Date—\$17,504,059

Current Active Organization and Grant Number

1. MedStar Research Institute
Hyattsville, Maryland —HL-064244

Heart Failure Clinical Research Network, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Improved Measures of Diet and Physical Activity for the Genes and Environment Initiative, Initiated in Fiscal Year 2007

The purpose of this program is to support the development of devices to improve diet and physical activity. The program is part of the Genes and Environment Initiative, a 4-year NIH-wide program designed to lay the foundation for understanding the complex interplay between genetic and environmental factors in human diseases.

Obligations

Funding History:

Fiscal Year 2010—\$1,986,571

Fiscal Years 2007–2009—\$7,192,192

Total Funding to Date—\$9,178,763

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-091736
2. Massachusetts Institute of Technology
Cambridge, Massachusetts —HL-091737
3. Princeton Multimedia Technologies
Corporation
Princeton, New Jersey —HL-091738

Look AHEAD: Action for Health in Diabetes, Initiated in Fiscal Year 2009

See Chapter 11. Clinical Trials.

* Formerly known as Targeted Approaches to Weight Control for Young Adults.

Network for Cardiothoracic Surgical Investigation in Cardiovascular Medicine, Initiated in Fiscal Year 2007

See Chapter 11. Clinical Trials.

NHLBI Cardiac Development Consortium, Initiated in Fiscal Year 2009

The purpose of this study is to gain complete understanding of the regulatory networks controlling cardiovascular development. A consortium of multidisciplinary research teams will select key regulatory pathways, identify components of the pathways and targets, and rapidly disseminate data to the scientific community. Research results may lead to the development of regenerative therapies and tissue engineering approaches.

Obligations

Funding History:

Fiscal Year 2010—\$7,126,599

Fiscal Year 2009—\$1,113,042

Total Funding to Date—\$8,239,641

Current Active Organizations and Grant Numbers

1. University of Utah
Salt Lake City, Utah —HL-098160
2. Harvard University Medical School
Boston, Massachusetts —HL-098166
3. J. David Gladstone Institutes
San Francisco, California —HL-098179
4. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-098180

NHLBI Pediatric Cardiac Genomics Consortium, Initiated in Fiscal Year 2009

The purpose of this study is to conduct clinical and translational research on the genetic causes of congenital heart disease and genetic contributions to outcome in individuals with congenital heart disease.

Obligations

Funding History:

Fiscal Year 2010—\$3,772,602

Fiscal Year 2009—\$1,370,839

Total Funding to Date—\$5,143,441

Current Active Organizations and Grant Numbers

1. Mount Sinai School of Medicine
New York, New York —HL-098123

2. Children's Hospital Boston
Boston, Massachusetts —HL-098147
3. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-098153
4. Yale University
New Haven, Connecticut —HL-098162
5. Columbia University Health Sciences
New York, New York —HL-098163

NHLBI Pediatric Translational Consortium Administrative Coordinating Center, Initiated in Fiscal Year 2009

The purpose of this Coordinating Center is to provide administrative support for the Cardiovascular Development Consortium and the Pediatric Cardiac Genomics Consortium, monitor multicenter patient recruitment by the Pediatric Cardiac Genomics Consortium, and administer funds to consortium-wide Cores.

Obligations

Funding History:

Fiscal Year 2010—\$10,036,869

Fiscal Year 2009—\$417,107

Total Funding to Date—\$10,453,976

Current Active Organization and Grant Number

1. New England Research Institute, Inc.
Watertown, Massachusetts —HL-98188

NHLBI Progenitor Cell Biology Consortium Research Hubs, Initiated in Fiscal Year 2009

The purpose of this study is to establish virtual research hubs that focus on progenitor cell biology. Investigators will seek to identify and characterize progenitor cell lineages, direct the differentiation of stem and progenitor cells to desired cell fates, and develop new strategies to address the unique challenges presented by the transplantation of these cells.

Obligations

Funding History:

Fiscal Year 2010—\$24,066,547

Fiscal Year 2009—\$22,721,547

Total Funding to Date—\$46,788,094

Current Active Organizations and Grant Numbers

1. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-099656
2. University of Wisconsin, Madison
Madison, Wisconsin —HL-099773

3. Johns Hopkins University Baltimore, Maryland	—HL-099775
4. Stanford University Stanford, California	—HL-099776
5. Fred Hutchinson Cancer Research Center Seattle, Washington	—HL-099993
6. Stanford University Stanford, California	—HL-099995
7. University of Maryland Baltimore, Maryland	—HL-099997
8. Stanford University Stanford, California	—HL-099999
9. Children’s Hospital Boston Boston, Massachusetts	—HL-100001
10. Fred Hutchinson Cancer Research Center Seattle, Washington	—HL-100395
11. Stanford University Stanford, California	—HL-100397
12. Vanderbilt University Nashville, Tennessee	—HL-100398
13. University of Texas Southwestern Medical Center Dallas, Texas	—HL-100401
14. Massachusetts General Hospital Boston, Massachusetts	—HL-100402
15. University of Pennsylvania Philadelphia, Pennsylvania	—HL-100405
16. J. David Gladstone Institutes San Francisco, California	—HL-100406
17. University of Minnesota, Twin Cities Minneapolis, Minnesota	—HL-100407
18. Massachusetts General Hospital Boston, Massachusetts	—HL-100408

Occluded Artery Trial (OAT), Initiated in Fiscal Year 1999

The purpose of this study is to determine whether percutaneous revascularization to open an occluded artery within a few days or as long as a month following an acute MI in asymptomatic patients improves their outcome. Although the benefits of early restoration of blood flow following an acute MI have been well-established, it is not known whether later intervention is also beneficial. The trial is in a long-term follow-up phase.

Obligations

Funding History:

Fiscal Year 2010—\$1,032,987
Fiscal Years 1999–2009—\$21,223,324
Total Funding to Date—\$22,256,311

Current Active Organizations and Grant Numbers

1. New York University School of Medicine New York, New York	—HL-062509
2. Clinical Trials and Surveys Corporation Owings Mills, Maryland	—HL-062511

Pediatric Heart Network, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Pharmacogenetics Research Network, Initiated in Fiscal Year 2001

The purpose of this study is to establish a network to systematically evaluate candidate genes that may influence pharmacologic response to drug treatments for arrhythmia, heart failure, hypertension, and lipid disorders. Investigators seek to identify gene polymorphisms capable of predicting drug toxicity and efficacy. One of the projects has 38 percent minority participation.

Obligations

Funding History:

Fiscal Year 2010—\$6,574,122
Fiscal Years 2001–2009—\$67,847,214
Total Funding to Date—\$74,421,336

Current Active Organizations and Grant Numbers

1. Vanderbilt University Nashville, Tennessee	—HL-065962
2. Children’s Hospital and Research Center Oakland, California	—HL-069757
3. University of Maryland Baltimore, Maryland	—HL-105198

Practice-Based Opportunity for Weight Reduction (POWER) Trials,* Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Ranolazine in Implantable Defibrillators (RAID) Trial, Initiated in Fiscal Year 2010

The purpose of this clinical trial is to determine whether ranolazine will reduce the risk of ventricular arrhythmias and improve survival in high-risk patients who already have an implantable cardiac defibrillator. Currently,

* Formerly known as Weight-Loss in Obese Adults With Cardiovascular Risk Factors.

very few options are available for treating patients at risk for ventricular arrhythmias—which often leads to death—and ranolazine may be a safe and effective treatment.

Funding History:

Fiscal Year 2010—\$2,279,794
Total Funding to Date—\$2,279,794

Current Active Organizations and Grant Numbers

1. University of Rochester
Rochester, New York —HL-096607
2. University of Rochester
Rochester, New York —HL-096610

Rule Out Myocardial Infarction Using Computed Assisted Tomography (ROMICAT II), Initiated in Fiscal Year 2009

The purpose of this study is to determine whether using cardiac computed assisted tomography early in the emergency department triage process will enable immediate and safe discharge without further testing of a significant number of patients with acute chest pain.

Obligations

Funding History:

Fiscal Year 2010—\$2,307,194
Fiscal Year 2009—\$2,111,994
Total Funding to Date—\$4,419,188

Current Active Organizations and Grant Numbers

1. Massachusetts General Hospital
Boston, Massachusetts —HL-092022
2. Massachusetts General Hospital
Boston, Massachusetts —HL-092040

Strong Heart Study, Initiated in Fiscal Year 1988

The objectives of this study are to survey CVD morbidity and mortality rates among three geographically diverse groups of American Indians and to estimate their levels of CVD risk factors. Phases II and III of the cohort study extended surveillance of community mortality and assessed development of CVD and changes in CVD risk factors. In Phase III, investigators added a substudy of asthma and a pilot family study. Phase IV expanded the family study to 120 families comprising 3,600 members to investigate genetic and environmental contributors of CVD. Phase V examined the family study cohort to assess genetic relationships to risk factor change over a 5-year period and initiated surveillance for cardiovascular morbidity and mortality.

Obligations

Funding History:

Fiscal Year 2010—\$3,020,433
Fiscal Years 1988–2009—\$70,858,608
Total Funding to Date—\$73,879,041

Current Active Organizations and Grant Numbers

1. Medstar Research Institute
Hyattsville, Maryland —HL-041642
2. Missouri Breaks Research, Inc.
Timberlake, South Dakota —HL-041652
3. University of Oklahoma
Oklahoma City, Oklahoma —HL-041654
4. Weill Medical College
New York, New York —HL-065521

Surgical Treatment for Ischemic Heart Failure (STICH), Initiated in Fiscal Year 2002

The objectives of this clinical trial are to determine whether (a) the addition of CABG to intensive medical therapy improves long-term survival of patients with heart failure and left ventricular (LV) dysfunction who have coronary artery disease amenable to surgical revascularization or (b) CABG plus surgical ventricular reconstruction to a more normal LV size improves survival free of subsequent hospitalizations of patients with anterior LV dysfunction, compared with CABG alone. Investigators found that CABG plus ventricular reconstruction offers no benefit over CABG alone.

Obligations

Funding History:

Fiscal Year 2010—\$1,233,343
Fiscal Years 2002–2009—\$38,807,719
Total Funding to Date—\$40,041,062

Current Active Organizations and Grant Numbers

1. Duke University
Durham, North Carolina —HL-069013
2. Duke University
Durham, North Carolina —HL-069015

Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA) Trials, Initiated in Fiscal Year 2009

The purpose of this program is to determine whether therapeutic hypothermia after pediatric cardiac arrest improves outcomes, including survival, in infants and

children. Approximately 50 percent of the patients are expected to come from racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$2,285,274

Fiscal Year 2009—\$3,648,449

Total Funding to Date—\$5,933,723

Current Active Organizations and Grant Numbers

1. University of Utah
Salt Lake City, Utah —HL-094339
2. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-094345

Translating Basic Behavioral and Social Science Discoveries Into Interventions To Reduce Obesity, Initiated in Fiscal Year 2009

The purpose of this study is to develop innovative obesity-reducing strategies that should be effective in small-scale trials, acceptable to target populations of interest, and ready to be tested in large-scale randomized clinical and community trials. Some of the projects are expected to have 50–100 percent participation from minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$5,556,238

Fiscal Year 2009—\$5,431,213

Total Funding to Date—\$10,987,451

Current Active Organizations and Grant Numbers

1. Claremont Graduate University
Claremont, California —HL-097839
2. Weill Medical College of
Cornell University
New York, New York —HL-097843
3. Wayne State University
Detroit, Michigan —HL-097889
4. Rush University Medical Center
Chicago, Illinois —HL-097894
5. University of California, San Francisco
San Francisco, California —HL-097973

Lung Diseases Program

Asthma Networks (AsthmaNet)

See Chapter 11. Clinical Trials.

Childhood Asthma Management Program—Continuation Study (CAMP–CS)/Phase III, Initiated in Fiscal Year 2007

The objective of this observational study is to follow the original CAMP cohort for 4 more years (through ages 21–29) to determine clinical and genetic risk factors for patterns of lung function decline indicative of chronic air flow obstruction in later adulthood; 31 percent of the participants are from minority groups.

Obligations

Funding History:

Fiscal Year 2010—\$2,065,318

Fiscal Years 2007–2009—\$5,188,779

Total Funding to Date—\$7,254,097

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-075232
2. Hospital for Sick Children
Toronto, Ontario —HL-075407
3. Johns Hopkins University
Baltimore, Maryland —HL-075408
4. Asthma, Inc.
Seattle, Washington —HL-075409
5. University of California, San Diego
La Jolla, California —HL-075415
6. National Jewish Medical
and Research Center
Denver, Colorado —HL-075416
7. Johns Hopkins University
Baltimore, Maryland —HL-075417
8. Brigham and Women’s Hospital
Boston, Massachusetts —HL-075419
9. University of New Mexico
Albuquerque, New Mexico —HL-075420

COPD Clinical Research Network, Initiated in Fiscal Year 2003

See Chapter 11. Clinical Trials.

Genetic Epidemiology of COPD, Initiated in Fiscal Year 2007

The purpose of this study is to perform a genome-wide association analysis to identify the genetic risk factors that determine susceptibility for COPD and COPD-related phenotypes in a large biracial population. Investigators are using computer tomography and clinical and physiological measures to separate the broad COPD syndrome into clinically significant subtypes.

Obligations

Funding History:

Fiscal Year 2010—\$7,731,991

Fiscal Years 2007–2009—\$23,297,945

Total Funding to Date—\$31,029,936

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-089856
2. National Jewish Medical and
Research Center
Denver, Colorado —HL-089897

Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS), Initiated in Fiscal Year 2008

The purpose of this randomized clinical trial is to assess the efficacy and safety of 7 percent hypertonic saline inhaled twice daily for 48 weeks among infants with CF aged 4 to 15 months at enrollment. Investigators are seeking to determine whether hypertonic saline will improve hyperinflation and obstructive lung disease as measured by infant lung function testing compared with the control agent (isotonic saline).

Obligations

Funding History:

Fiscal Year 2010—\$775,690

Fiscal Years 2008–2009—\$1,469,184

Total Funding to Date—\$2,244,874

Current Active Organizations and Grant Numbers

1. Children's Hospital and Regional
Medical Center
Seattle, Washington —HL-092931
2. University of Washington
Seattle, Washington —HL-092932

Microbiome of the Lung and Respiratory Tract in HIV-Infected Individuals and HIV-Uninfected Controls, Initiated in Fiscal Year 2009

The purpose of this study is to characterize the microbiome of the lung alone or in combination with the upper airways in HIV-infected individuals and matched HIV-uninfected controls. Investigators will use molecular techniques to identify bacteria, and if possible, other organisms (e.g., viruses, cell-wall deficient organisms, protozoa, and fungi). Data will be used to examine the effects of changes in the respiratory microbiome on the pathogenesis and progression of HIV disease, HIV-related respiratory complications, and anti-HIV therapies.

Obligations

Funding History:

Fiscal Year 2010—\$5,352,755

Fiscal Year 2009—\$5,390,250

Total Funding to Date—\$10,743,005

Current Active Organizations and Grant Numbers

1. University of Pennsylvania
Philadelphia, Pennsylvania —HL-098957
2. George Washington University
Washington, DC —HL-098958
3. Indiana University-Purdue University
at Indianapolis
Indianapolis, Indiana —HL-098960
4. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-098961
5. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-098962
6. University of California, San Francisco
San Francisco, California —HL-098964
7. University of Colorado
Denver, Colorado —HL-098966

Novel Therapies for Lung Diseases—Phase II, Initiated in Fiscal Year 2010

See Chapter 11. Clinical Trials.

Pharmacogenetics of Asthma Treatment, Initiated in Fiscal Year 2000

The objective of this project is to bring together research experts in asthma, epidemiology, statistics, bioinformatics, physiology, clinical trials, genetics, and genomics to focus on the pharmacogenetics of asthma treatment.

Obligations

Funding History:

Fiscal Year 2010—\$1,992,800

Fiscal Years 2000–2009—\$27,005,538

Total Funding to Date—\$28,998,338

Current Active Organization and Grant Number

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-065899

Prematurity and Respiratory Outcomes Program (PROP), Initiated in Fiscal Year 2010

The purpose of this observational clinical study is to investigate hypotheses on the molecular mechanisms that contribute to respiratory disease risk of the premature newborn with the long-term goal of improving outcomes in the first year of life.

Obligations

Funding History:

Fiscal Year 2010—\$1,597,280
Total Funding to Date—\$1,597,280

Current Active Organizations and Grant Numbers

1. Vanderbilt University
Nashville, Tennessee —HL-101456
2. Washington University
St. Louis, Missouri —HL-101465
3. University of Pennsylvania
Philadelphia, Pennsylvania —HL-101794
4. University of California, San Francisco
San Francisco, California —HL-101798
5. Children's Hospital Medical Center,
Cincinnati
Cincinnati, Ohio —HL-101800
6. University of Rochester
Rochester, New York —HL-101813

Preterm Birth in Nulliparous Women: An Understudied Population at Great Risk, Initiated in Fiscal Year 2010

The purpose of this study is to create a network of clinical research sites with a Data Coordinating and Analysis Center to develop common research protocols to study nulliparous women (women in their first pregnancies) to prevent preterm birth and other related adverse pregnancy outcomes.

Obligations

Funding History:

Fiscal Year 2010—\$500,000
Total Funding to Date—\$500,000

Current Active Organization and Grant Number

1. Research Triangle Institute
Research Triangle, North Carolina —HD-063036

Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea, Initiated in Fiscal Year 2006

The purpose of this randomized controlled study is to compare adenotonsillectomy and watchful waiting followed by reevaluation after 7 months for treatment of OSA in children aged 5 to 9 years; 75 percent of the participants are from various racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$1,674,567
Fiscal Years 2006–2009—\$8,501,620
Total Funding to Date—\$10,176,187

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-083075
2. University of Pennsylvania
Philadelphia, Pennsylvania —HL-083129

Randomized Trial of Antenatal Late Preterm Steroids (ALPS), Initiated in Fiscal Year 2010

The purpose of this study is to determine whether antenatal corticosteroids can potentially improve lung function and reduce respiratory morbidity in newborn infants who are born in the late preterm period (34–36 weeks). Studies have proved that steroids improve lung function in very premature infants but have not been evaluated in infants likely to deliver in the late preterm period. Fifty-five percent of the participants are expected to come from racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$2,133,947
Total Funding to Date—\$2,133,947

Current Active Organizations and Grant Numbers

1. George Washington University
Washington, DC —HL-098354
2. Columbia University Health Sciences
New York, New York —HL-098554

Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma, Initiated in Fiscal Year 2009

The purpose of this randomized clinical trial is to determine whether supplemental vitamin D to increase the level of vitamin D in a pregnant woman will prevent asthma and allergy in her child at age 3 years. Investigators will recruit 870 pregnant women who are in the first trimester of pregnancy. This sample will be randomized to one of two treatment arms of a 4-year clinical trial: 4,000 international units of vitamin D in addition to typical prenatal vitamins and typical prenatal vitamins alone. Currently, 70 percent of the participants are from racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$2,465,649

Fiscal Year 2009—\$2,510,267

Total Funding to Date—\$4,975,905

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-091075
2. Brigham and Women's Hospital
Boston, Massachusetts —HL-091528

Sedation Management in Pediatric Patients With Acute Respiratory Failure, Initiated in Fiscal Year 2008

The purpose of this randomized clinical trial is to test an innovative approach to sedation management that includes team education and consensus on the use of sedatives in pediatric patients supported on mechanical ventilation; team identification of each patient's trajectory of illness and daily prescription of a sedation goal; use of a nurse-implemented goal-directed comfort algorithm that guides moment-to-moment titration of opioids and benzodiazepines; and team feedback on sedation management performance. Investigators will randomize 2,754 critically ill infants and children into two study groups: sedation management intervention and usual care. Forty-five percent of the patients are from racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$3,326,889

Fiscal Years 2008–2009—\$4,452,227

Total Funding to Date—\$7,779,116

Current Active Organizations and Grant Numbers

1. University of Pennsylvania
Philadelphia, Pennsylvania —HL-086622
2. Children's Hospital Boston
Boston, Massachusetts —HL-086649

Study of Acid Reflux Therapy for Children With Asthma, Initiated in Fiscal Year 2006

The purpose of this randomized controlled clinical trial is to investigate whether an approved proton-pump inhibitor lansoprazole will reduce asthma exacerbations in children (aged 6–16 years) with poorly controlled asthma. Two-thirds of participants are from racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$762,974

Fiscal Years 2006–2009—\$3,345,010

Total Funding to Date—\$4,107,984

Current Active Organizations and Grant Numbers

1. University of Virginia
Charlottesville, Virginia —HL-080433
2. Johns Hopkins University
Baltimore, Maryland —HL-080450

Study of Asthma and Nasal Steroids (STAN), Initiated in Fiscal Year 2009

The purpose of this clinical trial is to determine whether the addition of treatment of chronic rhinitis and sinusitis with a nasal steroid will improve asthma control. Investigators will randomize 380 patients with poorly controlled asthma and chronic rhinitis/sinusitis to a nasal steroid or matching placebo in addition to their regular asthma treatment. One third of participants are expected to be from minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$724,812

Fiscal Year 2009—\$724,724

Total Funding to Date—\$1,449,536

Current Active Organizations and Grant Numbers

1. University of Vermont
Burlington, Vermont —HL-089464
2. Johns Hopkins University
Baltimore, Maryland —HL-089510

Study of Soy Isoflavones in Asthma (SOYA), Initiated in Fiscal Year 2009

The purpose of this double-blind, randomized controlled trial is to assess the effectiveness of genistein supplements (soy isoflavone) in improving lung function in patients with poorly controlled asthma. The study will include 380 patients with low dietary soy intake, ages 12 years and older, who are taking inhaled corticosteroids, leukotriene modifiers, or both and have poorly controlled asthma. Participants will be randomly assigned to treatment with either a soy isoflavone supplement (containing genistein, daidzein, and glycitein) 100 mg daily or to placebo for 6 months.

Thirty percent of participants are expected to be from minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$697,247

Fiscal Year 2009—\$774,607

Total Funding to Date—\$1,471,854

Current Active Organizations and Grant Numbers

1. Northwestern University
Evanston, Illinois —HL-087987
2. Johns Hopkins University
Baltimore, Maryland —HL-088367

Trial of Late Surfactant (TOLSURF) To Prevent Bronchopulmonary Dysplasia, Initiated in Fiscal Year 2009

The purpose of this randomized controlled clinical trial is to determine whether late doses of surfactant in addition to iNO administered to extremely low gestational age neonates (< 30 weeks) who require mechanical ventilation between 7 and 14 days of age will increase survival without bronchopulmonary dysplasia.

Obligations

Funding History:

Fiscal Year 2010—\$1,778,953

Fiscal Year 2009—\$1,986,898

Total Funding to Date—\$3,765,851

Current Active Organizations and Grant Numbers

1. University of California, San Francisco
San Francisco, California —HL-094338
2. University of California, San Francisco
San Francisco, California —HL-094355

Blood Diseases and Resources

Acute Venous Thrombosis: Thrombus Removal With Adjunctive Catheter-Directed Thrombolysis (ATTRACT),* Initiated in Fiscal Year 2008

The purpose of this study is to determine whether adjunctive pharmacomechanical catheter-directed thrombolysis, which includes intrathrombus administration of

recombinant tissue plasminogen activator, can prevent postthrombotic syndrome in patients with symptomatic proximal deep vein thrombosis (DVT) compared with optimal standard DVT therapy alone.

Obligations

Funding History:

Fiscal Year 2010—\$2,094,006

Fiscal Years 2008–2009—\$4,178,531

Total Funding to Date—\$6,272,537

Current Active Organizations and Grant Numbers

1. McMaster University
Hamilton, Ontario —HL-088118
2. Washington University
St. Louis, Missouri —HL-088476

Blood and Marrow Transplant Clinical Research Network, Initiated in Fiscal Year 2001

See Chapter 11. Clinical Trials.

Stroke With Transfusions Changing to Hydroxyurea (SWITCH), Initiated in Fiscal Year 2005

The purpose of this Phase III clinical trial is to compare standard therapy (transfusions and chelation) with alternative therapy (hydroxyurea and phlebotomy) for the prevention of secondary stroke and management of iron overload in children with sickle cell anemia. Additional objectives include comparisons of growth and development, frequency of nonstroke neurological and other sickle-related events, and quality of life. All of the participants are black.

Obligations

Funding History:

Fiscal Year 2010—\$1,778,230

Fiscal Years 2005–2009—\$17,852,750

Total Funding to Date—\$19,630,980

Current Active Organizations and Grant Numbers

1. St. Jude Children's Research Hospital
Memphis, Tennessee —HL-078787
2. Rho Federal Systems Division, Inc.
Chapel Hill, North Carolina —HL-078987

* Formerly known as Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT (ATTRACT) Trial.

Study of Low Molecular Weight Heparin as a Bridge Before or After Surgery or a Procedure (BRIDGE)* Trial, Initiated in Fiscal Year 2008

The purpose of this study is to determine the safety and efficacy of low molecular weight heparin (LMWH) in adults with atrial fibrillation who stop warfarin in preparation for surgery. The trial will randomly allocate 3,282 patients with atrial fibrillation to either LMWH or matching placebo before and after surgery. Investigators hypothesize that simply withholding warfarin in a peri-operative setting for patients with atrial fibrillation will not meaningfully increase the risk for arterial thromboembolism and will forestall hemorrhagic complications, compared with a strategy using LMWH before and after surgery. One-third of participants are expected to be from minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$5,226,772

Fiscal Year 2008–2009—\$10,305,131

Total Funding to Date—\$15,531,903

Current Active Organizations and Grant Numbers

1. Duke University
Durham, North Carolina —HL-086755
2. Duke University
Durham, North Carolina —HL-087229

Transfusion Medicine/Hemostasis Clinical Research Network, Initiated in Fiscal Year 2002

See Chapter 11. Clinical Trials.

* Formerly known as Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial.

NHLBI Centers of Research Program (P50)

The Centers of Research Program supports specialized centers that focus on multidisciplinary research and development from basic science to clinical investigation in response to announcements of the programmatic needs of the Institute. The spectrum of activities comprises a multifaceted attack on a specific disease entity or biomedical problem area.

NHLBI Centers of Research Program

Type of Center	Obligations (Dollars in Thousands)			
	Period of Operation	Prior to FY 2010	FY 2010	Total to Date
NIH Centers for Population and Health Disparities (CPHHD)	2010–	—	\$9,898	\$9,898
Subtotal, CPHHD		—	\$9,898	\$9,898
Specialized Centers of Clinically Oriented Research (P50)				
<i>Heart and Vascular Diseases Program</i>				
Vascular Injury, Repair, and Remodeling	2006–	57,170	12,473	69,643
Subtotal, Heart and Vascular Diseases Program		57,170	12,473	69,643
<i>Lung Diseases Program</i>				
Chronic Obstructive Pulmonary Disease	2007–	33,464	11,317	44,781
Host Factors in Chronic Lung Diseases	2006–	32,338	8,673	41,011
Pulmonary Vascular Disease	2007–	19,212	6,346	25,558
Subtotal, Lung Diseases Program		85,014	26,336	111,350
<i>Blood Diseases and Resources Program</i>				
Hemostatic and Thrombotic Diseases	2006–	32,554	8,570	41,124
Subtotal, Blood Diseases and Resources Program		32,554	8,570	41,124
Subtotal, SCCOR (P50)		\$174,738	\$47,379	\$222,117
Total, Centers of Research Program (P50)		\$174,738	\$57,277	\$232,015

NIH Centers for Population Health and Health Disparities (CPHHD) (P50)

The purpose of this program is to create centers of transdisciplinary research that will evaluate the multilevel determinants of health disparities and devise interventions to reduce them.

Obligations

Fiscal Year 2010—\$9,898,210

Current Active Organizations and Grant Numbers

1. Washington University St. Louis, Missouri	—HL-105184	3. Johns Hopkins University Baltimore, Maryland	—HL-105187
2. Northeastern University Boston, Massachusetts	—HL-105185	4. University of California, Los Angeles Los Angeles, California	—HL-105188
		5. Rush University Medical Center Chicago, Illinois	—HL-105189

Specialized Centers of Clinically Oriented Research (P50)

The NHLBI initiated the Specialized Centers of Research (SCOR) program in 1971 to encourage translational research—converting basic science findings to the clinic—in high priority areas. The SCOR concept emphasized multidisciplinary research (i.e., basic science and clinical investigations) on diseases relevant to the Institute’s mission. In 2002, the NHLBI revised the SCOR program—primarily on recommendation from the NHLBAC—to place more emphasis on clinical research projects. The SCCOR program still requires clinical and basic scientists to work together on a unified theme, but now requires at least 50 percent of the projects to be clinical. The SCOR program ended in 2008.

A description of the SCCORs supported by the Institute follows.

Heart and Vascular Diseases Program

Vascular Injury, Repair, and Remodeling

The purpose of this SCCOR is to foster multidisciplinary research on clinically relevant questions that will enable basic science findings to be more rapidly translated into clinical applications. Major goals of the program are to stimulate interdependent clinical and multidisciplinary basic research projects that investigate molecular and cellular mechanisms of vascular injury, repair, and remodeling; promote patient-oriented research that will improve our ability to prevent, detect, characterize, manage, and treat vascular diseases; and develop the skills and research capabilities of new clinical investigators.

Obligations

Fiscal Year 2010—\$12,472,870

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-083762
2. University of Texas Health
Science Center
Houston, Texas —HL-083794
3. University of Pennsylvania
Philadelphia, Pennsylvania —HL-083799
4. Stanford University
Stanford, California —HL-083800
5. Boston University Medical Campus
Boston, Massachusetts —HL-083801

Lung Diseases Program

Chronic Obstructive Pulmonary Disease

The purpose of this SCCOR is to foster multidisciplinary research to accelerate progress in the diagnosis, prevention, and treatment of COPD. The program will include a broad spectrum of basic and clinical research that will encompass animal models of COPD pathogenesis, human proteomic, genetic and genomic investigations, technologically refined disease phenotypes classification, and the development of new experimental therapeutic interventions.

Obligations

Fiscal Year 2010—\$11,317,450

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-084922

2. Weill Medical College
of Cornell University
New York, New York —HL-084936
3. Johns Hopkins University
Baltimore, Maryland —HL-084945
4. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-084948

Host Factors in Chronic Lung Diseases

The purpose of this SCCOR is to identify alterations in host responses and lung homeostasis and to determine how the dysregulation contributes to development or progression of chronic lung diseases. Enhanced understanding of these processes should facilitate identification of new targets for intervention, providing the basis for development of new therapeutic options for prevention and treatment of chronic lung diseases.

Obligations

Fiscal Year 2010—\$8,673,261

Current Active Organizations and Grant Numbers

1. Duke University
Durham, North Carolina —HL-084917
2. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-084932
3. University of North Carolina
Chapel Hill, North Carolina —HL-084934

Pulmonary Vascular Disease

The objective of this SCCOR is to facilitate multidisciplinary research that proposes original hypotheses and applies cutting-edge approaches, including genomics and proteomics, to clinical issues in pulmonary vascular disease.

Obligations

Fiscal Year 2010—\$6,345,936

Current Active Organizations and Grant Numbers

1. University of Colorado at Denver
Denver, Colorado —HL-084923
2. Johns Hopkins University
Baltimore, Maryland —HL-084946

Blood Diseases and Resources Program

Hemostatic and Thrombotic Diseases

The purpose of this SCCOR is to conduct multidisciplinary research to improve the prevention, diagnosis, and treatment of thrombotic and bleeding disorders. The program will support rapid translation of basic science findings into clinical application.

Obligations

Fiscal Year 2010—\$8,570,237

Current Active Organizations and Grant Numbers

- | | |
|-------------------------------------------------------------|------------|
| 1. Vanderbilt University
Nashville, Tennessee | —HL-081009 |
| 2. Cleveland Clinic Lerner College
Cleveland, Ohio | —HL-081011 |
| 3. University of Pennsylvania
Philadelphia, Pennsylvania | —HL-081012 |

Basic and Translational Research Program (U54)

The NHLBI reconfigured the Comprehensive Sickle Cell Centers program into a Basic and Translational Research Program (BTRP). The Program emphasizes fundamental investigations and their translation into initial studies in humans, as well as community translation to promote evidence-based clinical practice. The BTRP continues to support the Sickle Cell Disease Scholars program for the career development of young investigators and the Summer-for-Sickle Cell-Science program for research training and mentoring of high-school students. These components are part of a larger effort by NHLBI to prepare the next generation of scientists to advance the field of SCD research.

Obligation

Fiscal Year 2010—\$2,299,508

Current Active Organizations and Grant Numbers

1. Children's Hospital and Research Center at Oakland Oakland, California	—HL-070583	3. Children's Hospital Medical Center Cincinnati, Ohio	—HL-070871
2. Duke University Durham, North Carolina	—HL-070769	4. Medical College of Wisconsin Milwaukee, Wisconsin	—HL-090503

Cardiac Translational Research Implementation Program (C-TRIP) (P20)

The C-TRIP program, which consists of two stages, was initiated in FY 2010 to accelerate the translation of promising new therapeutic interventions derived from fundamental research discoveries for the treatment and prevention of heart failure or arrhythmias. Stage 1 focuses on planning and developing clinical trials to determine the safety and efficacy of interventions to be conducted during Stage 2 of the overall program. Stage 2 studies will be supported by the P50 mechanism.

Obligation

Fiscal Year 2010—\$8,664,795

Current Active Organizations and Grant Numbers

1. Mount Sinai School of Medicine New York, New York	—HL-100396	7. University of Colorado, Denver Aurora, Colorado	—HL-101435
2. Johns Hopkins University Baltimore, Maryland	—HL-101397	8. Texas Heart Institute Houston, Texas	—HL-101438
3. Brigham and Women's Hospital Boston, Massachusetts	—HL-101408	9. Mayo Clinic Rochester, Minnesota	—HL-101439
4. University of Medicine and Dentistry of New Jersey New Jersey Medical School Newark, New Jersey	—HL-101420	10. University of Miami School of Medicine Miami, Florida	—HL-101443
5. Vanderbilt University Nashville, Tennessee	—HL-101425	11. Children's Hospital of Philadelphia Philadelphia, Pennsylvania	—HL-101820
6. University of Maryland, Baltimore Baltimore, Maryland	—HL-101434	12. Brigham and Women's Hospital Boston, Massachusetts	—HL-101866

Centers for AIDS Research Program (P30)

The NHLBI, along with five other NIH Institutes, contributes to the support of six Centers for AIDS Research that were established to provide a multidisciplinary environment that promotes basic, clinical, behavioral, and translational research activities in the prevention, detection, and treatment of HIV infection and AIDS. Almost half of the patient population comes from minority groups.

Obligations

Fiscal Year 2010—\$3,368,475

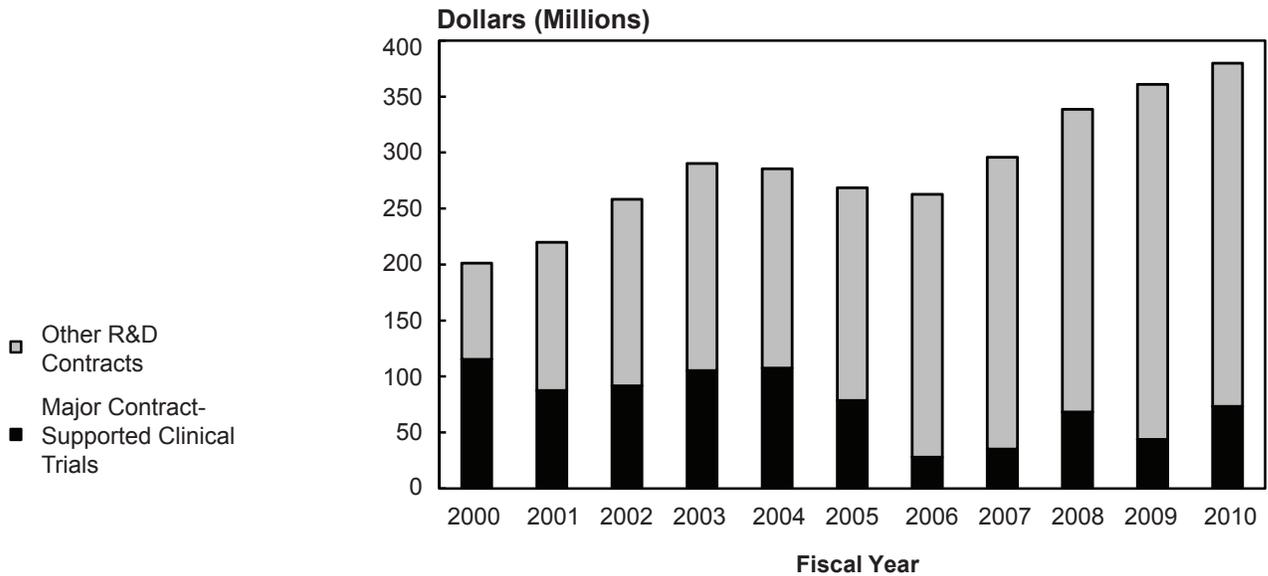
Current Active Organizations and Grant Numbers

1. New York University School of Medicine New York, New York	—AI-027742	12. Emory University Atlanta, Georgia	—AI-050409
2. University of Washington Seattle, Washington	—AI-027757	13. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—AI-050410
3. University of California, San Francisco San Francisco, California	—AI-027763	14. Yeshiva University New York, New York	—AI-051519
4. University of Alabama at Birmingham Birmingham, Alabama	—AI-027767	15. Vanderbilt University Nashville, Tennessee	—AI-054999
5. University of California, Los Angeles Los Angeles, California	—AI-028697	16. Harvard Medical School Boston, Massachusetts	—AI-060354
6. Baylor University Houston, Texas	—AI-036211	17. Duke University Durham, North Carolina	—AI-064518
7. University of California, San Diego La Jolla, California	—AI-036214	18. University of Miami School of Medicine Coral Gables, Florida	—AI-073961
8. Case Western Reserve University Cleveland, Ohio	—AI-036219	19. University of Rochester Rochester, New York	—AI-078498
9. University of Massachusetts Medical School Worcester, Massachusetts	—AI-042845	20. Rush University Medical Center Chicago, Illinois	—AI-082151
10. Miriam Hospital Providence, Rhode Island	—AI-042853	21. George Washington University Washington, DC	—AI-087714
11. University of Pennsylvania Philadelphia, Pennsylvania	—AI-045008		



10. Research and Development Contracts

NHLBI Research and Development Contract Obligations: * Fiscal Years 2000–2010



* For detailed data on contract-supported clinical trials, see Chapter 11.

NHLBI Total Research and Development Contract Obligations: Fiscal Years 2000–2010

	Dollars (Thousands)										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Heart	\$156,415	\$184,491	\$214,971	\$258,647	\$245,881	\$219,796	\$213,320	\$260,205	\$296,445	\$321,223	\$303,251
Lung	23,341	10,993	16,578	11,745	14,131	20,946	25,902	15,191	20,249	17,710	47,777
Blood	21,538	24,572	26,751	20,082	25,460	27,831	23,629	20,446	22,093	22,164	28,864
Total	\$201,294^A	\$220,056^B	\$258,300^C	\$290,474^D	\$285,472^E	\$268,573^F	\$262,851^G	\$295,842^H	\$338,787^I	\$361,097^J	\$379,892^K

A Includes Program Evaluation and IMPAC II Assessments of \$17,944,000.

B Includes Program Evaluation and IMPAC II Assessments of \$24,579,000.

C Includes Program Evaluation and IMPAC II Assessments of \$35,827,000.

D Includes Program Evaluation and IMPAC II Assessments of \$54,550,000.

E Includes Program Evaluation and IMPAC II Assessments of \$57,545,722.

F Includes Program Evaluation and IMPAC II Assessments of \$64,399,000.

G Includes Program Evaluation and IMPAC II Assessments of \$67,795,000.

H Includes Program Evaluation and IMPAC II Assessments of \$68,405,000.

I Includes Program Evaluation and IMPAC II Assessments of \$77,487,000.

J Includes Program Evaluation and IMPAC II Assessments of \$79,693,000.

K Includes Program Evaluation and IMPAC II Assessments of \$83,834,100.

Note: From 2000 to 2006 the WHI was reported separately. In this table, it has been incorporated in the “Heart” line.

Major NHLBI Research and Development Contracts by Program

	Total Obligations Prior to FY 2010	Total FY 2010 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Atherosclerosis Risk in Communities (ARIC)	\$149,712,440	\$7,456,559	\$157,168,999
Candidate Gene Association Resource (CARE)	22,420,575	2,351,820	24,772,395
Cardiovascular Health Study (CHS)	78,754,025	801,888	79,555,913
Clarification of Optimal Anticoagulation Through Genetics (COAG)*	6,167,062	—	6,167,062
Coronary Artery Risk Development in Young Adults (CARDIA)	98,363,316	775,143	99,138,459
DNA Resequencing and Genotyping	26,630,036	2,578,987	29,209,023
Framingham Heart Study (FHS)	113,632,876	2,076,405	115,709,281
Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions (GenTAC): National Registry	6,745,470	4,369,615	11,115,085
Global Health Centers of Excellence	13,399,780	999,984	14,399,764
Hispanic Community Health Study (HCHS)	51,239,547	228,993	51,468,540
Interagency Registry for Mechanical Circulatory Support (INTERMACS)	6,338,903	1,487,293	7,826,196
Jackson Heart Study (JHS)	38,406,573	87,684	38,494,257
Multi-Ethnic Study of Atherosclerosis (MESA)	101,275,569	1,703,851	102,979,420
NHLBI Gene Therapy Resource Program (GTRP)	19,127,735	2,625,737	21,753,472
NHLBI Programs of Excellence in Nanotechnology	—	65,777,271	65,777,271
Proteomics Initiative	157,606,085	16,912,672	174,518,757
Pumps for Kids, Infants, and Neonates (PumpKIN)	—	8,388,522	8,388,522
Studying Community Programs To Reduce Childhood Obesity	—	20,950,000	20,950,000
Systolic Blood Pressure Intervention Trial (SPRINT)	7,508,288	29,374,119	36,882,407
Lung Diseases			
Lung Tissue Research Consortium	26,504,208	3,495,792	30,000,000
Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS)	2,081,851	27,960,468	30,042,319
Blood Diseases and Resources			
Biologic Specimen and Data Repository Information Coordinating Center (BioLINCC)	—	599,990	599,990
Maintenance of NHLBI Biological Specimen Repository	17,664,473	1,668,235	19,332,708
NHLBI–CDC Registry and Surveillance System in Hemoglobinopathies (RuSH)	1,506,239	4,913,679	6,419,918
Production Assistance for Cellular Therapies (PACT)	—	10,826,333	10,826,333
Retrovirus Epidemiology Donor Study II (REDS-II)	43,591,343	9,425,551	53,016,894
Sickle Cell Disease Health-Related Quality of Life Questionnaire	5,172,976	564,672	5,737,648
Somatic Cell Therapy Processing Facilities	23,750,781	828,232	24,579,013

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.

Heart and Vascular Diseases Program

Atherosclerosis Risk in Communities (ARIC), Initiated in Fiscal Year 1985

The ARIC is a large, longitudinal study comprising a community surveillance component and a prospective cohort component to investigate the etiology of atherosclerosis and its clinical sequelae and variation in cardiovascular risk factors by race, gender, and location. The community surveillance component monitors trends in hospitalized myocardial infarction, fatal CHD, and heart failure (2005–2009) by race and gender in four U.S. communities. The cohort component investigates the etiology of CHD in 15,792 participants, aged 46–64 at baseline, who were selected from the same communities. The participants received an extensive examination upon entry into the study (1987–1989) that included gathering medical, social, and demographic data. Subsequent examinations occurred in 1990–1992, 1993–1995, and 1996–1998, followed by contact annually by telephone to assess the health status of the cohort. Beginning in 2011, the study will reexamine the cohort participants with a focus on heart failure—a major epidemic in the rapidly aging population in the United States. Three of the cohort components represent the racial mix of their community, and the fourth is exclusively black.

Obligations

Funding History:

Fiscal Year 2010—\$7,456,559

Fiscal Years 1985–2009—\$149,712,440

Total Funding to Date—\$157,168,999

Current Active Organizations and Contract Numbers

1. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —HC-55015
2. Baylor College of Medicine
Houston, Texas —HC-55016
3. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —HC-55018
4. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-55019
5. Johns Hopkins University
Baltimore, Maryland —HC-55020
6. Mississippi Medical Center
Jackson, Mississippi —HC-55021

Candidate Gene Association Resource (CARE), Initiated in Fiscal Year 2006

The CARE program is a shared genotype/phenotype resource for analyses of the association of genotypes with phenotypes relevant to the mission of the NHLBI. The resource comprises nine cohort studies funded by the NHLBI: ARIC, CHS, Cleveland Family Study, Cooperative Study of SCD, CARDIA, FHS, JHS, MESA, and the Sleep Heart Health Study. The database of genotypes and phenotypes (dbGaP) includes records for approximately 44,000 study participants with approximately 50,000 single nucleotide polymorphisms (SNPs) from more than 2,000 selected candidate genes. In addition, a genome-wide association study using a 1,000K SNP chip was conducted on approximately 8,500 black participants drawn from four CARE cohorts: ARIC, CARDIA, JHS, and MESA. Data from individual cohorts are available to approved investigators through dbGaP.

Obligations

Funding History:

Fiscal Year 2010—\$2,351,820

Fiscal Years 2006–2009—\$22,420,575

Total Funding to Date—\$24,772,395

Current Active Organization and Contract Number

1. The Broad Institute, Inc
Cambridge, Massachusetts —268200900055C

Cardiovascular Health Study (CHS), Initiated in Fiscal Year 1988

The CHS is a population-based, longitudinal study of risk factors for development and progression of CHS and stroke in elderly adults, 17 percent of whom are from minority populations. Extensive data and samples have been collected from nearly 6,000 participants since 1989–1990. The current CHS: Transition Phase provides partial support for an infrastructure to enable continued access to study resources and expertise, scientific collaborations, and mentorship of early-career investigators.

Obligations

Funding History:

Fiscal Year 2010—\$801,888

Fiscal Years 1988–2009—\$78,754,025

Total Funding to Date—\$79,555,913

Current Active Organization and Contract Number

1. University of Washington
Seattle, Washington —268200800007C

Clarification of Optimal Anticoagulation Through Genetics (COAG),* Initiated in 2008

See Chapter 11. Clinical Trials.

Coronary Artery Risk Development in Young Adults (CARDIA), Initiated in Fiscal Year 1984

CARDIA is a long-term study that examines the evolution of CVD risk factors and early clinical events in a cohort of black and white adults, ages 18–30 years in 1985–1986. The study examines risk factors for heart and lung diseases by collecting information on body mass index, physical activity and lifestyle, genetics, serologic and metabolic components, inflammatory markers, and other subclinical measures of disease. Fifty percent of the participants are black.

Obligations

Funding History:

Fiscal Year 2010—\$775,143

Fiscal Years 1984–2009—\$98,363,316

Total Funding to Date—\$99,138,459

Current Active Organizations and Contract Numbers

1. Johns Hopkins University
Baltimore, Maryland —HC-45241
2. University of Alabama at Birmingham
Birmingham, Alabama —HC-48047
3. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-48048
4. Northwestern University
Chicago, Illinois —HC-48049
5. Kaiser Permanente Division of Research
Oakland, California —HC-48050
6. University of Alabama at Birmingham
Birmingham, Alabama —HC-95095

DNA Resequencing and Genotyping, Initiated in Fiscal Year 2004

The purpose of this program is to obtain rapid, reliable, and cost-efficient DNA sequencing and genotyping of candidate genomic regions potentially important in the disease pathways of heart, lung, and blood diseases

and sleep disorders. This information will assist ongoing investigations of genetic components involved in the causes, variable outcome, and progression of the diseases and disorders.

Obligations

Funding History:

Fiscal Year 2010—\$2,578,987

Fiscal Years 2004–2009—\$26,630,036

Total Funding to Date—\$29,209,023

Current Active Organizations and Contract Numbers

1. University of Washington
Seattle, Washington —HV-48194
2. J. Craig Venter Institute, Inc.
Rockville, Maryland —HV-48196

Framingham Heart Study (FHS)

The original Framingham Heart Study was designed as a longitudinal investigation of constitutional and environmental factors influencing the development of CVD in individuals free of these conditions at the outset. Of the original 5,209 subjects, about 200 members remain alive. In 1971, the Framingham Offspring Study was initiated to assess familial and genetic factors associated with CHD. More than 5,000 offspring (and their spouses) were included. A third-generation cohort consisting of approximately 4,000 grandchildren was added in 2002 to permit examination of numerous hypotheses about the genetic contribution to CVD and CVD risk factors. Additional goals include identifying new risk factors for cardiovascular, lung, and blood diseases and developing new imaging tests that can detect very early stages of coronary atherosclerosis in otherwise healthy adults. In 2009, the Omni Group 1 and Omni Group 2 cohorts were integrated into the NHLBI contract for the FHS. These two cohorts consist of minority residents of Framingham, Massachusetts (about 500 and 400 participants, respectively), and were previously identified, recruited, and examined through investigator-initiated grants. Their addition to the study reflects the growing diversity of the community.

Obligations

Funding History:

Fiscal Year 2010—\$2,076,405

Fiscal Years 1983–2009—\$113,632,876

Total Funding to Date—\$115,709,281

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.

Current Active Organization and Contract Number

1. Boston University Medical Center
Boston, Massachusetts —HC-25195

Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions (GenTAC): National Registry, Initiated in Fiscal Year 2006

The purpose of this program is to establish a national registry to enable investigators to determine the best medical practices to advance the clinical management of genetic thoracic aortic aneurysms and other cardiovascular complications associated with connective tissue diseases, such as Marfan, Loeys-Dietz, and Ehlers Danlos (vascular type) Syndromes.

Obligations

Funding History:

Fiscal Year 2010—\$4,369,615
Fiscal Years 2006–2009—\$6,745,470
Total Funding to Date—\$11,115,085

Current Active Organization and Contract Number

1. Research Triangle Institute
Research Triangle Park, North Carolina—268201000048C

Global Health Centers of Excellence, Initiated in Fiscal Year 2009

The purpose of this program is to support a worldwide network of research and training centers to prevent and control chronic diseases, such as cardiovascular diseases, lung diseases, and diabetes. The NHLBI joined with Minneapolis-based UnitedHealth Group's Chronic Disease Initiative in establishing the UnitedHealth and NHLBI Collaborating Centers of Excellence network. Each center is led by a research institution in a low- or middle-income, developing country that is paired with at least one partner academic institution in a developed country to enhance research and training opportunities.

Obligations

Funding History

Fiscal Year 2010—\$999,984
Fiscal Year 2009—\$13,399,780
Total Funding to Date—\$14,399,764

Current Active Organizations and Contract Numbers

1. St. John's Research Institute
Karnataka, India —HV-98215

2. Public Health Foundation in India
New Delhi, India —HV-98216
3. The George Institutes in China
Beijing, China —HV-98217
4. Instituto de Nutrición de Centro América
Guatemala City, Guatemala —HV-98218
5. Institute for Clinical Effectiveness
and Health Policy
Buenos Aires, Argentina —HV-98219
6. University of Cape Town
Cape Town, South Africa —HV-98220
7. Moi University School of Medicine
Eldoret, Kenya —HV-98221
8. International Center for Diarrhoeal
Disease Branch
Mohakhali, Bangladesh —HV-98222
9. University of Peruana
San Martin, Peru —HV-98223
10. Westat
Rockville, Maryland —HV-98224

Hispanic Community Health Study (HCHS), Initiated in Fiscal Year 2006

The purpose of this program is to determine the prevalence of and risk factors for cardiovascular and lung diseases in Hispanic populations and the role of cultural adaptation and disparities in development of these and other chronic diseases. The multicenter, 6.5-year epidemiology study comprises approximately 16,000 Hispanic/Latinos, aged 18–74 years, who self-identify as Mexican/Mexican American, Puerto Rican, Cuban, or Central or South American.

Obligations

Funding History:

Fiscal Year 2010—\$228,993
Fiscal Years 2006–2009—\$51,239,547
Total Funding to Date—\$51,468,540

Current Active Organizations and Contract Numbers

1. University of North Carolina at
Chapel Hill
Chapel Hill, North Carolina —HC-65233
2. University of Miami
Miami, Florida —HC-65234
3. Albert Einstein College of Medicine
New York, New York —HC-65235
4. Northwestern University
Chicago, Illinois —HC-65236
5. San Diego State University
San Diego, California —HC-65237

Interagency Registry for Mechanical Circulatory Support (INTERMACS), Initiated in Fiscal Year 2005

The purpose of this program is to establish a data and clinical coordinating center to manage a registry of patients receiving an FDA-approved mechanical circulatory support device (MCS) to treat heart failure. The registry will collect and analyze clinical and laboratory data and tissue samples from patients who receive MCSs as destination therapy for end-stage heart failure at 90–100 participating hospitals.

Obligations

Funding History:

Fiscal Year 2010—\$1,487,293

Fiscal Years 2005–2009—\$6,338,903

Total Funding to Date—\$7,826,196

Current Active Organization and Contract Number

1. University of Alabama
Birmingham, Alabama —HV-58198

Jackson Heart Study (JHS), Initiated in Fiscal Year 1998

The JHS is an epidemiologic study of CVD in blacks in Jackson, Mississippi, similar to established studies in Framingham, Massachusetts, and Honolulu, Hawaii. The goals of the study are to identify factors related to the development and progression of CVD and its risk factors and to assess roles of sociocultural factors (e.g., stress, racism, discrimination, coping strategies), hereditary factors, specific genetic variants, and gene–environment interactions in CVD among the black population. In addition, the JHS seeks to build research capabilities in minority institutions, address the critical shortage of minority investigators in epidemiology and prevention, and reduce barriers to dissemination and use of health information in a minority population.

Obligations

Funding History:

Fiscal Year 2010—\$87,684

Fiscal Years 1998–2009—\$38,406,573

Total Funding to Date—\$38,494,257

Current Active Organizations and Contract Numbers

1. Jackson State University
Jackson, Mississippi —HC-95170

2. Mississippi Medical Center
Jackson, Mississippi —HC-95171
3. Tougaloo College
Tougaloo, Mississippi —HC-95172

Multi-Ethnic Study of Atherosclerosis (MESA), Initiated in Fiscal Year 1999

The purpose of this study is to investigate the prevalence, correlates, and progression of subclinical CVD (i.e., disease detected noninvasively before it has produced clinical signs and symptoms) in a population that is 38 percent white, 28 percent black, 22 percent Hispanic, and 12 percent Asian. A fifth examination began in 2010 and includes a measurement of cardiac function with MRI. Periodic monitoring of participants to identify recent hospitalizations and other clinical events will continue.

Obligations

Funding History:

Fiscal Year 2010—\$1,703,851

Fiscal Years 1999–2009—\$101,275,569

Total Funding to Date—\$102,979,420

Current Active Organizations and Contract Numbers

1. University of Washington
Seattle, Washington —HC-95159
2. University of California, Los Angeles
Los Angeles, California —HC-95160
3. Columbia University
New York, New York —HC-95161
4. Johns Hopkins University
Baltimore, Maryland —HC-95162
5. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-95163
6. Northwestern University
Chicago, Illinois —HC-95164
7. Wake Forest University
Winston-Salem, North Carolina —HC-95165
8. University of Vermont
Colchester, Vermont —HC-95166
9. New England Medical Center
Boston, Massachusetts —HC-95167
10. Johns Hopkins University
Baltimore, Maryland —HC-95168
11. Harbor-UCLA Research and
Education Institute
Los Angeles, California —HC-95169

NHLBI Gene Therapy Resource Program (GTRP), Initiated in Fiscal Year 2007

The purpose of this program is to promote the translation of basic research into clinical trials. The program will support the production of safe and well-characterized vectors; conduct extensive toxicology and pharmacology studies on animals to determine vector dosing, related toxicity, and vector dissemination; and provide investigators with regulatory assistance to initiate a clinical trial. The GTRP also will support a maximum of two phase I/II gene transfer clinical trials per year that have successfully met all regulatory requirements and are ready to enroll patients within 12 months of application approval.

Obligations

Funding History:

Fiscal Year 2010—\$2,625,737

Fiscal Years 2008–2009—\$19,127,735

Total Funding to Date—\$21,753,472

Current Active Organizations and Contract Numbers

1. Social and Scientific Systems, Inc.
Silver Spring, Maryland —HV-78200
2. Lovelace Biomedical Research &
Education Institute
Albuquerque, New Mexico —HV-78201
3. University of Pennsylvania
Philadelphia, Pennsylvania —HV-78202
4. Children’s Hospital of Philadelphia
Philadelphia, Pennsylvania —HV-78203
5. Indiana University
Indianapolis, Indiana —HV-78204

NHLBI Programs of Excellence in Nanotechnology,* Initiated in Fiscal Year 2010

The purpose of this program is to establish multidisciplinary teams to develop nanotechnology and biomolecular engineering tools and methodologies for the diagnosis and treatment of heart, lung, and blood diseases and to translate these technologies toward clinical application. The program presents a unique opportunity for research collaboration and skills training by bringing bioengineering and nanotechnology solutions into medicine and vice versa.

Obligations

Funding History:

Fiscal Year 2010—\$65,777,271

Total Funding to Date—\$65,777,271

Current Active Organizations and Contract Numbers

1. Georgia Institute of Technology
Atlanta, Georgia —268201000043C
2. Massachusetts General Hospital
Boston, Massachusetts —268201000044C
3. Mount Sinai School of Medicine
New York, New York —268201000045C
4. Washington University
St. Louis, Missouri —268201000046C

Proteomics Initiative, Initiated in Fiscal Year 2002

The purpose of this program is to establish highly interactive, multidisciplinary centers to enhance and develop innovative proteomic technologies directed to relevant biologic questions associated with heart, lung, blood, and sleep health and disease.

Obligations

Funding History:

Fiscal Year 2010—\$16,912,672

Fiscal Years 2002–2009—\$157,606,085

Total Funding to Date—\$174,518,757

Current Active Organizations and Contract Numbers

1. Medical University of South Carolina
Charleston, South Carolina —HV-28181
2. Boston University
Boston, Massachusetts —268201000031C
3. Johns Hopkins University
Baltimore, Maryland —268201000032C
4. Massachusetts General Hospital
Boston, Massachusetts —268201000033C
5. Stanford University
Stanford, California —268201000034C
6. University of California, Los Angeles
Los Angeles, California —268201000035C
7. University of Texas
San Antonio, Texas —268201000036C
8. University of Texas
Galveston, Texas —268201000037C

* NHLBI Programs of Excellence in Nanotechnology was a cooperative agreement from 2005 to 2009.

Pumps for Kids, Infants, and Neonates (PumpKIN), Initiated in Fiscal Year 2010

The purpose of this program is to complete the pre-clinical testing of investigational MCSDs to be used in infants and young children with congenital and acquired CVD who experience cardiopulmonary failure and circulatory collapse.

Obligations

Funding History:

Fiscal Year 2010—\$8,388,522

Total Funding to Date—\$8,388,522

Current Active Organizations and Contract Numbers

1. University of Pittsburgh
Pittsburgh, Pennsylvania —268201000012C
2. Jarvik Heart, Inc.
New York, New York —268201000013C
3. University of Maryland
Baltimore, Maryland —268201000014C
4. Ension, Inc.
Pittsburgh, Pennsylvania —268201000015C

Studying Community Programs To Reduce Childhood Obesity, Initiated in Fiscal Year 2010

The purpose of this program is to establish a Research Coordinating Center to support a nationwide scientific study of communities to examine outcomes associated with characteristics of existing or new community programs and policies to reduce childhood obesity rates. The Center will partner with members of the National Collaborative on Childhood Obesity Research (NIH, Robert Wood Johnson Foundation, and CDC) to design and implement the research.

Obligations

Funding History:

Fiscal Year 2010—\$20,950,000

Total Funding to Date—\$20,950,000

Current Active Organization and Contract Number

1. Batelle Memorial Institute
Columbus, Ohio —HC-05265

Systolic Blood Pressure Intervention Trial (SPRINT), Initiated in 2009

See Chapter 11. Clinical Trials.

Lung Diseases Program

Lung Tissue Research Consortium, Initiated in Fiscal Year 2004

The purpose of this program is to establish a consortium for collecting lung tissues and preparing and distributing them for research. Scientists seek to improve management of lung diseases by increasing understanding of the pathogenetic mechanisms of lung diseases through molecular histopathological studies on tissues with and without disease. Primary emphases are on COPD and idiopathic pulmonary fibrosis.

Obligations

Funding History:

Fiscal Year 2010—\$3,495,792

Fiscal Years 2004–2009—\$26,504,208

Total Funding to Date—\$30,000,000

Current Active Organizations and Contract Numbers

1. Mayo Clinic College of Medicine
Rochester, New York —HR-46158
2. University of Colorado
Health Science Center
Denver, Colorado —HR-46159
3. Mayo Clinic College of Medicine
Rochester, New York —HR-46161
4. University of Michigan
Ann Arbor, Michigan —HR-46162
5. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-46163
6. Clinical Trials and Survey Corporation
Baltimore, Maryland —HR-46164

Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS), Initiated in Fiscal Year 2009

See Chapter 11. Clinical Trials.

Blood Diseases and Resources Program

Biologic Specimen and Data Repository Information Coordinating Center (BioLINCC), Initiated in Fiscal Year 2010

The purpose of this program is to coordinate data and biospecimens from NHLBI-funded studies and make them available for use in other approved studies. The center will also create teaching datasets from NHLBI-funded studies for use in training future biostatisticians.

Obligations

Funding History:

Fiscal Year 2010—\$599,990
Total Funding to Date—\$599,990

Current Active Organization and Contract Number

1. Information Management Services
Rockville, Maryland —268200800012C

Maintenance of NHLBI Biological Specimen Repository, Initiated in Fiscal Year 1998

The purpose of this project is to establish an NHLBI Biological Specimen Repository for blood specimens from Institute-supported research. The Repository monitors storage, labeling, and testing of the specimens, as well as administers safe shipment of precise sample aliquots to approved investigators for future studies.

Obligations

Funding History:

Fiscal Year 2010—\$1,668,235
Fiscal Years 1998–2009—\$17,664,473
Total Funding to Date—\$19,332,708

Current Active Organization and Contract Number

1. SeraCare Life Sciences, Inc.
Rockville, Maryland —HB-87144

NHLBI–CDC Registry and Surveillance System in Hemoglobinopathies (RuSH), Initiated in Fiscal Year 2009

The purpose of this program is to develop and implement a national data system and biospecimen repository that will provide data to describe the epidemiologic and clinical characteristics of people who have all genotypes of SCD, thalassemias, and other hemoglobinopathies. The system will be designed to collect, analyze, interpret, and disseminate data on the epidemiology, clinical correlates, health care use, and community resources of patients who have these conditions. It will support research, information dissemination, policy decisions, health care planning, and provider training at the local, state, and national levels.

Obligations

Funding History:

Fiscal Year 2010—\$4,913, 679
Fiscal Year 2009—\$1,506,239
Total Funding to Date—\$6,419,918

Current Active Organization and Contract Number

1. Centers for Disease Control and Prevention
Atlanta, Georgia —HR-9045

Production Assistance for Cellular Therapies (PACT), Initiated in Fiscal Year 2010

The purpose of this program is to advance (a) cellular therapy research in the areas of regeneration of damaged or diseased tissues, organs, and biologic systems and (b) targeted treatments for serious diseases without effective therapies. The cell processing facilities will support translational research in innovative cell therapies to advance the field of cellular therapy and enable scientifically meritorious basic science research to reach the clinical trial stage.

Obligations

Funding History:

Fiscal Year 2010—\$10,826,333
Total Funding to Date—\$10,826,333

Current Active Organizations and Contract Numbers

1. EMMES Corp.
Rockville, Maryland —268201000006C
2. Baylor College of Medicine
Houston, Texas —268201000007C
3. University of Minnesota
Minneapolis, Minnesota —268201000008C
4. Immune Disease Institutes
Boston, Massachusetts —268201000009C
5. University of Wisconsin
Madison, Wisconsin —268201000010C
6. Beckman Research Institutes
Duarte, California —268201000011C

Retrovirus Epidemiology Donor Study-II (REDS-II), Initiated in Fiscal Year 2005

The purpose of this program is to conduct epidemiologic, laboratory, and survey research on volunteer blood donors within the United States to ensure the safety and availability of the blood supply. The study seeks to assess the prevalence and incidence of existing and newly discovered infectious agents that pose a threat to blood safety; evaluate characteristics and behaviors of voluntary blood donors; determine the causes of adverse transfusion reactions of unknown etiology; assess new and existing blood donor screening methodologies; assess the impact of new blood bank technologies on blood safety and availability; and evaluate the donation process for ways to improve the adequacy of the blood supply.

An international component was added to conduct epidemiologic, laboratory, and survey research on blood donors in China and Brazil, two countries seriously affected by the AIDS epidemic, to ensure the availability and safety of blood for transfusion.

Obligations

Funding History:

Fiscal Year 2010—\$9,425,551
Fiscal Years 2005–2009—\$43,591,343
Total Funding to Date—\$53,016,894

Current Active Organizations and Contract Numbers

1. Blood Center of Southeastern Wisconsin
Milwaukee, Wisconsin —HB-47168
2. American Red Cross Blood Service,
New England
Farmington, Connecticut —HB-47169
3. Emory University
Atlanta, Georgia —HB-47170
4. University of Cincinnati
Cincinnati, Ohio —HB-47171
5. Institute for Transfusion Medicine
Pittsburgh, Pennsylvania —HB-47172
6. University of California, San Francisco
San Francisco, California —HB-47174
7. Westat, Inc.
Rockville, Maryland —HB-47175
8. Blood System Research, Inc.
San Francisco, California —HB-57181

Sickle Cell Disease Health-Related Quality of Life Questionnaire, Initiated in 2005

The purpose of this project is to develop a psychometrically sound and clinically relevant health-related

quality of life instrument and related materials for use in sickle cell clinical trials and outcomes research.

Obligations

Funding History:

Fiscal Year 2010—\$564,672
Fiscal Years 2005–2009—\$5,172,976
Total Funding to Date—\$5,737,648

Current Active Organization and Contract Number

1. Blood Center of Southeastern Wisconsin
Milwaukee, Wisconsin —HL-54264

Somatic Cell Therapy Processing Facilities, Initiated in Fiscal Year 2003

The purpose of this project is to develop novel somatic cellular therapies in areas ranging from basic science through animal studies to proof-of-principle and eventually human trials for heart, lung, and blood diseases and sleep disorders. The goal is to provide rapid, safe translation of basic research ideas into clinical practice.

Obligations

Funding History:

Fiscal Year 2010—\$828,232
Fiscal Years 2003–2009—\$23,750,781
Total Funding to Date—\$24,579,013

Current Active Organization and Contract Number

1. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HB-37164



11. Clinical Trials

A clinical trial is defined as a scientific research study undertaken with human subjects to evaluate prospectively the diagnostic, prophylactic, or therapeutic effect of a drug, device, regimen, or procedure used or intended ultimately for use in the practice of

medicine or the prevention of disease. A clinical trial is planned and conducted prospectively and includes a concurrent control group or other appropriate comparison group.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2000–2010

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Heart and Vascular Diseases											
Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest	\$ 392	\$ 75	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Women's Health Study (WHS)	1,594	—	—	—	—	889	—	868	875	919	927
Women's Antioxidant and Cardiovascular Study (WACS)	556	572	598	592	599	670	—	—	—	—	—
Stress Reduction and Atherosclerotic CVD in Blacks	339	360	376	394	—	—	—	—	—	—	—
Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?	440	362	298	291	296	—	—	—	—	—	—
HDL-Atherosclerosis Treatment Study	326	—	—	—	—	—	—	—	—	—	—
Women's Estrogen/Progestin Lipid Lowering Hormone Atherosclerosis Regression Trial (WELL-HART)*	—	32	—	—	—	—	—	—	—	—	—
Mode Selection Trial in Sinus Node Dysfunction (MOST)*	1,136	154	—	—	—	—	—	—	—	—	—
Estrogen and Graft Atherosclerosis Research Trial (EAGER)*	361	371	—	—	—	—	—	—	—	—	—
REMATCH Trial*	825	750	—	—	—	—	—	—	—	—	—
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)**	1,247	151	387	376	395	—	—	—	—	—	—
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)*	1,698	1,798	1,412	1,930	—	—	—	—	—	—	—
CVD Risk and Health in Post-Menopausal Phytoestrogen Users	244	—	304	152	—	—	—	—	—	—	—
Treatment of Hypertension With Two Exercise Intensities	481	420	—	—	—	—	—	—	—	—	—
Prevention of Recurrent Venous Thromboembolism (PREVENT)	521	543	1,272	—	—	—	—	—	—	—	—
PREMIER: Lifestyle Interventions for Blood Pressure Control*	3,595	2,925	1,505	—	—	—	—	—	—	—	—
Azithromycin and Coronary Events Study (ACES)*	2,182	720	1,254	1,137	—	—	—	—	—	—	—
Antiarrhythmic Effects of N-3 Fatty Acids	542	529	647	—	—	—	—	—	—	—	—
Fatty Acid Antiarrhythmia Trial (FAAT)	605	—	—	—	—	—	—	—	—	—	—

* Paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2000–2010 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Heart and Vascular Diseases (continued)												
Occluded Artery Trial (OAT)*	5,079	2,604	1,724	1,963	—	—	963	1,452	1,277	1,270	1,033	
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*	3,942	6,515	9,342	8,189	8,265	8,304	8,592	2,647	1,971	1,130	—	
Hematocrit Strategy in Infant Heart Surgery*	473	557	596	590	492	—	—	—	—	—	—	
Angiotensin-II Blockade in Mitral Regurgitation	—	553	610	629	500	—	—	—	—	—	—	
Heart Failure Adherence and Retention Trial (HART)	—	795	1,617	1,453	1,174	862	740	304	—	—	—	
Reduction of Triglycerides in Women on HRT	—	708	746	555	544	721	—	625	501	—	—	
Women's Ischemia Syndrome Evaluation (WISE)**	—	1,502	1,506	1,306	1,303	996	—	—	—	—	—	
ACE Inhibition and Novel Cardiovascular Risk Factors	—	—	694	656	602	—	—	—	—	—	—	
Heart Failure: A Controlled Trial Investigating Outcomes of Exercise (HF-ACTION)*	—	—	7,471	9,582	7,973	4,483	4,590	2,846	652	—	—	
Clinical Trial of Dietary Protein on Blood Pressure	—	—	655	610	612	504	500	—	—	—	—	
Home Automatic External Defibrillator Trial (HAT)*	—	—	3,567	5,433	4,264	1,801	2,115	—	—	—	—	
Perioperative Interventional Neuroprotection Trial (POINT)	—	—	553	553	562	572	378	—	—	—	—	
Stop Atherosclerosis in Native Diabetics Study (SANDS)*	—	—	2,410	2,165	2,107	2,324	2,074	197	218	—	—	
Surgical Treatment for Ischemic Heart Failure (STICH)*	—	—	5,709	4,495	1,613	6,082	5,583	9,396	3,639	727	1,233	
Girls Health Enrichment Multisite Studies (GEMS)*	—	—	—	2,461	2,400	2,369	1,950	—	—	—	—	
Treatment of Depression Following Bypass Surgery	—	—	—	964	1,132	1,181	1,193	885	—	—	—	
Weight Loss Maintenance (WLM)*	—	—	—	3,687	4,368	3,099	4,015	2,151	145	150	—	
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)*	—	—	—	—	4,343	5,610	4,884	3,307	3,269	—	4,414	
FREEDOM Trial: Future Revascularization Evaluation in Patients With Diabetes Mellitus: Optional Management of Multivessel Disease	—	—	—	—	3,663	4,669	—	5,180	2,818	1,658	3,429	
IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care*	—	—	—	—	5,170	9,514	10,966	—	—	—	—	
AIM HIGH: Niacin Plus Statin To Prevent Vascular Events*	—	—	—	—	—	663	6,324	6,018	1,380	2,324	6,927	
Claudication: Exercise Versus Endoluminal Revascularization (CLEVER)*	—	—	—	—	—	1,368	1,478	1,898	—	1,822	1,080	

* Paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2000–2010 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Heart and Vascular Diseases (continued)											
Interventions To Control Obesity in College	—	—	—	—	—	—	677	633	670	686	588
PACeMaker and Beta-Blocker Therapy Post-Myocardial Infarction (PACE-MI)	—	—	—	—	—	—	1,300	4,555	384	—	—
Efficacy of Smoking Quit Line in the Military	—	—	—	—	—	—	—	739	720	731	—
Vest prevention of Early Sudden Death Trial (VEST) and PREDiction of ICD Therapies Studies (PREDICTS)*	—	—	—	—	—	—	—	1,390	1,356	1,391	1,404
Planned Care for Obesity and Risk Reduction (Planned CORR)	—	—	—	—	—	—	—	—	784	770	769
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation on the AIM-HIGH Trial	—	—	—	—	—	—	—	—	302	312	383
Women's Ischemia Syndrome Evaluation (WISE) Coronary Vascular Dysfunction	—	—	—	—	—	—	—	—	776	742	745
Rule-Out Myocardial Infarction Using Computer Assisted Tomography (ROMICAT II)*	—	—	—	—	—	—	—	—	—	2,112	2,307
Collaborative Model To Improve BP Control and Minimize Racial Disparities	—	—	—	—	—	—	—	—	—	1,963	1,938
Multiscale Model of the Human Heart for Imaging Research	—	—	—	—	—	—	—	—	—	566	503
Catheter Ablation Versus Antiarrhythmic Drug Therapy for Atrial Fibrillation (CABANA)*	—	—	—	—	—	—	—	—	—	2,941	3,045
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA)*	—	—	—	—	—	—	—	—	—	3,648	2,285
Vitamin D and Omega 3 Trial (VITAL)*	—	—	—	—	—	—	—	—	—	1,260	1,248
Late Sodium Blockade in High-Risk ICD Patients*	—	—	—	—	—	—	—	—	—	—	2,280
Subtotal, Heart and Vascular Diseases	26,578	22,996	45,253	50,163	52,377	56,681	58,312	45,091	21,737	27,122	36,538
Lung Diseases											
Lung Health Study III* **	1,616	1,672	927	—	—	—	—	—	—	—	—
Asthma Clinical Research Network (ACRN)* **	5,686	5,705	5,863	—	—	—	—	—	—	—	—
Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia*	429	181	—	—	—	—	—	—	—	—	—
Scleroderma Lung Study*	1,501	1,761	1,501	1,055	—	—	71	—	—	—	—
Inhaled Nitric Oxide for Prevention of Chronic Lung Disease*	1,959	1,803	1,764	1,442	1,245	—	—	—	—	—	—
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease*	1,548	1,742	1,839	1,604	903	—	—	—	—	—	—
Prospective Investigation of Pulmonary Embolism Diagnosis II (PIOPED II)*	2,190	3,667	3,388	472	—	—	—	—	—	—	—
Randomized Trial To Reduce ETS in Children With Asthma	555	545	468	277	—	—	—	—	—	—	—

* Paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2000–2010 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lung Diseases (continued)											
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*	—	—	3,224	3,021	3,110	3,188	—	1,532	—	—	—
Childhood Asthma Management Program-Continuation Study (CAMP-CS)/Phase II***	—	—	—	1,489	2,043	2,623	2,750	—	—	—	—
Acid Reflux Therapy in Asthma*	—	—	—	736	783	791	773	662	—	—	—
Impact of CPAP on Functional Outcomes in Milder Obstructive Sleep Apnea (CATNAP)	—	—	—	682	612	608	694	—	—	—	—
Outcomes of Sleep Disorders in Older Men	—	—	—	4,163	4,262	1,390	1,142	910	—	—	—
Supplemental Selenium and Vitamin E and Pulmonary Function	—	—	—	698	610	630	605	561	—	—	—
Improving Asthma Care in Minority Children in Head Start	—	—	—	—	721	826	1,004	779	—	—	—
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea	—	—	—	—	—	—	2,255	2,388	1,346	2,501	1,675
Early Insulin Therapy and Development of ARDS	—	—	—	—	—	—	—	489	454	464	417
Childhood Asthma Management Program—Continuation Study (CAMP-CS)/Phase III***	—	—	—	—	—	—	—	2,077	1,966	1,146	2,065
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)*	—	—	—	—	—	—	—	—	732	737	776
Scleroderma Lung Study II	—	—	—	—	—	—	—	—	2,281	2,297	2,252
Sedation Management in Pediatric Patients With Acute Respiratory Failure*	—	—	—	—	—	—	—	—	568	3,885	3,327
Study of Asthma and Nasal Steroids (STAN)*	—	—	—	—	—	—	—	—	—	725	725
Outpatient Treatment of Low-Risk Patients With Pulmonary Embolism	—	—	—	—	—	—	—	—	—	755	349
Translating COPD Guidelines Into Primary Care Practice	—	—	—	—	—	—	—	—	—	733	719
Family Intervention for Pediatric Asthma Self-Management in Puerto Ricans	—	—	—	—	—	—	—	—	—	225	187
Physical Activity Self-Management in Patients With COPD	—	—	—	—	—	—	—	—	—	663	660
Study of Soy Isoflavones in Asthma (SOYA)*	—	—	—	—	—	—	—	—	—	775	697
Trial of Late Surfactant To Prevent Bronchopulmonary Dysplasia (TOLSURF)*	—	—	—	—	—	—	—	—	—	1,987	1,779

* Paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2000–2010 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lung Diseases (continued)		-									
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma*	—	—	—	—	—	—	—	—	—	2,510	2,466
Effects of HIV Antiretroviral Therapy on Pulmonary Function	—	—	—	—	—	—	—	—	—	614	516
Randomized Trial of Antenatal Late Preterm Steroids (ALPS)*	—	—	—	—	—	—	—	—	—	—	2,134
Vitamin D Supplementation in Pregnancy: Impact on Neonatal Immune Phenotype	—	—	—	—	—	—	—	—	—	—	323
Role of Beta-Catenin in Epithelial Repair in Acute Lung Injury	—	—	—	—	—	—	—	—	—	—	125
Mechanisms of Familial Pulmonary Fibrosis	—	—	—	—	—	—	—	—	—	—	2,330
Multicomponent Intervention To Decrease COPD-Related Hospitalizations	—	—	—	—	—	—	—	—	—	—	412
Subtotal, Lung Diseases	15,484	17,076	18,974	15,639	14,289	10,056	9,294	9,398	7,347	20,017	23,934
Blood Diseases and Resources											
Stroke Prevention in Sickle Cell Anemia (STOP)*	293	—	—	—	—	—	—	—	—	—	—
Stroke Prevention in Sickle Cell Anemia (STOP 2)*	4,200	3,166	3,168	2,320	2,366	—	—	—	—	—	—
Induction of Stable Chimerism for Sickle Cell Anemia*	—	489	525	527	551	—	—	—	—	—	—
Sibling Donor Cord Blood Banking and Transplantation*	—	1,222	1,224	1,286	1,353	—	—	—	—	—	—
FOCUS*	—	—	—	1,639	1,796	2,923	2,446	1,974	—	—	—
Stroke With Transfusions Changing to Hydroxyurea (SWiTCH)*	—	—	—	—	—	3,345	3,932	3,531	3,828	3,216	1,778
Randomized Trial of Interventions To Improve Warfarin Adherence	—	—	—	—	—	—	—	—	801	787	771
Study of Low Molecular Weight Heparin as a Bridge Before or After Surgery or a Procedure (BRIDGE)* **	—	—	—	—	—	—	—	—	4,632	5,673	5,227
Acute Venous Thrombosis: Thrombus Removal With Adjunctive Catheter-Directed Thrombolysis (ATTRACT)†	—	—	—	—	—	—	—	—	2,071	2,108	2,094
Transcranial Doppler With Transfusions Changing to Hydroxyurea (TWiTCH)	—	—	—	—	—	—	—	—	—	4,176	4,177
Impact of Blood Storage Duration on Measures: RECESS Ancillary Study	—	—	—	—	—	—	—	—	—	—	387
Subtotal, Blood Diseases and Resources	4,493	4,877	4,917	5,772	6,066	6,268	6,378	5,505	11,332	15,960	14,434
Total, NHLBI	\$46,555	\$44,949	\$69,144	\$71,574	\$72,732	\$73,005	\$73,984	\$59,994	\$40,416	\$63,099	\$74,906

* Paid by U01/U10.

** Formerly known as Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Procedure or Surgery (BRIDGE) Trial.

† Formerly known as Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT–ATTRACT Trial.

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2010: Summary by Program

	Total Obligations Prior to 2010	FY 2010 Obligations	Total Obligation to Date
Heart and Vascular Diseases			
AIM HIGH: Niacin Plus Statin To Prevent Vascular Events*	\$ 16,710,039	\$ 6,927,377	\$ 23,637,416
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)*	21,413,274	4,413,950	25,827,224
Catheter Ablation Versus Antiarrhythmic Drug Therapy for Atrial Fibrillation Trial (CABANA)*	2,940,676	3,044,967	5,985,643
Claudication: Exercise Versus Endoluminal Revascularization (CLEVER)*	6,567,493	1,079,923	7,647,416
Collaborative Model To Improve BP Control and Minimize Racial Disparities	1,962,536	1,938,361	3,900,897
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation in the AIM-HIGH Trial	613,764	383,483	997,247
FREEDOM Trial: Future Revascularization Evaluation in Patients With Diabetes Mellitus: Optimal Management of Multivessel Disease	17,988,870	3,428,589	21,417,459
Interventions To Control Obesity in College	2,656,815	588,410	3,245,225
Late Sodium Blockade in High-Risk ICD Patients*	—	2,279,794	2,279,794
Multiscale Model of the Human Heart for Imaging Research	565,856	502,961	1,068,817
Occluded Artery Trial (OAT)	21,223,324	1,032,987	22,256,311
Planned Care for Obesity and Risk Reduction (Planned CORR)	1,554,163	768,874	2,323,037
Rule-Out Myocardial Infarction Using Computer Assisted Tomography (ROMICAT II)*	2,111,994	2,307,194	4,419,188
Surgical Treatment for Ischemic Heart Failure (STICH)*	37,243,638	1,233,343	38,476,981
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA)*	3,648,449	2,285,274	5,933,723
Vest Prevention of Early Sudden Death Trial (VEST) and PREDiction of ICD Therapies Studies (PREDICTS)*	4,137,380	1,403,538	5,540,918
Vitamin D and Omega 3 Trial (VITAL)*	1,260,000	1,247,778	2,507,778
Women's Health Study (WHS)	19,584,523	926,561	20,511,084
Women's Ischemia Syndrome Evaluation (WISE) Coronary Vascular Dysfunction	1,517,476	745,442	2,262,918
Subtotal, Heart and Vascular Diseases	163,700,270	36,538,806	200,239,076
Lung Diseases			
Childhood Asthma Management Program—Phase III (CAMP III)* **	5,188,779	2,065,318	7,254,097
Early Insulin Therapy and Development of ARDS	1,407,511	417,188	1,824,699
Effects of HIV Antiretroviral Therapy on Pulmonary Function	613,957	515,991	1,129,948
Family Intervention for Pediatric Asthma Self-Management in Puerto Ricans	225,000	187,500	412,500
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)*	1,469,184	775,690	2,244,874
Mechanisms of Familial Pulmonary Fibrosis	—	2,330,347	2,330,347
Multicomponent Intervention To Decrease COPD-Related Hospitalizations	—	411,777	411,777
Outpatient Treatment of Low-Risk Patients With Pulmonary Embolism	755,080	349,378	1,104,458

* Paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

Physical Activity Self-Management in Patients With COPD 662,744 660,370 1,323,114

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2010: Summary by Program (continued)

	Total Obligations Prior to 2010	FY 2010 Obligations	Total Obligation to Date
Lung Diseases (continued)			
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea*	8,488,920	1,674,567	10,163,487
Randomized Trial of Antenatal Late Preterm Steroids (ALPS)*	—	2,133,947	2,133,947
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma*	2,510,267	2,465,649	4,975,916
Role of Beta-Catenin in Epithelial Repair in Acute Lung Injury	—	125,172	125,172
Scleroderma Lung Study II	4,577,300	2,251,504	6,828,804
Sedation Management in Pediatric Patients With Acute Respiratory Failure*	4,452,227	3,326,889	7,779,116
Study of Asthma and Nasal Steroids (STAN)*	724,724	724,812	1,449,536
Study of Soy Isoflavones in Asthma (SOYA)*	774,607	697,247	1,471,854
Translating COPD Guidelines Into Primary Care Practice	733,424	718,575	1,451,999
Trial of Late Surfactant To Prevent Bronchopulmonary Dysplasia (TOLSURF)*	1,986,898	1,778,953	3,765,851
Vitamin D Supplementation in Pregnancy: Impact on Neonatal Immune Phenotype	—	323,300	323,300
Subtotal, Lung Diseases	34,570,622	23,934,174	58,504,796
Blood Diseases and Resources			
Acute Venous Thrombosis: Thrombus Removal with Adjunctive Catheter-Directed Thrombolysis (ATTRACT)*†	4,178,531	2,094,006	6,272,537
Impact of Blood Storage Duration on Physiologic Measures: RECESS Ancillary Study	—	386,523	386,523
Randomized Trial of Interventions To Improve Warfarin Adherence	1,587,429	770,987	2,358,416
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)*	17,852,750	1,778,230	19,630,980
Study of Low Molecular Weight Heparin as a Bridge Before or After Surgery or a Procedure (BRIDGE)*‡	10,305,131	5,226,772	15,531,903
Transcranial Doppler With Transfusions Changing to Hydroxyurea (TWITCH)	4,175,979	4,177,447	8,353,426
Subtotal, Blood Diseases and Resources	26,207,260	14,433,965	40,641,225
TOTAL, NHLBI	\$224,478,152	\$74,906,945	\$299,385,097

* Paid by U01/U10.

† Formerly known as Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT–ATTRACT Trial.

‡ Formerly known as Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial.

Institute-Initiated Clinical Trials: Fiscal Years 2000–2010

Contracts

Dollars (Thousands)

	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Heart and Vascular Diseases											
Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT)	6,259	7,000	3,980	2,761	3,346	—	—	—	—	—	1,235
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHED)	3,487	596	425	70	—	—	—	—	—	—	—
Atrial Fibrillation Follow-Up: Investigation in Rhythm Management (AFFIRM)	1,239	2,401	802	—	—	—	—	—	—	—	—
Women's Angiographic Vitamin and Estrogen Trial (WAVE)	886	756	—	32	—	—	—	—	—	—	—
Women's Ischemia Syndrome Evaluation (WISE)	1,424	10	50	—	—	—	—	—	—	—	—
Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE)	5,988	—	2,849	558	—	—	—	—	—	—	—
Magnesium in Coronaries (MAGIC)	1,243	—	238	—	—	—	—	—	—	—	—
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)	1,820	—	1,129	—	—	—	311	—	—	—	—
Action To Control Cardiovascular Risk in Diabetes (ACCORD)	6,590	—	1,750	18,521	33,779	26,126	—	19,484	16,343	15,461	403
Public Access Defibrillation (PAD) Community Trial	2,414	3,058	1,101	—	—	—	—	—	—	—	—
Trial of Aldosterone Antagonist Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT)	—	—	—	—	837	5,162	5,480	2,218	7,912	4,408	898
Women's Health Initiative	57,700	59,200	59,010	63,222	57,483	37,826	12,124	14,873	22,609	30,615	2,409
Systolic Blood Pressure Intervention Trial (SPRINT)	—	—	—	—	—	—	—	—	—	3,057	29,374
Clarification of Optimal Anticoagulation Through Genetics (COAG)*	—	—	—	—	—	—	—	—	2,637	3,530	—
Subtotal, Heart and Vascular Diseases	89,050	73,021	71,334	85,164	95,445	69,114	17,915	36,575	49,501	57,071	34,319
Lung Diseases											
Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2)	315	—	113	—	—	—	—	—	—	—	—
Childhood Asthma Management Program (CAMP)	729	1,330	2,786	2,287	1,475	599	—	—	—	—	—
Acute Respiratory Distress Syndrome Clinical Network (ARDSNet)	5,587	2,667	1,502	4,402	5,517	4,707	7,396	5,037	1,992	6,195	7,208

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.

Institute-Initiated Clinical Trials: Fiscal Years 2000–2010 (continued)

Contracts (continued)

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lung Diseases (continued)											
National Emphysema Treatment Trial (NETT)	4,047	6,989	7,910	1,630	1,648	357	—	—	—	285	—
Feasibility of Retinoid Treatment in Emphysema (FORTE)	7,711	—	2,429	725	507	185	—	—	—	—	—
Long-Term Oxygen Treatment Trial (LOTT)	—	—	—	—	—	—	—	6,208	10,042	202	4,335
Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS)	—	—	—	—	—	—	—	—	—	2,082	27,960
Subtotal, Lung Diseases	18,389	10,986	14,740	9,044	9,147	5,848	7,396	11,245	12,034	8,764	39,503
Blood Diseases and Resources											
Clinical Course of Sickle Cell Disease	106	—	—	—	—	—	—	—	—	—	—
T-Cell Depletion in Unrelated Donor Marrow Transplantation	1,085	1,144	557	774	164	—	—	—	—	—	—
Viral Activation Transfusion Study (VATS)	339	—	—	—	—	—	—	—	—	—	—
Cord Blood Stem Cell Transplantation Study (COBLT)	5,122	1,846	2,166	588	707	822	—	—	—	—	—
Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-Up	—	—	588	994	1,136	1,340	—	—	—	—	—
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	1,606	405	3,100	1,112	1,964	1,526	891	3,966	5,573	1,704	—
Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension	—	—	—	—	—	—	1,867	2,801	3,702	963	320
Subtotal, Blood Diseases and Resources	8,258	3,395	6,411	3,468	3,971	3,688	2,758	6,767	9,275	2,667	320
Total, NHLBI Clinical Trials Contracts	\$115,697	\$87,402	\$92,485	\$97,676	\$108,563	\$78,650	\$28,069	\$54,587	\$70,810	\$68,502	\$74,142

Institute-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

Cooperative Agreements

	Dollars (Thousands)											
	Fiscal Year											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Heart and Vascular Diseases												
Bypass Angioplasty Revascularization Investigation (BARI)	\$ 1,634	\$ 1,549	\$ 1,456	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Obesity Prevention in Young American Indians (PATHWAYS)	2,459	—	—	—	—	—	—	—	—	—	—	—
Girls Health Enrichment Multisite Studies (GEMS)	2,365	2,877	2,713	—	—	—	—	—	—	—	—	—
Trial of Activity for Adolescent Girls (TAAG)	5,274	4,831	5,919	5,828	6,350	5,103	905	—	—	—	—	—
Pediatric Heart Network Clinical Research Consortium To Improve Resuscitation Outcome	—	3,447	4,822	5,381	4,948	3,992	6,988	6,607	12,255	7,637	7,471	6,244
Dynamic Assessment of Patient-Reported Chronic Disease Outcomes	—	—	—	—	1,010	—	—	—	—	—	—	—
Heart Failure Clinical Research Network	—	—	—	—	—	—	5,642	7,801	7,813	7,939	262	—
Pediatric HIV/AIDS Cohort Study (PHACS)—Data and Operations Center	—	—	—	—	—	—	1,000	500	490	500	—	—
Cardiovascular Cell Therapy Research Network	—	—	—	—	—	—	—	4,424	7,568	6,227	6,200	—
Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives	—	—	—	—	—	—	1,419	2,314	3,151	1,999	2,071	—
Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine	—	—	—	—	—	—	—	6,009	8,681	3,210	8,079	—
EDTA Chelation Therapy for Coronary Artery Disease	—	—	—	—	—	—	—	—	—	2,109	—	—
Practice-Based Opportunity for Weight Reduction (POWER) Trials*	—	—	—	—	—	—	—	—	—	3,729	2,329	—
Look AHEAD: Action for Health in Diabetes	—	—	—	—	—	—	—	—	—	—	—	4,000
Diabetes Prevention Program Outcomes Study—Phase II	—	—	—	—	—	—	—	—	—	—	—	1,100
Early Adult Reduction of Weight Through Lifestyle Intervention (EARLY) Trials**	—	—	—	—	—	—	—	—	—	4,656	5,864	—

* Formerly known as Weight Loss in Obese Adults With Cardiovascular Risk Factors.

** Formerly known as Targeted Approaches to Weight Control for Young Adults.

Institute-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

Cooperative Agreements (continued)

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Heart and Vascular Diseases (continued)											
Childhood Obesity Prevention and Treatment Research (COPTR)	—	—	—	—	—	—	—	—	—	—	4,058
Effectiveness Research on Smoking Cessation in Hospitalized Patients	—	—	—	—	—	—	—	—	—	—	3,322
Other Clinical Trials	—	—	—	—	—	—	—	—	—	—	78,858
Subtotal, Heart and Vascular Diseases	11,732	12,704	14,910	11,209	19,194	18,434	28,249	40,341	48,893	43,106	129,858
Lung Diseases											
Asthma Clinical Research Network (ACRN) [†]	—	—	—	8,181	8,424	8,667	7,839	8,918	872	—	—
Childhood Asthma Research and Education (CARE) Network	5,002	5,314	6,005	5,610	5,292	5,704	5,735	5,916	4,887	—	—
COPD Clinical Research Network	—	—	—	6,843	6,848	8,438	7,664	6,836	3,400	3,150	3,150
Idiopathic Pulmonary Fibrosis Clinical Research Network	—	—	—	—	—	3,486	7,349	7,216	7,154	7,325	—
NICHD Cooperative Multicenter Neonatal Research Network	—	—	—	—	—	—	1,336	238	27	—	—
Asthma Network (AsthmaNet)	—	—	—	—	—	—	—	—	—	8,300	15,500
Novel Therapies for Lung Diseases—Phase II	—	—	—	—	—	—	—	—	—	—	7,594
Subtotal, Lung Diseases	5,002	5,314	6,005	20,634	20,564	26,295	29,923	29,124	16,340	18,775	26,244
Blood Diseases and Resources											
Thalassemia (Cooley's Anemia) Clinical Research Network	2,192	2,219	2,269	2,320	2,375	2,730	2,682	2,618	2,600	658	—
Blood and Marrow Transplant Clinical Research Network	—	5,360	5,899	5,950	5,972	6,460	6,845	6,709	6,952	6,351	2,507
Transfusion Medicine/Hemostasis Clinical Research Network	—	—	6,053	6,241	6,093	6,221	6,521	6,407	6,374	6,541	6,590
Sickle Cell Disease Clinical Research Network	—	—	—	—	—	—	3,761	7,498	7,173	—	—
Subtotal, Blood Diseases and Resources	2,192	7,579	14,221	14,511	14,440	15,411	19,809	23,232	23,099	13,550	9,097
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	\$18,926	\$25,597	\$35,136	\$46,354	\$54,198	\$60,140	\$77,981	\$92,697	\$88,332	\$75,431	\$165,199
Total, NHLBI-Initiated Clinical Trials	\$134,623	\$112,999	\$127,621	\$144,030	\$162,761	\$138,790	\$106,050	\$147,284	\$159,142	\$143,933	\$239,341

[†] Investigator-Initiated from 1998 to 2002.

Institute-Initiated Clinical Trials, Fiscal Year 2010: Summary by Program

Contracts

	Total Obligations Prior to FY 2010	Total FY 2010 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Action To Control Cardiovascular Risk in Diabetes (ACCORD)	\$ 142,184,481	\$ 403,065	\$ 142,587,546
Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT)	83,170,059	1,235,371	84,405,430
Clarification of Optimal Anticoagulation Through Genetics (COAG)*	6,167,062	—	6,167,062
Systolic Blood Pressure Intervention Trial (SPRINT)	7,508,288	29,374,119	36,882,407
Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT)	26,016,365	897,950	26,914,315
Women's Health Initiative (WHI)	790,662,086	2,408,632	793,070,718
Subtotal, Heart and Vascular Diseases	1,055,708,341	34,319,137	1,090,027,478
Lung Diseases			
Acute Respiratory Distress Syndrome Clinical Network (ARDSNET)	71,534,973	7,207,532	78,742,505
Long-Term Oxygen Treatment Trial (LOTT)	16,452,447	4,334,914	20,787,361
Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS)	2,081,851	27,960,468	30,042,319
Subtotal, Lung Diseases	90,069,271	39,502,914	129,572,185
Blood Diseases and Resources			
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	21,847,533	—	21,847,533
Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension	9,333,094	320,083	9,653,177
Subtotal, Blood Diseases and Resources	31,180,627	320,083	31,500,710
Total, NHLBI-Initiated Clinical Trials, Contracts	\$1,176,958,239	\$74,142,134	\$1,251,100,373

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.

Note: From 1999 to 2006, the WHI was reported separately under its own major heading. In this table, it is included in the Heart and Vascular Diseases section.

Cooperative Agreements

	Total Obligations Prior to FY 2010	Total FY 2010 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Cardiovascular Cell Therapy Research Network	\$ 18,219,368	\$ 6,199,959	\$ 24,419,327
Childhood Obesity Prevention and Treatment Research (COPTR)	—	4,058,435	4,058,435
Clinical Research Consortium To Improve Resuscitation Outcome	40,203,762	6,243,690	46,447,452
Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives	8,882,655	2,070,651	10,953,306
Diabetes Prevention Program Outcomes Study—Phase II	1,100,000	1,100,000	2,200,000
Early Adult Reduction of Weight Through Lifestyle Intervention (EARLY) Trials*	4,656,109	5,863,594	10,519,703
Effectiveness Research on Smoking Cessation in Hospitalized Patients	—	3,321,649	3,321,649
Heart Failure Clinical Research Network	29,194,950	262,170	29,457,120
Look AHEAD: Action for Health in Diabetes	4,000,000	4,000,000	8,000,000
Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine	17,900,101	8,078,705	25,978,806
Pediatric Heart Network	55,877,857	7,471,016	63,348,873
Pediatric HIV/AIDS Cohort Study: Data and Operations Center (PHACS)	2,490,000	—	2,490,000
Practice-Based Opportunity for Weight Reduction (POWER) Trials**	13,666,191	2,329,121	15,995,312
Other Clinical Trials	—	78,858,002	78,858,802
Subtotal, Heart and Vascular Diseases	196,190,993	129,857,792	326,048,785
Lung Diseases			
Asthma Network (AsthmaNet)	8,300,000	15,500,000	23,800,000
COPD Clinical Research Network	43,180,386	3,150,000	46,330,386
Novel Therapies for Lung Diseases—Phase II	—	7,593,739	7,593,739
Subtotal, Lung Diseases	51,480,386	26,243,739	70,130,386
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	56,563,600	2,507,421	59,071,021
Transfusion Medicine/Hemostasis Clinical Research Network	50,450,201	6,589,859	57,040,060
Subtotal, Blood Diseases and Resources	107,013,801	9,097,280	116,111,081
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	\$354,685,180	\$165,198,811	\$512,290,252
Total, NHLBI-Initiated Clinical Trials	\$1,531,643,419	\$239,340,945	\$1,763,390,625

* Formerly known as Targeted Approaches to Weight Control for Young Adults.

** Formerly known as Weight Loss in Obese Adults With Cardiovascular Risk Factors.

Heart and Vascular Diseases Program

Action To Control Cardiovascular Risk in Diabetes (ACCORD), Initiated in Fiscal Year 1999

The purpose of this multicenter, randomized clinical trial was to evaluate the ability of three treatment strategies (intensive glycemic control, intensive blood pressure control, and fibrate treatment to raise HDL-cholesterol and lower triglycerides) to prevent major cardiovascular events in adults who have type 2 diabetes mellitus and are at high risk for heart attack and stroke. The primary outcome measure was CVD mortality or major morbidity (MI and stroke). A total of 10,251 participants were recruited across 77 clinical sites in the United States and Canada. In February 2008, the glycemia trial was terminated early due to a higher mortality in the intensive glycemia treatment strategy compared with the standard treatment strategy. The lipid and blood pressure trials were continued, and interventions were stopped on June 30, 2009, for all participants.

Obligations

Funding History:

Fiscal Year 2010—\$403,065

Fiscal Years 1999–2009—\$142,184,481

Total Funding to Date—\$142,587,546

Current Active Organizations and Contract Numbers

1. Veterans Affairs Medical Center,
Albuquerque
Albuquerque, New Mexico —HC-10100
2. Veterans Affairs Medical Center, Memphis
Memphis, Tennessee —HC-90350
3. Wake Forest University
Winston-Salem, North Carolina —HC-95178
4. McMaster University
Hamilton, Ontario —HC-95179
5. University of Washington
Seattle, Washington —HC-95180
6. Case Western Reserve University
Cleveland, Ohio —HC-95181
7. Wake Forest University
Winston-Salem, North Carolina —HC-95182
8. Minneapolis Medical Research Foundation
Minneapolis, Minnesota —HC-95183
9. Trustees of Columbia University of
New York
New York, New York —HC-95184

Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT), Initiated in Fiscal Year 1993

The purposes of this study were to compare the ability of a diuretic versus newer antihypertensive treatments (ACE inhibitor, calcium channel blocker, alpha blocker) to lower the combined incidence of fatal CHD and nonfatal MI in high-risk hypertensive patients, and to determine whether lowering serum cholesterol with an HMG CoA reductase inhibitor reduced the total mortality in a subset of hypertensive patients with moderately elevated LDL cholesterol. A high percentage of minorities participated in the study. In February 2000, the alpha blocker arm of the study was discontinued because the CVD event rate was significantly greater among those patients compared with those in the control group.

Results were published in 2002 and showed that diuretics work best to both lower blood pressure and prevent stroke and some forms of heart disease, including heart attack and heart failure. To answer additional scientific questions, a post-trial follow-up of participants through 2006 was conducted to obtain data on post-trial morbidity and mortality. The objective was to compare long-term effects of antihypertensive treatment with a thiazide-type diuretic, a calcium channel blocker, an ACE inhibitor, and an alpha receptor blocker when each drug was used as initial treatment, with step-up drugs added as needed for the lipid component, to assess long-term effects of pravastatin compared with usual care.

Obligations

Funding History:

Fiscal Year 2010—\$1,235,371

Fiscal Years 1993–2009—\$83,170,059

Total Funding to Date—\$84,405,430

Current Active Organization and Contract Number

1. University of Texas
Health Science Center
Houston, Texas —HC-35130

Cardiovascular Cell Therapy Research Network, Initiated in Fiscal Year 2007

The purpose of this program is to establish a research network to evaluate innovative cell therapy strategies for individuals with CVD. The network will provide the necessary infrastructure to develop, coordinate, and conduct multiple collaborative clinical protocols to facilitate

application of emerging scientific discoveries to improve CVD outcomes.

Obligations

Funding History:

Fiscal Year 2010—\$6,199,959

Fiscal Years 2007–2009—\$18,219,368

Total Funding to Date—\$24,419,327

Current Active Organizations and Grant Numbers

1. Case Western Reserve University
Cleveland, Ohio —HL-087314
2. University of Texas
Health Science Center
Houston, Texas —HL-087318
3. Texas Heart Institute
Houston, Texas —HL-087365
4. University of Florida
Gainesville, Florida —HL-087366
5. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-087394
6. Vanderbilt University
Nashville, Tennessee —HL-087403

Childhood Obesity Prevention and Treatment Research (COPTR), Initiated in Fiscal Year 2010

The purpose of this research consortium is to test interventions to prevent excess weight gain in non-overweight and overweight youth and to reduce weight in obese and severely obese youth. Two obesity prevention trials will develop and test approaches that target home, community, and primary care settings for preschool children living in low-income and ethnically diverse neighborhoods.

Two obesity treatment trials will examine the therapies on overweight and obese children, 7- to 15-year olds, in school and home settings in collaboration with local youth organizations. More than 50 percent of the participants are expected to be from racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$4,058,435

Total Funding to Date—\$4,058,435

Current Active Organizations and Grant Numbers

1. University of North Carolina at
Chapel Hill
Chapel Hill, North Carolina —HL-103561

2. Vanderbilt University
School of Medicine
Nashville, Tennessee —HL-103620
3. Case Western Reserve University
Cleveland, Ohio —HL-103622
4. Stanford University
Palo Alto, California —HL-103629

Clarification of Optimal Anticoagulation Through Genetics (COAG),* Initiated in Fiscal Year 2008

The purpose of this randomized, multicenter clinical trial is to compare two approaches to the initiation of warfarin therapy for optimal anticoagulation. One approach is based on algorithms using clinical information and an individual's genotype using genes known to influence warfarin response ("genotype-guided dosing"), and the other is based on algorithms using only clinical information ("clinical-guided dosing"). Approximately 1,200 participants will be randomized over a 2-year period at 12 medical centers throughout the United States. The primary endpoint is anticoagulation control during the first month of therapy. The trial will assess anticoagulation control, bleeding problems and other complications, quality of life, and cost of therapy up to 6 months after initiation of therapy.

Obligations

Funding History:

Fiscal Year 2010—\$0

Fiscal Years 2008–2009—\$6,167,062

Total Funding to Date—\$6,167,062

Current Active Organization and Contract Number

1. University of Pennsylvania
Philadelphia, Pennsylvania —HV-88210

Clinical Research Consortium To Improve Resuscitation Outcomes, Initiated in Fiscal Year 2004

The purpose of this program is to conduct research in cardiopulmonary arrest and severe traumatic injury to facilitate the rapid translation of promising scientific and clinical advances to improve resuscitation outcomes. The Consortium conducts multiple, collaborative clinical trials and studies that focus primarily on the out-of-hospital clinical emergency setting. To date, it has established an infrastructure of 245 emergency medical

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.

service (EMS) agencies and nearly 35,000 EMS providers that covers more than 22 million people throughout North America.

Obligations

Funding History:

Fiscal Year 2010—\$6,243,690

Fiscal Years 2004–2009—\$40,203,762

Total Funding to Date—\$46,447,452

Current Active Organizations and Grant Numbers

1. University of Washington
Seattle, Washington —HL-077863
2. Medical College of Wisconsin
Milwaukee, Wisconsin —HL-077866
3. University of Washington
Seattle, Washington —HL-077867
4. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-077871
5. St. Michael's Hospital
Toronto, Ontario —HL-077872
6. Oregon Health and Science University
Portland, Oregon —HL-077873
7. University of Alabama at Birmingham
Birmingham, Alabama —HL-077881
8. Ottawa Health Research Institute
Ottawa, Ontario —HL-077885
9. University of Texas
Southwestern Medical Center
Dallas, Texas —HL-077887
10. University of California, San Diego
La Jolla, California —HL-077908

Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives, Initiated in Fiscal Year 2006

The purpose of this program is to develop and evaluate the effectiveness of culturally appropriate interventions to promote the adoption of healthy lifestyle behaviors to reduce CVD risk in American Indian/Alaska Native communities. Interventions focus on weight reduction, regular physical activity, and smoking cessation. A central feature of this project is to develop interventions that can be incorporated into clinical programs of the community health care system or delivered through public health approaches in Native communities.

Obligations

Funding History:

Fiscal Year 2010—\$2,070,651

Fiscal Years 2006–2009—\$8,882,655

Total Funding to Date—\$10,953,306

Current Active Organizations and Grant Numbers

1. University of Washington
Seattle, Washington —HL-087322
2. University of Oklahoma Health
Sciences Center
Oklahoma City, Oklahoma —HL-087354
3. University of Wisconsin—Madison
Madison, Wisconsin —HL-087381
4. Black Hills Center/American Indian
Health
Rapid City, South Dakota —HL-087422

Diabetes Prevention Program Outcomes Study—Phase II, Initiated in Fiscal Year 2009

The purpose of this multicenter clinical trial is to determine the efficacy of treatments to prevent or delay the development of type 2 diabetes in a population at high risk due to the presence of impaired glucose tolerance. The Phase II trial will continue to follow the original cohort to determine the long-term effects of the interventions (metformin versus lifestyle) on further diabetes development, microvascular outcomes, and CVD and CVD risk factors. Forty-five percent of participants are from diverse minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$1,100,000

Fiscal Year 2009—\$1,100,000

Total Funding to Date—\$2,200,000

Current Active Organizations and Grant Numbers

1. University of Colorado
Aurora, Colorado —DK-048375
2. Louisiana State University
Pennington Biomedical Research Center
Baton Rouge, Louisiana —DK-048377
3. Northwestern University
Chicago, Illinois —DK-048380
4. University of Chicago
Chicago, Illinois —DK-048381
5. MEDSTAR Research Institute
Hyattsville, Maryland —DK-048387
6. St. Luke's Roosevelt Institute
for Health Sciences
New York, New York —DK-048404
7. Indiana University-Purdue
University at Indianapolis
Indianapolis, Indiana —DK-048406
8. University of New Mexico
Albuquerque, New Mexico —DK-048407

9. University of Tennessee Health Science Center Memphis, Tennessee	—DK-048411
10. Seattle Institute for Biomedical and Clinical Research Seattle, Washington	—DK-048413
11. University of California, Los Angeles Los Angeles, California	—DK-048443
12. Thomas Jefferson University Philadelphia, Pennsylvania	—DK-048468
13. Johns Hopkins University Baltimore, MD	—DK-048485
14. George Washington University Washington, DC	—DK-048489
15. University of Texas Health Science Center San Antonio, Texas	—DK-048514

Early Adult Reduction of Weight Through Lifestyle Intervention (EARLY) Trials,* Initiated in Fiscal Year 2009

The purpose of this program is to conduct two-phase clinical research to refine and test innovative behavioral approaches for weight control—using mobile phones, social networks, and Web-based curricula—in young adults, ages 18–35 years, who are at high risk for weight gain. During Phase I, researchers will refine proposed intervention, recruitment, retention, and adherence strategies. During Phase II, researchers will test the efficacy of the interventions that will address weight loss, prevention of weight gain, or prevention of excessive weight gain during pregnancy. Targeted populations include pregnant and postpartum women, community college and university students, and young adults who are trying to quit smoking.

Obligations

Funding History:

Fiscal Year 2010—\$5,863,594

Fiscal Year 2009—\$4,656,109

Total Funding to Date—\$10,519,703

Current Active Organizations and Grant Numbers

1. University of Tennessee Health Science Center Memphis, Tennessee	—HL-096628
2. University of California, San Diego La Jolla, California	—HL-096715
3. Duke University Durham, North Carolina	—HL-096720

4. Cornell University Ithaca, New York	—HL-096760
5. University of Minnesota, Twin Cities Minneapolis, Minnesota	—HL-096767
6. University of Pittsburgh Pittsburgh, Pennsylvania	—HL-096770

Effectiveness Research on Smoking Cessation in Hospitalized Patients, Initiated in Fiscal Year 2010

The purposes of this study are to (a) evaluate the translation of efficacious smoking cessation strategies initiated during hospitalization and continued post-discharge into effective programs that can be widely implemented in routine clinical practice and (b) assess the cost effectiveness of the interventions.

Obligations

Funding History:

Fiscal Year 2010—\$3,321,649

Total Funding to Date—\$3,321,649

Current Active Organizations and Grant Numbers

1. University of Michigan at Ann Arbor Ann Arbor, Michigan	—HL-105218
2. New York University School of Medicine New York, New York	—HL-105229
3. Kaiser Foundation Research Institute Oakland, California	—HL-105231
4. University of Kansas Medical Center Kansas City, Kansas	—HL-105232

Heart Failure Clinical Research Network, Initiated in Fiscal Year 2006

The purpose of this network is to accelerate research in the diagnosis and management of heart failure in order to improve outcomes through optimal application of existing therapies and evaluation of novel therapies. The network provides the necessary infrastructure to develop, coordinate, and conduct multiple collaborative clinical protocols to facilitate application of emerging basic science discoveries into clinical investigations.

Obligations

Funding History:

Fiscal Year 2010—\$262,170

Fiscal Years 2006–2009—\$29,194,950

Total Funding to Date—\$29,457,120

* Formerly known as Targeted Approaches to Weight Control for Young Adults.

Current Active Organizations and Grant Numbers

1. Minneapolis Medical Research Foundation, Inc. Minneapolis, Minnesota	—HL-084861
2. Duke University Durham, North Carolina	—HL-084875
3. Brigham and Women's Hospital Boston, Massachusetts	—HL-084877
4. University of Utah Salt Lake City, Utah	—HL-084889
5. Baylor College of Medicine Houston, Texas	—HL-084890
6. Morehouse School of Medicine Atlanta, Georgia	—HL-084891
7. University of Vermont and State Agriculture College Burlington, Vermont	—HL-084899
8. Duke University Durham, North Carolina	—HL-084904
9. Mayo Clinic College of Medicine Rochester, Minnesota	—HL-084907
10. Montreal Heart Institute Montreal, Quebec, Canada	—HL-084931

Look AHEAD: Action for Health in Diabetes, Initiated in Fiscal Year 2009

The purpose of this multicenter randomized clinical trial is to determine the effect of a lifestyle intervention—designed to achieve and maintain weight loss over the long term through decreased caloric intake and exercise—in obese individuals with type 2 diabetes. Participants have been randomly assigned to one of two interventions—either Lifestyle Intervention or Diabetes Support and Education—and will be followed for up to 11.5 years. The trial will monitor major cardiovascular events, such as heart attack, stroke, and cardiovascular-related death. Investigators will also examine the impact of the interventions on other cardiovascular disease-related outcomes, cardiovascular risk factors, all-cause mortality, diabetes control and complications, fitness, general health, and health-related quality of life and psychological outcomes. One of the 16 clinical centers is targeting American Indians.

Obligations

Funding History:

Fiscal Year 2010—\$4,000,000
Fiscal Year 2009—\$4,000,000
Total Funding to Date—\$8,000,000

Current Active Organizations and Grant Numbers

1. University of Alabama at Birmingham Birmingham, Alabama	—DK-057008
2. University of Tennessee Health Science Center Memphis, Tennessee	—DK-057078
3. University of Pennsylvania Philadelphia, Pennsylvania	—DK-057135
4. University of Colorado Denver, Colorado	—DK-057151

Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine, Initiated in Fiscal Year 2007

The purpose of this program is to establish a network to evaluate newer surgical techniques, technologies, devices, and innovative pharmaceutical and bioengineered products directed at CVD to ensure that the public has access to the best procedures. The Network will also serve as a clinical trials training ground for fellows and junior faculty.

Obligations

Funding History:

Fiscal Year 2010—\$8,078,705
Fiscal Years 2007–2009—\$17,900,101
Total Funding to Date—\$25,978,806

Current Active Organizations and Grant Numbers

1. University of Virginia, Charlottesville Charlottesville, Virginia	—HL-088925
2. Emory University Atlanta, Georgia	—HL-088928
3. Albert Einstein College of Medicine of Yeshiva University Bronx, New York	—HL-088939
4. Columbia University Health Sciences New York, New York	—HL-088942
5. Mount Sinai School of Medicine New York, New York	—HL-088951
6. Duke University Durham, North Carolina	—HL-088953
7. Case Western Reserve University Cleveland, Ohio	—HL-088955
8. University of Pennsylvania Philadelphia, Pennsylvania	—HL-088957
9. Montreal Heart Institute Montreal, Quebec, Canada	—HL-088963

Pediatric Heart Network, Initiated in Fiscal Year 2001

The objective of this study is to establish a clinical network to evaluate novel treatment methods and management strategies for children with structural congenital heart disease, inflammatory heart disease, heart muscle disease, or arrhythmias.

Obligations

Funding History:

Fiscal Year 2010—\$7,471,016
Fiscal Years 2001–2009—\$55,877,857
Total Funding to Date—\$63,348,873

Current Active Organizations and Grant Numbers

1. Duke University
Durham, North Carolina —HL-068269
2. New England Research Institute, Inc.
Watertown, Massachusetts —HL-068270
3. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-068279
4. Medical University of South Carolina
Charleston, South Carolina —HL-068281
5. Children's Hospital
Boston, Massachusetts —HL-068285
6. Hospital for Sick Children
Toronto, Ontario —HL-068288
7. Columbia University Health Sciences
New York, New York —HL-068290
8. University of Utah
Salt Lake City, Utah —HL-068292
9. Children's Hospital Medical Center
Cincinnati, Ohio —HL-085057

Pediatric HIV/AIDS Cohort Study (PHACS)—Data and Operations Center, Initiated in Fiscal Year 2006

The purpose of this study is to create a body of data to (a) understand more fully the effect of HIV on sexual maturation, pubertal development, and socialization of perinatally HIV-infected preadolescents and adolescents and (b) acquire more definitive information about the long-term safety of antiretroviral agents when used during pregnancy and in newborns.

Obligations

Funding History:

Fiscal Year 2010—\$0
Fiscal Years 2006–2009—\$2,490,000
Total Funding to Date—\$2,490,000

Current Active Organization and Contract Number

1. Harvard University
Boston, Massachusetts —HD-052102

Practice-Based Opportunity for Weight Reduction (POWER) Trials,* Initiated in Fiscal Year 2006

The purpose of this program is to conduct randomized clinical trials in routine clinical practice settings to test the effectiveness of weight loss interventions in obese patients who have one or more additional cardiovascular risk factors. Unlike traditional multicenter clinical trials, each study functions as an independent trial with a distinct protocol, but efforts are made to coordinate and standardize several aspects of the trials. Forty-five to 100 percent of the participants are from racial and ethnic minority populations.

Obligations

Funding History:

Fiscal Year 2010—\$2,329,121
Fiscal Years 2006–2009—\$13,666,191
Total Funding to Date—\$15,995,312

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-087071
2. University of Pennsylvania
Philadelphia, Pennsylvania —HL-087072
3. Johns Hopkins University
Baltimore, Maryland —HL-087085

Systolic Blood Pressure Intervention Trial (SPRINT), Initiated in Fiscal Year 2009

The purpose of this study is to determine whether intensive lowering of systolic blood pressure below the currently recommended standard will reduce the risk of cardiovascular and kidney diseases or age-related cognitive decline. About 9,250 participants with systolic blood pressure ≥ 130 mm Hg will be recruited at approximately 90 clinics within 5 clinical center networks over a 2-year period and will be followed for 4–6 years.

* Formerly known as Weight Loss in Obese Adults With Cardiovascular Risk Factors.

Among the participants, approximately 4,300 will have chronic kidney disease and 3,250 will be aged 75 years and older. The primary endpoints are nonfatal MI, acute coronary syndrome, stroke, heart failure, or CVD mortality. Secondary endpoints include decline in renal function or development of end stage renal disease. The MIND substudy will focus on the effect of lowering systolic blood pressure to reduce the decline in cognitive function.

Obligations

Funding History:

Fiscal Year 2010—\$29,374,119
Fiscal Year 2009—\$7,508,288
Total Funding to Date—\$36,882,407

Current Active Organizations and Contract Numbers

1. Wake Forest University Health Science Center
Winston-Salem, North Carolina —HC-95240
2. University of Utah
Salt Lake City, Utah —HC-95255
3. University of Birmingham
Birmingham, Alabama —HC-95256
4. Wake Forest University Health Science Center
Winston-Salem, North Carolina —HC-95257
5. Case Western Reserve University
Cleveland, Ohio —HC-95258

Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT), Initiated in Fiscal Year 2004

The purpose of this international randomized trial is to evaluate the effectiveness of spironolactone, a generic and inexpensive drug, to reduce cardiovascular mortality and heart failure hospitalization in patients who have heart failure with preserved systolic function (left ventricular ejection fraction \geq 45 percent). The trial will recruit up to 3,500 patients in Argentina, Brazil, Canada, Republic of Georgia, Russia, and the United States.

Obligations

Funding History:

Fiscal Year 2010—\$897,950
Fiscal Years 2004–2009—\$26,016,365
Total Funding to Date—\$26,914,315

Current Active Organization and Contract Number

1. New England Research Institutes, Inc.
Watertown, Massachusetts —HC-45207

Women's Health Initiative (WHI), Initiated in Fiscal Year 1992

The purpose of the WHI was to study cardiovascular disease, cancer, and osteoporosis in postmenopausal women. The program consisted of three major components: randomized controlled clinical trials of HRT, dietary modification, and calcium/vitamin D supplementation; an observational study to identify predictors of disease; and a study of community approaches to developing healthful behaviors.

In 2007, the WHI began a program to maximize the scientific yield from the biologic resources and associated participant exposure and outcome data from the study. The program seeks innovative technologies that will enable comprehensive investigation of sets of markers associated with disease outcomes or treatment effects, or of groups of mediators that might explain the pathway of exposure or treatment effects on disease outcomes.

Obligations

Funding History:

Fiscal Year 2010—\$2,408,632
Fiscal Years 1992–2009*—\$790,662,086
Total Funding to Date—\$793,070,018

Current Active Organizations and Contract Numbers

1. Fred Hutchinson Cancer Research Center
Seattle, Washington —WH-22110
2. University of Medicine and Dentistry of New Jersey
Newark, New Jersey —WH-24152
3. Fred Hutchinson Cancer Research Center
Seattle, Washington —WH-32100
4. University of Minnesota, Twin Cities
Minneapolis, Minnesota —WH-32101
5. University of Iowa College of Medicine
Iowa City, Iowa —WH-32102
6. University of Alabama at Birmingham
Birmingham, Alabama —WH-32105
7. Wake Forest University
Winston-Salem, North Carolina —WH-32106
8. Northwestern University
Chicago, Illinois —WH-32108

* This figure reflects funding for the clinical trials and observational studies only. From 1992 to 1998, major support was provided through the Office of the Director, NIH. The Community Prevention Study receives funding through an inter-Agency agreement with the CDC: \$4,000,000 in FY 1999 and \$12,000,000 from FY 1996–1998.

9. Brigham and Women's Hospital Boston, Massachusetts	—WH-32109	34. Rush-Presbyterian-St. Luke's Medical Center Chicago, Illinois	—WH-42124
10. Emory University Atlanta, Georgia	—WH-32111	35. University of California, Los Angeles Los Angeles, California	—WH-42125
11. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-32112	36. University of Cincinnati Medical Center Cincinnati, Ohio	—WH-42126
12. University of California, Davis Davis, California	—WH-32113	37. University of Florida College of Medicine Gainesville, Florida	—WH-42129
13. University of Arizona Tucson, Arizona	—WH-32115	38. University of Hawaii at Manoa Honolulu, Hawaii	—WH-42130
14. University of Tennessee Memphis, Tennessee	—WH-32118	39. University of Miami Miami, Florida	—WH-42131
15. Memorial Hospital of Rhode Island Pawtucket, Rhode Island	—WH-32119	40. University of Wisconsin Madison, Wisconsin	—WH-42132
16. State University of New York at Buffalo Buffalo, New York	—WH-32122	41. Wake Forest University Winston-Salem, North Carolina	—WH-44221
17. University of California, Irvine Irvine, California	—WH-42107	42. Albert Einstein College of Medicine New York, New York	—WH-74310
18. George Washington University Washington, DC	—WH-42108	43. Brigham and Women's Hospital Boston, Massachusetts	—WH-74311
19. Stanford University Stanford, California	—WH-42109	44. California Pacific Medical Center San Francisco, California	—WH-74312
20. Baylor College of Medicine Houston, Texas	—WH-42110	45. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-74313
21. University of Texas Health Science Center San Antonio, Texas	—WH-42111	46. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-74314
22. Ohio State University Columbus, Ohio	—WH-42112	47. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-74315
23. University of Nevada School of Medicine Reno, Nevada	—WH-42113	48. Ohio State University Columbus, Ohio	—WH-74316
24. Kaiser Foundation Research Institute Oakland, California	—WH-42114	49. Tufts University Boston, Massachusetts	—WH-74317
25. State University of New York at Stony Brook Stony Brook, New York	—WH-42115	50. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-74318
26. University of Massachusetts Medical School Worcester, Massachusetts	—WH-42116	51. University of California, Davis Davis, California	—WH-74319
27. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—WH-42117	52. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-74320
28. Wayne State University Detroit, Michigan	—WH-42118	53. Wake Forest University Winston-Salem, North Carolina	—WH-74321
29. Albert Einstein College of Medicine New York, New York	—WH-42119	54. Ohio State University Columbus, Ohio	—WH-94341
30. Harbor-UCLA Research and Education Institute Torrance, California	—WH-42120	55. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-94342
31. Kaiser Foundation Research Institute Oakland, California	—WH-42121	56. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94343
32. Medical College of Wisconsin Milwaukee, Wisconsin	—WH-42122	57. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94344
33. MedStar Research Institute Washington, DC	—WH-42123	58. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94346

59. Fred Hutchinson Cancer Research Center
Seattle, Washington —WH-94347
60. Fred Hutchinson Cancer Research Center
Seattle, Washington —WH-94348
61. Albert Einstein College of Medicine
New York, New York —WH-94349
62. Brigham and Women's Hospital
Boston, Massachusetts —WH-94350

Lung Diseases Program

Acute Respiratory Distress Syndrome Clinical Network (ARDSNet), Initiated in Fiscal Year 1994

The purpose of this network is to develop and conduct randomized controlled clinical trials to prevent, treat, and improve the outcome of patients with acute lung injury, ARDS, and other related critical illnesses.

Obligations

Funding History:

- Fiscal Year 2010—\$7,207,532
- Fiscal Years 1994–2009—\$71,534,973
- Total Funding to Date—\$78,742,505

Current Active Organizations and Contract Numbers

1. Baystate Medical Center
Springfield, Massachusetts —HR-56165
2. University of California, San Francisco
San Francisco, California —HR-56166
3. University of Colorado
Health Sciences Center
Denver, Colorado —HR-56167
4. Cleveland Clinic Lerner College of
Medicine–Case Western Reserve University
Cleveland, Ohio —HR-56168
5. Duke University Medical Center
Durham, North Carolina —HR-56169
6. Johns Hopkins University
Baltimore, Maryland —HR-56170
7. LDS Hospital
Salt Lake City, Utah —HR-56171
8. Louisiana State University
New Orleans, Louisiana —HR-56172
9. University of Washington
Seattle, Washington —HR-56173
10. Vanderbilt University Medical Center
Nashville, Tennessee —HR-56174
11. Wake Forest University Health Sciences
Winston-Salem, North Carolina —HR-56175
12. Mayo Clinic College of Medicine
Rochester, Minnesota —HR-56176
13. Massachusetts General Hospital
Boston, Massachusetts —HR-56179

Asthma Network (AsthmaNet), Initiated in Fiscal Year 2009

The purpose of this network is to develop and conduct multiple clinical trials to address the most important asthma management questions and new treatment approaches in pediatric and adult populations. Investigators will identify optimal therapies for a variety of asthma phenotypes, genotypes, and racial and ethnic backgrounds. They will also conduct a limited number of proof-of-concept studies to advance the development of innovative therapies and perform studies to investigate the mechanistic bases for the interventions. Approximately 30 percent of the participants will be from diverse minority populations.

Obligations

Funding History:

- Fiscal Year 2010—\$15,500,000
- Fiscal Year 2009—\$8,300,000
- Total Funding to Date—\$23,800,000

Current Active Organizations and Grant Numbers

1. National Jewish Health
Denver, Colorado —HL-098075
2. University of Wisconsin, Madison
Madison, Wisconsin —HL-098090
3. Northwestern University
Chicago, Illinois —HL-098096
4. Washington University
St. Louis, Missouri —HL-098098
5. Brigham and Women's Hospital
Boston, Massachusetts —HL-098102
6. Wake Forest University Health
Science Center
Winston-Salem, North Carolina —HL-098103
7. University of California, San Francisco
San Francisco, California —HL-098107
8. University of Arizona
Tucson, Arizona —HL-098112
9. Pennsylvania State University
Hershey, Pennsylvania —HL-098115
10. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-098177

COPD Clinical Research Network, Initiated in Fiscal Year 2003

The purpose of this network is to investigate disease management approaches in patients with moderate-to-severe COPD and to ensure that the findings are rapidly disseminated to the medical community.

Obligations

Funding History:

Fiscal Year 2010—\$3,150,000

Fiscal Years 2003–2009—\$43,180,386

Total Funding to Date—\$46,330,386

Current Active Organizations and Grant Numbers

1. Harbor-UCLA Research and Education Institute Torrance, California	—HL-074407
2. Temple University Philadelphia, Pennsylvania	—HL-074408
3. Denver Health and Hospital Authority Denver, Colorado	—HL-074409
4. Minnesota Veterans Research Institute Minneapolis, Minnesota	—HL-074416
5. University of Alabama at Birmingham Birmingham, Alabama	—HL-074418
6. University of Michigan at Ann Arbor Ann Arbor, Michigan	—HL-074422
7. University of Minnesota, Twin Cities Minneapolis, Minnesota	—HL-074424
8. Brigham and Women's Hospital Boston, Massachusetts	—HL-074428
9. University of California, San Francisco San Francisco, California	—HL-074431
10. University of Pittsburgh Pittsburgh, Pennsylvania	—HL-074439
11. University of Maryland Baltimore Professional School Baltimore, Maryland	—HL-074441

Long-Term Oxygen Treatment Trial (LOTT), Initiated in Fiscal Year 2007

The purpose of this program is to determine the effectiveness and safety of long-term oxygen therapy in patients with COPD. Approximately 1,100 patients with moderate COPD will be enrolled to determine whether supplemental oxygen can improve their quality of life and extend their lifespan. Research findings will help Medicare decide whether to extend coverage for home oxygen treatment for patients with moderately severe disease.

Obligations

Funding History:

Fiscal Year 2010—\$4,334,914

Fiscal Years 2007–2009—\$16,452,447

Total Funding to Date—\$20,787,361

Current Active Organizations and Contract Numbers

1. Brigham and Women's Hospital Boston, Massachusetts	—HR-76183
2. Cleveland Clinic Foundation Cleveland, Ohio	—HR-76184
3. Denver Health and Hospital Authority Denver, Colorado	—HR-76185
4. Duke University Medical Center Durham, North Carolina	—HR-76186
5. Kaiser Foundation Hospitals Portland, Oregon	—HR-76187
6. Los Angeles Biomedical Institute/Harbor-UCLA Los Angeles, California	—HR-76188
7. Ohio State University Columbus, Ohio	—HR-76189
8. Temple University Philadelphia, Pennsylvania	—HR-76190
9. University of Alabama at Birmingham Birmingham, Alabama	—HR-76191
10. University of Michigan Ann Arbor, Michigan	—HR-76192
11. University of Pittsburgh Pittsburgh, Pennsylvania	—HR-76193
12. University of Utah Salt Lake City, Utah	—HR-76194
13. University of Washington Seattle, Washington	—HR-76195
14. Washington University St. Louis, Missouri	—HR-76196
15. Johns Hopkins University Baltimore, Maryland	—HR-76197

Novel Therapies for Lung Diseases—Phase II, Initiated in Fiscal Year 2010

The purpose of this study is to conduct proof-of-concept Phase II clinical trials that test novel interventions for a lung disease or a cardiopulmonary disorder from sleep. Investigators seek to identify interventions that will have the potential to significantly change clinical management.

Obligations

Funding History:

Fiscal Year 2010—\$7,593,739

Total Funding to Date—\$7,593,739

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital Boston, Massachusetts	—HL-102225
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2. University of Colorado Denver Aurora, Colorado	—HL-102235
3. University of Iowa Iowa City, Iowa	—HL-102288
4. Fred Hutchinson Cancer Research Center Seattle, Washington	—HL-102547
5. Brigham and Women's Hospital Boston, Massachusetts	—HL-105371
6. Johns Hopkins University Baltimore, Maryland	—HL-105569

Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS), Initiated in Fiscal Year 2009

The purposes of this study are to (a) define pathogenetically homogeneous subgroups of COPD subjects on the basis of biomarkers, genotypes, and computed tomography images and (b) identify immediate outcome measures for use in future clinical studies. Secondary aims are to clarify the natural history of COPD; develop bioinformatic resources that will enable the use and sharing of data in studies of COPD and related diseases; and create a collection of clinical, biomarker, radiographic, and genetic data that can be used by external investigators for other studies of COPD.

Obligations

Funding History:

Fiscal Year 2010—\$27,960,468
Fiscal Year 2009—\$2,081,851
Total Funding to Date—\$30,042,319

Current Active Organizations and Contract Numbers

1. University of California, San Francisco San Francisco, California	—HR-96199
2. University of California, Los Angeles Los Angeles, California	—HR-96200
3. Columbia University New York, New York	—HR-96201
4. University of Michigan at Ann Arbor Ann Arbor, Michigan	—HR-96202
5. University of Utah Salt Lake City, Utah	—HR-96203
6. Wake Forest University Winston-Salem, North Carolina	—HR-96204
7. University of Iowa Iowa City, Iowa	—HR-96205
8. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—HR-96206

Blood Diseases and Resources Program

Blood and Marrow Transplant Clinical Research Network, Initiated in Fiscal Year 2001

The purpose of this network is to compare novel treatment methods and management strategies of potential benefit for children and adults undergoing blood or marrow transplantation.

Obligations

Funding History:

Fiscal Year 2010—\$2,507,421
Fiscal Years 2001–2009—\$56,563,600
Total Funding to Date—\$59,071,021

Current Active Organizations and Grant Numbers

1. University of Nebraska Medical Center Omaha, Nebraska	—HL-069233
2. Fred Hutchinson Cancer Research Center Seattle, Washington	—HL-069246
3. Dana Farber Cancer Institute Boston, Massachusetts	—HL-069249
4. National Childhood Cancer Foundation Arcadia, California	—HL-069254
5. University of California, San Diego La Jolla, California	—HL-069273
6. Duke University Durham, North Carolina	—HL-069274
7. City of Hope Medical Center Duarte, California	—HL-069278
8. University of Pennsylvania Philadelphia, Pennsylvania	—HL-069286
9. University of Minnesota, Twin Cities Minneapolis, Minnesota	—HL-069290
10. Stanford University Stanford, California	—HL-069291
11. Medical College of Wisconsin Milwaukee, Wisconsin	—HL-069294
12. University of Florida Gainesville, Florida	—HL-069301
13. Johns Hopkins University Baltimore, Maryland	—HL-069310
14. Sloan Kettering Institute for Cancer Research New York, New York	—HL-069315
15. University of Michigan at Ann Arbor Ann Arbor, Michigan	—HL-069330
16. University of Texas M.D. Anderson Cancer Center Houston, Texas	—HL-069334
17. Case Western Reserve University Cleveland, Ohio	—HL-069348

Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG), Initiated in Fiscal Year 2000

The objective of this clinical trial is to determine if hydroxyurea therapy is effective in preventing chronic end organ damage in pediatric patients with sickle cell anemia.

Obligations

Funding History:

Fiscal Year 2010—\$0

Fiscal Years 2000–2009—\$21,847,533

Total Funding to Date—\$21,847,533

Current Active Organizations and Contract Numbers

1. Children's Research Institute
Washington, DC —HB-07150
2. Duke University Medical Center
Durham, North Carolina —HB-07151
3. Howard University
Washington, DC —HB-07152
4. Johns Hopkins University
Baltimore, Maryland —HB-07153
5. Medical University of South Carolina
Charleston, South Carolina —HB-07154
6. St. Jude Children's Research Hospital
Memphis, Tennessee —HB-07155
7. The Research Foundation of SUNY
New York, New York —HB-07156
8. University of Miami
Miami, Florida —HB-07157
9. University of Mississippi Medical Center
Jackson, Mississippi —HB-07158
10. University of Texas
Southwestern Medical Center
Dallas, Texas —HB-07159
11. Clinical Trials and Surveys Corporation
Baltimore, Maryland —HB-07160

Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension, Initiated in Fiscal Year 2006

The purpose of this clinical trial is to evaluate the safety and efficacy of 16 weeks of therapy with sildenafil, a nitric oxide potentiator, in adult patients with SCD and pulmonary hypertension. Exercise endurance and pulmonary artery pressure will be measured. Pulmonary hypertension occurs in up to 30 percent of SCD cases and is strongly associated with mortality in adults with SCD. All of the participants are black.

Obligations

Funding History:

Fiscal Year 2010—\$320,083

Fiscal Years 2006–2009—\$9,333,094

Total Funding to Date—\$9,653,177

Current Active Organizations and Contract Numbers

1. Rho Federal Systems Division, Inc.
Chapel Hill, North Carolina —HB-67182
2. Imperial College of London
London, England —HB-67183
3. Children's Hospital of Pittsburgh
Pittsburgh, Pennsylvania —HB-67184
4. University of Colorado
Denver, Colorado —HB-67185
5. Children's Hospital and Research Center
at Oakland
Oakland, California —HB-67186
6. University of Illinois at Chicago
Chicago, Illinois —HB-67187
7. Johns Hopkins University
Baltimore, Maryland —HB-67188
8. Howard University
Washington, DC —HB-67189
9. Albert Einstein College of Medicine of
Yeshiva University
New York, New York —HB-67190

Transfusion Medicine/Hemostasis Clinical Research Network, Initiated in Fiscal Year 2002

The purpose of this network is to promote the efficient comparison of new management strategies for individuals with hemostatic disorders, such as idiopathic thrombocytopenia and thrombotic thrombocytopenic purpura, and evaluate new and existing blood products and cytokines for treatment of hematologic disorders.

Obligations

Funding History:

Fiscal Year 2010—\$6,589,859

Fiscal Years 2002–2009—\$50,450,201

Total Funding to Date—\$57,040,060

Current Active Organizations and Grant Numbers

1. University of Iowa
Iowa City, Iowa —HL-072028
2. Case Western Reserve University
Cleveland, Ohio —HL-072033
3. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-072072

4. Johns Hopkins University Baltimore, Maryland	—HL-072191	12. Children’s Hospital Boston, Massachusetts	—HL-072291
5. Weill Medical College of Cornell University New York, New York	—HL-072196	13. Massachusetts General Hospital Boston, Massachusetts	—HL-072299
6. Emory University Atlanta, Georgia	—HL-072248	14. Puget Sound Blood Center Seattle, Washington	—HL-072305
7. New England Research Institutes, Inc. Watertown, Massachusetts	—HL-072268	15. University of Pittsburgh Pittsburgh, Pennsylvania	—HL-072331
8. Tulane University of Louisiana New Orleans, Louisiana	—HL-072274	16. University of Pennsylvania Philadelphia, Pennsylvania	—HL-072346
9. University of Oklahoma Health Sciences Center Oklahoma City, Oklahoma	—HL-072283	17. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—HL-072355
10. Duke University Durham, North Carolina	—HL-072289	18. University of Maryland Baltimore Professional School Baltimore, Maryland	—HL-072359
11. Blood Center of Southeastern Wisconsin Milwaukee, Wisconsin	—HL-072290		



12. Activities To Promote Diversity and Address Health Disparities

Throughout its history, the NHLBI has been a leader in conducting and supporting research to eliminate health disparities that exist between various segments of the U.S. population. The Institute has not only initiated research projects with significant minority participation to compare health status between various populations, but has also given high priority to programs that focus exclusively on minority health issues.

Since FY 1991, the Institute has had procedures in place to ensure full compliance with the NIH Policy on Inclusion of Women and Minorities as Subjects in Clinical Research. As a result, all NHLBI-supported research that involves human subjects includes minorities, with the exception of a very few projects for which a compelling justification for limited diversity in the study population exists. Thus, all segments of the population, minority and nonminority, women, and children, stand to benefit from the Institute's research programs.

It has long been a goal of the NHLBI to increase the number of individuals from underrepresented groups in biomedical and behavioral research. Selected FY 2010 activities addressing this goal include the following:

- Historically Black Colleges and Universities (HBCU) Research Scientist Award and the Research Scientist Award for Minority Institutions: Strengthens the biomedical and behavioral research capabilities and resources of HBCUs or minority institutions by recruiting an established research scientist in areas related to cardiovascular, lung, or blood health and disease; transfusion medicine; or sleep disorders
- Sickle Cell Scholars Program: Supports career development of young or new investigators in SCD research as part of the BTRP (see Chapter 9)
- Summer for Sickle Cell Science Program: Supports career development of young or new investigators in SCD research as part of the BTRP
- Clinical Research Education and Career Development in Minority Institutions: Encourages the development and implementation of curriculum-dependent programs in minority institutions to train selected doctoral and postdoctoral candidates in clinical research leading to a Master of Science Degree in Clinical Research or Master of Public Health Degree in a clinically relevant area
- Minority Undergraduate Biomedical Education Program: Encourages development of pilot demonstration programs at minority undergraduate educational institutions to recruit and retain talented undergraduate students in the biomedical sciences
- Short-Term Research Education Program To Increase Diversity in Health-Related Research: Promotes diversity in undergraduate and health professional student populations by offering short-term education support to stimulate career development in cardiovascular, lung, and blood diseases and sleep disorders research
- Program To Increase Diversity Among Individuals Engaged in Health-Related Research (PRIDE): Encourages scientists and research-oriented faculty from diverse backgrounds to expand their research skills and gain experience in advanced methods and experimental approaches in basic and applied sciences in heart, lung, and blood diseases and sleep disorders so that they can compete for external funding for research in the biomedical and behavioral sciences
- Mentored Career Development Award To Promote Faculty Diversity/Re-Entry in Biomedical Research: Promotes an increase in the number of highly trained investigators—from diverse backgrounds (i.e., faculty members who are from underrepresented racial and ethnic groups or who have disabilities or who are from disadvantaged backgrounds) or those who have experienced an interruption in their research careers—whose basic and clinical research interests are grounded in the advanced methods and experimental approaches needed to solve problems related to cardiovascular, lung, and blood diseases and sleep disorders.

The Office of Research Training and Minority Health (ORTMH) within the Office of the Director provides oversight for, and coordinates, supports, and evaluates Institute programs related to minority health outcomes, including research, research training and career development, public outreach, and translation of research findings. The ORTMH also coordinates activities to foster greater participation of underrepresented minorities in NHLBI research and research training and career development programs. Selected FY 2010 activities include the following:

- Issuing two training and career development RFAs to increase the number of highly trained individuals from diverse backgrounds, including underrepresented minorities, individuals from disadvantaged backgrounds, and individuals with disabilities
- Participating in HHS-Endorsed Minority Organization Internship Programs by supporting positions in NHLBI extramural and intramural divisions for students from the National Association for Equal Opportunity in Higher Education, the Hispanic Association of Colleges and Universities, the Washington Internships for Native Students programs, and the Directors of Health Promotion and Education Internship Program/CDC
- Sponsoring Out of the Box, a project for the Cherokee and Smoky Mountain Elementary Schools that is designed to create awareness and interest in the importance of science, medicine, and health; eliminate gaps in quality of health among minorities by encouraging health-related careers; and empower young children to take responsibility for their own health
- Supporting the African American, Hispanic, and Native American Youth Initiatives to bring minority students to the NIH campus for scientific presentations, an introduction to NHLBI research training and career development programs, and a tour of NHLBI laboratories
- Providing undergraduate students from the Tougaloo College Scholars program an opportunity to learn about the NIH, biomedical research, and research training opportunities at the NHLBI during a 3-day tour of the NIH
- Increasing recruitment of individuals for the NHLBI intramural and extramural training programs by representing the Institute at four diversity-focused research meetings to raise awareness of research and

research training and career development opportunities supported by the NHLBI

- Coordinating the Biomedical Research Training Program for Individuals from Underrepresented Groups, which offers opportunities for underrepresented undergraduate, postbaccalaureate, and graduate students to receive training in fundamental biomedical sciences and clinical research as they relate to the etiology and treatment of heart, blood vessel, lung, and blood diseases
- Serving as the NHLBI contact for guidance to candidates applying for the NIH Pathway to Independence Award and the NHLBI Career Transition Award for extramural programmatic issues

See Chapter 13 for additional NHLBI-supported research training and career development programs for individuals from diverse backgrounds.

The following text describes selected current projects that focus on minority populations and reflect the Institute's research portfolio related to minority health. Additional information can be found in Chapters 9–11.

Heart and Vascular Diseases

Epidemiology

Long-term epidemiologic studies are critical to uncovering risk factors that lead to disease. The Institute has initiated several major studies of heart disease focused significantly or completely on minority populations:

- **CARDIA** (see Chapter 10): To determine the evolution of CHD risk factors and lifestyle characteristics in young adults that may influence development of risk factors prior to middle age. Fifty percent of participants are black.
- **ARIC** (see Chapter 10): To investigate the association of CHD risk factors with development of atherosclerosis and CVD in an adult population. Thirty percent of participants are black.
- **Strong Heart Study** (see Chapter 9): To compare risk factor levels and morbidity and mortality from CVD among American Indians from three different geographic locations.
- **JHS** (see Chapter 10): To identify environmental and genetic factors influencing evolution and progression of CVD in blacks.

- MESA (see Chapter 10): To examine the characteristics of subclinical CVD that predict progression to clinically overt CVD and related risk factors that predict subclinical disease in blacks, whites, Hispanics, and Asians. Sixty-two percent of participants are from minority populations.
- GOCADAN (see Chapter 9): To document CVD risk factors and measures of subclinical disease and to identify and characterize genes that contribute to CVD in approximately 40 extended Alaska Native families.
- HCHS (see Chapter 10): To identify risk factors for cardiovascular and lung disease in Hispanic/Latino populations in the United States and determine the role of acculturation in their prevalence and development.

The Institute supports components of the NHANES that track the prevalence of disease and risk factors for cardiovascular and lung diseases by race and ethnicity in the U.S. population and the National Longitudinal Mortality Study that analyzes socioeconomic, demographic, occupational, and racial differentials in mortality in the United States.

The NHLBI also supports a variety of investigator-initiated research activities across a range of racial and ethnic groups on risk factors, genetic contributors, and health disparities in heart, lung, and blood diseases and sleep disorders. Many of them are ancillary studies to NHLBI-initiated cohort studies.

Risk Factors

Investigator-initiated studies on cardiovascular risk factors in ethnic and minority groups range in focus from biological to environmental, psychosocial, and cultural. Examples are studies to determine geographic and ethnic variations in the prevalence of CHD risk factors; investigate risk factors linked to atherosclerosis and disease progression in South Asians living in the United States; determine whether vascular injury is detectable at a young age in those with obesity and high blood pressure; compare the prevalence of vulnerable atherosclerotic plaque and differences in plaque vulnerability in blacks and whites; study the effects of arsenic exposure on diabetes and CVD in American Indians; and examine socio-cultural risk factors for CVD in Hispanics/Latinos.

Genetic Epidemiology

Areas of focus in genetic epidemiology include gene discovery through linkage studies in family-based samples and GWAS in population-based samples; effects of gene–environment interactions on risk factors and health; and genotypic characterization in relationship to intermediate phenotypes, such as biomarkers.

Genetic epidemiologic research is also beginning to transition to predicting and assessing genetic risk and reporting genetic results to participants of research studies. The activities offer unique insights into specific populations and general observations that are relevant to all populations. Examples are studies of genetics of hypertension in populations of West African origin; the role of stress in gene–environment interaction in a multi-ethnic population; the contribution of genetic variation to obstructive sleep apnea, impaired endothelial function, and central blood pressure in Mexican Americans; salt sensitivity and blood pressure in Chinese populations; genetics of high serum triglycerides and metabolic traits in Mexican Americans; genetic susceptibility to lipid disorders in blacks; and genetic variation that underlies obesity and obesity-related phenotypes among Samoan adults.

Health Disparities

The NHLBI is committed to supporting and conducting research that will contribute to reducing health disparities among racial and ethnic minorities. Efforts related to reducing health disparities include:

- CPHHD (see Chapter 9): To promote transdisciplinary research in health disparities to improve health outcomes and quality of life for populations at high risk for CVD.
- Cultural Competence and Health Disparities Academic Award Program: To enhance the ability of physicians and other health care professionals to address, in a culturally sensitive manner, disparities in the occurrence, management, and outcomes of cardiovascular, lung, and blood diseases and sleep disorders among various population groups in the United States. The program addresses ethnic, cultural, religious, socioeconomic, linguistic, and other factors that contribute to health disparities and seeks culturally competent approaches to mitigating them.
- Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives (see Chapter 11): To test the effectiveness of

culturally appropriate behavioral interventions that promote adoption of healthy lifestyles (healthy diet, regular physical activity, smoking cessation, and stress management) related to heart disease and stroke risk in American Indians and Alaska Natives.

The Institute supports ancillary studies to major Institute-initiated and investigator-initiated studies that characterize health disparities and their determinants in ethnic minorities. Projects integrating data from multiple sources include one that is developing a population-based surveillance system in a large U.S. metropolitan area to identify and track chronic disease disparities among several ethnic groups at the local level and another that is creating a state-wide network of information on health, health care quality, and public health resources to assess health disparities at the community level.

Other studies on determinants of health disparities include one that is investigating the impact of neighborhood socioeconomic status and psychosocial factors—such as discrimination, stress, and social support—on coronary heart disease risk in blacks in Mississippi; another that is studying the influences of cultural and environmental factors on ethnic disparities in obesity prevalence; a third that is examining black–white racial disparities in physician practice care for obesity and patient self-management of body weight; and a fourth that is determining the degree to which ethnic/racial bias among health care providers is associated with disparities in the management and control of hypertension in racial and ethnic minority populations.

Education

The NHLBI, through DARD, translates research findings into practice by developing clinical practice guidelines, communicating research advances, and disseminating health information to physicians, health care professionals, patients, and the public on ways to prevent or treat diseases within the Institute's mandate. The Institute has initiated the following activities to improve cardiovascular health in racial and cultural/ethnic groups:

- The Community Health Worker Initiative: To help improve cardiovascular health among black, Hispanic, American Indian, Alaska Native, and Filipino communities using community-based strategies.

- NHLBI–U.S. Department of Housing and Urban Development HOPE VI: To address cardiovascular health disparities in public housing settings. With the aid of the NHLBI heart health curriculum, residents of the black community are trained to become educators of other public housing residents.
- NHLBI–Health Resources and Services Administration Bureau of Primary Care Partnership: To integrate clinical care management teams and trained community health educators to implement pilot programs for blacks, Hispanics, and Filipinos in the United States who are at high risk for CVD.
- Salud para su Corazón: To develop networks to disseminate information and strategies about CVD prevention and control by promoting heart healthy behaviors in Hispanic communities.
- NHLBI–Pan American Health Organization/WHO Partnership To Promote Cardiovascular Health in the Americas: To develop and evaluate community-based interventions to prevent and control CVD risk factors among low-resource communities in Argentina, Chile, and Guatemala.
- Honoring the Gift of Heart Health: To develop and evaluate community-based interventions to prevent and control CVD risk factors through education and outreach using tribal community health workers and community health educators.
- Healthy Heart, Healthy Family: To develop and evaluate culturally and linguistically appropriate outreach activities and information to increase community awareness of heart disease and its associated risk factors and to promote heart healthy lifestyles among the growing Filipino population in the United States.
- *The Heart Truth*[®] Campaign: To raise awareness of heart disease in women through community-based interventions. Special populations are especially targeted through *The Heart Truth's* Women of Color Initiative, a partnership with national black and Hispanic organizations.
- *We Can!*[®] (Ways to Enhance Children's Activity & Nutrition): To help children, ages 8–13 years, maintain a healthy weight by providing curricula, tools, tips, and other resources to parents, caregivers, communities, and other organizations. Special attention is directed to black, Latino/Hispanic, and American Indian/Alaska Native populations.

In addition to the activities mentioned above, the Institute has prepared publications on CVD prevention for minority populations. They include the following:

- *With Every Heartbeat Is Life: A Community Health Worker's Manual for African Americans*
- *On the Move to Better Heart Health for African Americans* (easy-to-read booklet on heart healthy living)
- *Honoring the Gift of Heart Health: A Heart Health Educator Manual for American Indians and Alaska Natives*
- *Your Choice for Change: Honoring the Gift of Heart Health for American Indians* (easy-to-read booklet on heart healthy living)
- *Healthy Heart, Healthy Family: A Community Health Worker's Manual for the Filipino Community* in English and Tagalog
- *Vietnamese Aspire for Healthy Hearts* in Vietnamese and English
- *Your Heart Is Golden: Heart Health Promotion Activities for Vietnamese Communities*
- *Your Heart, Your Life: A Health Educator's Manual for the Latino Community* in English and Spanish
- *Healthy Homes, Healthy Hearts Series* (six easy-to-read English and Spanish booklets on heart healthy living)
- *Bringing Heart Health to Latinos: A Guide for Building Community Programs*
- *The Heart Truth for African American Women: An Action Plan*
- *The Heart Truth for Latinas: An Action Plan*

The educational materials listed throughout this chapter can be obtained from the NHLBI public Web site or through the NHLBI online catalog.

Arrhythmias

Arrhythmia is a disorder of the normal rhythms of the heart, whereby it beats too fast (tachycardia), too slow (bradycardia), or irregularly. The NHLBI is supporting basic and genetic research on the mechanisms that underlie cardiac arrhythmias to improve diagnosis, treatment, and prevention of arrhythmias in all racial and ethnic groups in the United States. One study is investigating

the genetic basis and electrophysiological mechanisms of Ca^{2+} triggered arrhythmias in inherited diseases and syndromes—such as catecholaminergic polymorphic ventricular tachycardia, long QT syndrome, and hypertrophic cardiomyopathy—as a means to improve understanding of the pathogenesis of sudden cardiac arrest. Another study is evaluating variants of the gene *NOS1AP* that affect the QT interval in various racial and ethnic populations. A third study is evaluating the distributions of electrocardiographic predictors of atrial fibrillation in racial and ethnic groups to identify whether minority populations may have a higher risk for this arrhythmia than whites.

Scientists have identified an association between variations in certain receptors that are activated during sympathetic nervous system stimulation and an increased risk of sudden cardiac death, most often due to ventricular arrhythmia. Although significant differences in associated risk of sudden cardiac death were not found between blacks and whites, continued research is expected to advance understanding of differences in genetic predisposition for cardiac arrhythmias among racial and ethnic groups and ultimately lead to improved therapy.

Investigators identified two mutations in a gene encoding the major intracellular calcium release channel in two cases of SIDS. One mutation was identified in 1 of 50 black infants and the other in 1 of 83 white infants. Researchers reported a pathogenic mechanism for SIDS, whereby SIDS-linked mutant ion channels become “leaky” during stress and thus potentially trigger fatal cardiac arrhythmias. Importantly, researchers have found further evidence that cardiac arrhythmias of genetic origin contribute to SIDS, a concept that offers a chance to prevent some avoidable tragedies.

Heart Failure

Heart failure (heart muscle dysfunction) affects about 5 million Americans of all ethnicities and is a growing public health concern. It is frequently the end result of other conditions, such as hypertension, diabetes, and prior heart attacks.

The NHLBI is supporting basic and clinical research associated with heart failure that will benefit Americans of all ethnicities. One Institute-initiated study is facilitating the translation of basic science discoveries into clinical applications:

- Heart Failure Clinical Research Network (see Chapter 9): To develop, coordinate, and conduct multiple collaborative proof-of-concept clinical protocols to improve heart failure outcomes. The Network has been expanded to include a historically black medical center with minority investigators and access to a high-risk, underserved population.

Investigator-initiated research targeting minority populations includes an examination of the role that impaired ATP synthesis and delivery contribute to contractile dysfunction in heart failure—30 percent of the participants are from racial minority populations; an investigation of genetic variations (especially those common in blacks) that affect individual responses to the beta blocker drugs used to treat heart failure; a study of underlying genetic variations that result in familial dilated cardiomyopathy, an inherited form of heart dysfunction; and a study on angioedema—a severe allergic reaction and a life-threatening side effect of ACE-inhibitor drugs that is more common in blacks than in whites. Investigators are determining the mechanisms that cause this side effect and are studying the genetic profile of affected individuals and their families to determine who should avoid taking the drugs.

Individuals with heart failure typically have a poor prognosis and a diminished quality of life. Inadequate health literacy skills, depression, and emotional stress are common and often associated with poor health outcome. One study seeks to determine whether a literacy-sensitive intervention to improve heart failure self-management skills can improve health outcomes, especially in those with inadequate literacy; 60 percent of the participants are from racial and ethnic minority populations. Another study seeks to determine whether cognitive behavioral intervention is superior to supportive clinical management for depressed outpatients with heart failure; 30 percent of participants are expected to be black. A third study is examining the role of emotional stress on heart failure exacerbations; currently, two-thirds of the participants is black. A fourth study is investigating whether an exercise intervention, such as tai chi, can increase physical function, cardiac functional capacity, and quality of life in patients with heart failure; 40 percent of the participants are expected to come from minority populations.

An investigator-initiated, multicenter observational clinical study is being conducted to improve the ability of physicians to identify and treat appropriately patients who are at high risk for serious complications from heart

failure. Participants will comprise individuals who visit the emergency department at one of three hospitals that treats racially and socioeconomically diverse patients.

High Blood Pressure

Etiology

High blood pressure is a serious health problem that is especially prevalent and severe among minorities. The NHLBI supports a number of investigator-initiated studies to identify genes linked to hypertension in blacks, Mexican Americans, and whites to determine if part of the disparity in prevalence can be attributed to genetic differences among the groups. Genes under investigation include those associated with the renin-angiotensin system, the autonomic nervous system, and sodium transport.

Other gene variants under investigation include those associated with adipokine regulatory genes. Based on evidence of a pro-inflammatory adipokine profile and markers of vascular injury in obese adolescents with high blood pressure but not in obese adolescents without high blood pressure, scientists are examining the contribution of genetic variants in adipokine regulatory genes to the development of vascular injury and high blood pressure in obese black adolescents.

The role of dietary factors, particularly macronutrients, in the etiology of high blood pressure is another area of investigation. Scientists are conducting epidemiologic studies among participants with diverse ethnicity, SES, and dietary habits in four countries to determine the effect of selected dietary components (proteins, lipids, carbohydrates, amino acids, calcium, magnesium, sodium, potassium, antioxidants, fiber, and caffeine) on blood pressure. Another study is seeking to identify the link between healthy diet, genetic factors, and their underlying biological mechanisms.

Treatment and Prevention

Identifying effective treatment strategies for various populations requires large-scale studies with representative populations in sufficient numbers.

- SPRINT (see Chapter 11): To determine whether intensive lowering of systolic blood pressure below the currently recommended standard will reduce the risk of cardiovascular and kidney diseases or age-related cognitive decline. At least 30 percent of the participants will be from racial and ethnic populations.

An investigator-initiated ancillary study to ALLHAT, the largest hypertension clinical trial conducted by the NHLBI, is evaluating the pharmacogenetic response to antihypertensive treatment and long-term clinical complications in blacks, whites, and Hispanics. Scientists are seeking to determine whether pharmacogenetics is a feasible approach to personalized therapy for hypertension.

The Institute also supports a number of investigator-initiated studies to prevent hypertension and improve blood pressure control in racial and ethnic minorities. Interventions target both lay and medical communities. Strategies being tested include communication skill enhancement, organizational change, educational programs, lifestyle and nutritional counseling, use of technology, case management, pharmacy-based interventions, and provision of care by community health workers and other nontraditional providers.

Understanding racial differences in blood pressure control is an area of major interest for the Institute. Scientists are examining whether variations in genes of the renin-angiotensin-aldosterone system predict differences in blood pressure response to diuretic therapy among hypertensive blacks and whites. Research is also focusing on variations in the ACE gene between blacks and whites to explain racial differences in the antihypertensive responsiveness to ACE inhibitors.

Education

The NHLBI has developed a number of outreach activities to inform minority populations of the importance of blood pressure control. Several publications and Web-based products have been developed for and introduced to health professionals, patients, and the public. Some examples are:

- *Plan de Alimentación Saludable Contra la Hipertensión: Prevenir y Controlar la Presión Arterial Alta Siguiendo el Plan de Alimentación Conocida Como DASH* (DASH to the Diet: Prevent and Control High Blood Pressure Following the DASH Eating Plan)
- *Presión Arterial Alta: NHLBI Diseases and Conditions Index*
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta: Lo Que Usted Debe Saber Sobre la Prevención y Control de la Presión Arterial Alta*

(Prevent and Control High Blood Pressure: What You Should Know)

- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta: Lo Que los Médicos Deben Saber* (Prevent and Control High Blood Pressure: What Every Physician Should Know)
- *Keep the Beat: Control Your High Blood Pressure in English and Spanish*
- *Help Your Heart: Control Your High Blood Pressure in Tagalog and English*
- *Keep Your Heart in Check—Know Your Blood Pressure Number in Vietnamese and English*

High Serum Cholesterol

Etiology

The Institute supports investigator-initiated studies to identify genes that influence the lipoprotein profile within racial and ethnic groups, including blacks, Hispanics, and American Indians. Research findings could offer an explanation for differences in susceptibility to CHD found among racial and ethnic groups. One project involving extended families of Mexican Americans in the San Antonio Family Heart Study has detected and mapped many quantitative trait loci (QTLs) for CVD risk factors, including some that influence HDL and LDL levels. Scientists seek to identify the genes for the QTLs related to lipoproteins. Another study is focused on the variation in hepatic lipase activity that leads to differences in plasma concentrations of HDL and LDL synthesis and catabolism. Researchers are investigating whether racial differences in hepatic lipase activity are responsible for the well-known differences in plasma HDL concentrations found in blacks and whites. Thirty-nine percent of participants are black.

Prevention

The NHLBI is supporting an investigator-initiated study among minority preschool children to track the long-term effectiveness of nutrition interventions on diet and blood cholesterol levels. Additional potential risk factors—such as increased blood pressure, obesity, and intention to smoke—will also be monitored.

Education

The Institute has prepared the following publications on blood cholesterol for minority audiences:

- *Do You Know Your Cholesterol Levels?* in English and Spanish
- *Heart-Healthy Home Cooking African American Style*
- *Delicious Heart-Healthy Latino Recipes*
- *American Indian and Alaska Native People: Treat Your Heart to a Healthy Celebration!*
- *Be Heart Smart: Keep Your Cholesterol in Check* in Tagalog and English
- *Serve Up a Healthy Life—Give the Gift of Good Nutrition* in Vietnamese and English

Obesity

Etiology

Obesity is a major health concern that affects children and adults. Minorities—including blacks, Mexican Americans, and American Indians—are especially at risk. Data from the 2003–2006 NHANES show that 33 percent of adults and 16 percent of children aged 2–19 years are obese. Understanding the causes of obesity could lead to effective strategies to combat it.

An investigator-initiated study seeks to elucidate interconnected biological and social pathways associated with adolescent obesity and risk for later development of type 2 diabetes and CVD in Latin American youth. The goal of the study is to identify modifiable conditions to prevent obesity and related diseases.

The NHLBI funds several studies that focus on genetic risk factors for obesity in one or more minority populations. Evidence for obesity genes has been identified on chromosomes 5 and 6 in blacks, on chromosome 9 in Mexican Americans, and on chromosome 4 in American Indians. In some cases, the results confirm those found in European Americans, and in other cases, they represent novel findings.

Researchers have found that black and Hispanic children are especially likely to develop sleep apnea. An investigator-initiated study will assess the role of obesity in the development of abnormalities that increase the likelihood of developing sleep apnea and whether the problem can be corrected with weight loss. Blacks comprise 55 percent of participants. Another study is determining whether obese children with sleep apnea are at

greater risk of cognitive impairment and vascular disease. Forty-five percent of participants are black.

Many women experience weight gain during the transitional period from pre- to post-menopause. Using data and repository specimen resources of the Study of Women's Health Across the Nation, an epidemiologic study seeks to characterize the development and progression of CVD risk factors in relation to biochemical markers of obesity metabolism. The study will determine the interrelationships between biochemical markers of obesity metabolism, ovarian aging, and CVD risk in a multi-ethnic population of women aged 42–52 years at baseline.

Treatment and Prevention

The NHLBI has initiated programs to test approaches for treating or preventing obesity:

- **POWER** (see Chapter 11): To test the effectiveness of interventions delivered in routine clinical practice on achieving weight loss in obese patients who have other CVD risk factors (e.g., hypertension). One study focuses on a low-income minority population.
- **EARLY Trials** (see Chapter 11): To develop and evaluate innovative approaches for weight control in young adults at high risk for weight gain. Participants will be from ethnically and socioeconomically diverse populations.
- **Translating Basic Behavior and Social Science Discoveries Into Interventions To Reduce Obesity** (see Chapter 9): To translate findings from basic research on human behavior into more effective clinical, community, and population interventions to reduce obesity and improve obesity-related behaviors. Some of the studies are expected to have 50- to 100-percent participation from minority populations.
- **COPTR Consortium** (see Chapter 9): To test interventions to prevent excess weight gain in non-overweight and overweight youth and reduce weight in obese and severely obese youth. More than 50 percent of participants are expected to be from racial and ethnic minority populations.

The Institute supports a number of investigator-initiated studies on the effectiveness of obesity prevention and control interventions among diverse populations. One study is testing the effectiveness of weight-control interventions (involving diet, physical activity, psychosocial

and familial influences) administered during the critical transition period from prepuberty to puberty in black girls at high risk for obesity. Another study in preadolescent black girls is evaluating the efficacy of an after-school dance program and a family-based intervention involving reduced use of television, videotapes, and video games to reduce weight gain. A third study is testing an integrated school- and community-based intervention that involves physical activity and diet to reduce the prevalence of obesity among Asians, Hispanics, and whites.

Blacks at high risk of CVD often have limited success in weight loss and lifestyle change programs. A study was initiated to examine the role of social support, particularly from family members and friends, to facilitate weight loss and related dietary and physical activity changes in blacks.

Hispanics are also an important population targeted for intervention programs. One project is studying the effects of physical activity and dietary behaviors in a microenvironment (i.e., home environment) and in a macroenvironment (i.e., apartment complex, schools, grocery stores, parks, restaurants). Community health workers (promotoras) are working with the families and the community to increase awareness and promote environmental change. Another project with strong Hispanic participation is evaluating how well an intervention, Planned Care for Obesity and Risk Reduction, supports primary care treatment of obesity in adults with at least one other cardiovascular risk factor. The study is seeking to improve the way primary care providers offer services to their patients who are overweight and who also have other important medical conditions or health risks, such as hypertension, smoking, or high cholesterol.

Obesity is one of the major health challenges facing Native American children and has serious implications for the development of type 2 diabetes. A school-based intervention, augmented with a family intervention, is focusing on reducing excess weight gain by increasing physical activity and healthy dietary practices in kindergarten and first-grade Native American children.

Education

The NHLBI has prepared health information on losing excess weight for minorities:

- *Do You Need To Lose Weight?* in English and Spanish

- *¿En Qué Consisten el Sobrepeso y la Obesidad?* (What Are Overweight and Obesity?) NHLBI Diseases and Conditions Index
- *Keep the Beat: Aim for a Healthy Weight* in Tagalog and English
- *We Can!*® (Ways to Enhance Children's Activity & Nutrition): Many bilingual (English and Spanish) publications on energy balance are available on the Web site at <http://wecan.nhlbi.nih.gov>

Physical Inactivity

Despite substantial research about the positive impact of physical activity on CVD and its risk factors, physical inactivity is highly prevalent, especially among minority populations. Researchers have observed an age-related decline in physical activity or aerobic capacity in the biracial cohorts of Institute-initiated longitudinal cohort studies (National Growth and Health Study and CARDIA). Those results, when coupled with findings from MESA and HCHS, have helped to increase understanding of the interrelationships of cardiorespiratory fitness, body composition, and CVD-related risk factors and endpoints, and may provide the basis for more specific evidence-based recommendations on the role of fitness in cardiovascular health among minority children and adults.

Physical inactivity among children is often attributed to lack of open space, lack of recreational equipment, and fear by parents for the safety of children playing outdoors. A study is being conducted to determine if an intervention that changes these neighborhood features in a low-income, inner-city neighborhood will increase physical activity in children. Components of CARDIA, MESA, and HCHS are also examining the effects of the neighborhood environment on physical activity.

A longitudinal follow-up of the Trial of Activity for Adolescent Girls is examining the effects of a school-community joint intervention on physical activity among middle school girls.

A number of investigator-initiated studies are evaluating culturally appropriate interventions to increase physical activity. One study is using lay health advisors to increase moderate intensity physical activity among Mexican American women, a group with many countervailing family and community influences. Several studies are using faith-based approaches—including

community-based participatory research approaches to engage church leaders and congregations—to increase activity levels in blacks. Other studies are testing culturally targeted interventions in schools or among pregnant women and mothers with young children.

Several projects are using mobile phone technology to increase physical activity and decrease sedentary behaviors. These studies capitalize on recent advances in communication technologies, such as “smart phones” that offer a potentially transformative platform to deliver convenient and sustainable adherence strategies.

Education

The Institute has prepared the following publications for minorities on the importance of physical activity and ways to become more physically active:

- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta con Actividad Física* (Move To Prevent and Control High Blood Pressure With Physical Activity)
- *American Indian and Alaska Native People: Be Active for Your Heart!*
- *Are You at Risk for Heart Disease?* in Tagalog and English
- *Be Active for a Healthier Heart* in Vietnamese and English
- *We Can!*® (Ways to Enhance Children’s Activity & Nutrition): Many bilingual (English and Spanish) publications on energy balance are available on the Web site at <http://wecan.nhlbi.nih.gov>

The Institute also has developed a Web-based application on physical activity for lay health educators in English and Spanish, which can be found at <http://hin.nhlbi.nih.gov/salud/pa/index.htm>.

Smoking

Smoking is a major risk factor for CHD, stroke, COPD, and other cardiovascular and respiratory conditions and is the leading cause of preventable death. Although considerable progress has been made in reducing smoking rates and providing effective prevention and cessation interventions, additional research is needed to extend these efforts and improve the maintenance of behavior change. The Institute has initiated a smoking intervention program in hospitalized patients.

- Effectiveness Research on Smoking Cessation in Hospitalized Patients (see Chapter 11): To evaluate the translation of efficacious smoking cessation strategies initiated during hospitalization and continued post-discharge into effective programs that can be widely implemented in routine clinical practice and assess the cost-effectiveness of these interventions. One of the projects will have approximately 75 percent participation from Asian, Hispanic, and black populations.

The NHLBI supports a number of investigator-initiated studies of smoking cessation in underserved populations. One study among predominately black women who live in public housing neighborhoods is evaluating smoking cessation interventions that use a combination of strategies—including contact with community health workers, small-group behavioral counseling, and neighborhood support groups. Another study is assessing the efficacy of telemedicine as a way to provide smoking cessation counseling to primary care patients who live in rural areas, and a third study is testing ways to help people who have quit involuntarily to maintain their abstinence.

Education

The Institute has prepared the following publications on smoking cessation for minorities:

- *Enjoy Living Smoke Free* in English and Spanish
- *Be Heart Healthy: Enjoy Living Smoke Free* in Tagalog and English
- *Don’t Burn Your Life Away—Be Good to Your Heart* in Tagalog and English and in Vietnamese and English

Psychosocial Factors

Etiology

A large and consistent body of evidence has demonstrated that psychosocial factors—such as depression, stress, and low social support—are associated with elevated risk for CVD and major adverse cardiac events in heart disease patients. Additionally, race and ethnicity, gender, and social class are important factors that can influence these associations in important ways.

The NHLBI is funding research to identify more precisely the nature of the relationship between depression and adverse cardiac outcomes and the conditions associated with successful treatment of depression. Research

results will guide clinical care and inform future trials of depression treatment in heart patients and minority patient populations. Studies include defining the biologic pathways that link depression to physiological mechanisms in post-myocardial infarction and acute coronary syndrome patients—including inflammatory processes implicated in atherogenesis, autonomic nervous system dysfunction, and platelet aggregation and adhesion. Approximately 30 percent of participants are black.

The Institute is also supporting research among middle-aged black and white women to determine whether depression is associated with the adipocytokines adiponectin and leptin, which are bioactive molecules secreted by adipose tissue that play a critical role in atherogenesis and metabolic dysregulation. Research results will provide information on how depression affects risk for diabetes, metabolic syndrome, obesity, and CVD in women.

The Institute supports investigator-initiated research on the interactions of psychosocial factors with race and ethnicity, environmental factors, and low SES in the development of CHD. Scientists are investigating the contribution of biobehavioral factors (hostility, anxiety, and heightened cardiovascular reactivity to stress) in the etiology, pathogenesis, and course of CHD. Racial differences in stress-induced physiologic responses are also being examined.

The nature of the relationship between acute and chronic forms of stress and cardiac morbidity and mortality is particularly relevant to minority populations, because stress induced by environmental, social, and discriminatory influences can be significant. One study is investigating whether the effect of acute and chronic exposure to established risk factors (depressive symptoms, major life events, and lack of social support) for CVD over a 5-year period is related to a 2-year increase of subclinical CVD in a sample of women undergoing menopause. Fifty-four percent of participants will be black. Another study is examining whether racial disparity in AMI-recovery outcomes in older individuals is partially due to stress related to age and racial stigmas. Fifty percent of the population will be black. Other studies are seeking to clarify the physiologic pathways through which stress affects cardiovascular outcomes—including hemodynamic, sympathetic nervous system and neuroendocrine mechanisms, and inflammatory processes. The ultimate goal is to determine whether stress management interventions can alter these physiological indicators and improve cardiovascular outcomes.

Additional research supported by the Institute includes studies that are addressing the genetic basis of behavioral risk factors and the relationships between risk-promoting variables (psychosocial stress, smoking, poor diet, physical inactivity, lack of adherence to cardiac medications), presumed mediating variables (sympathetic nervous system activity and insulin metabolism), and CHD risk factors.

Treatment

The Institute supports several investigator-initiated studies to develop and evaluate interventions that seek to improve cardiovascular outcomes. One study is seeking to determine the efficacy of a personalized health plan intervention that incorporates mind–body techniques targeted at reducing various risk factors for CVD—such as insulin resistance, inflammatory markers, and self-reported negative effect. Participants select their own goals on which to focus, and the intervention is tailored to their individual risk profile. Twenty-nine percent of participants will be from minority populations. Another study is evaluating the effectiveness of stress management training combined with exercise-based cardiac rehabilitation as a way to reduce stress in vulnerable cardiac patients. Approximately 25 percent of participants are black. A third study is developing and evaluating an intervention among racial minorities that reduces the impact of bias by reducing stereotypic perceptions that render patients and providers less able to communicate effectively and impair the effect of the visit to improve patient self-management behavior. Additional studies are investigating whether stress management in a high-risk population of blacks with hypertension can influence cardiovascular risk factors.

Diabetes

Etiology

Diabetes mellitus is a strong risk factor for CVD. Individuals with type 2 diabetes are 2- to 4-times more likely to be at risk for CHD than the general population. Using GWASs, investigators have identified several genetic variants for CHD in the general population. An investigator-initiated study is seeking to identify new genetic variants for excessive risk of CHD in diabetic patients, assess the genetic effects on intermediate biochemical changes, and examine gene–environment interactions. One of the data sources will come from the Costa Rican Diabetes–CHD case-control study.

Two studies are determining the associations of fetuin-A with CVD mortality and diabetes. Fetuin-A is a protein that may simultaneously inhibit vascular calcification and promote insulin resistance and diabetes. One of the studies will use data from MESA.

Treatment and Prevention

The NHLBI supports clinical trials to determine the benefits of various strategies to reduce CVD among patients with diabetes or treat patients with coronary artery disease and diabetes:

- ACCORD (see Chapter 11): To evaluate the benefits of different therapies to reduce CVD in type 2 diabetes. More than one-third of participants are from minority populations.
- Diabetes Prevention Program Outcomes Study—Phase II (see Chapter 11): To determine the efficacy of treatments to prevent or delay the development of type 2 diabetes in a population at high risk due to the presence of impaired glucose tolerance. Forty-five percent of participants will be from minority populations.
- Look AHEAD (see Chapter 11): To test the effectiveness of a lifestyle intervention in obese participants with type 2 diabetes over a long-term period. One of the clinical centers will direct its interventions toward American Indians.

Education

The Institute has prepared the following publications on diabetes for minorities:

- *Protect Your Heart Against Diabetes* in English and Spanish
- *Protect Your Heart: Prevent and Control Diabetes* in Tagalog and English

Lung Diseases

The NHLBI supports research on a number of lung diseases—such as asthma, COPD, sarcoidosis, TB, and HIV-related lung diseases—which disproportionately affect minorities. The following section provides examples of research to address health disparities in lung diseases; selected sleep disorders are also included.

Asthma

Asthma is a chronic lung disease that inflames and narrows the airways. It affects people of all ages, but it most often starts in childhood. In the United States, more

than 22 million people are known to have asthma, and more than 6 million of them are children. Prevalence rates are especially high in blacks and Puerto Ricans.

Etiology and Pathophysiology

The NHLBI has initiated several studies to determine the etiology and pathophysiology of asthma:

- CAMP-CS (see Chapter 9): To follow the original CAMP cohort to determine clinical and genetic risk factors for patterns in the decline of lung function that are indicative of chronic air flow obstruction in later adulthood. Thirty-one percent of the participants are from minority populations.
- Severe Asthma Research Program: To determine the mechanistic basis for severe asthma and to determine how it differs from mild-to-moderate asthma. Several of the projects have strong minority participation.
- Airway Smooth Muscle Function and Targeted Therapeutics in Human Asthma: To investigate the complex role that airway smooth muscle plays in the development of asthma and identify innovative therapeutic targets. Two projects expect 30 to 50 percent of participants to be from minority populations.
- Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma (see Chapter 9): To determine whether supplemental vitamin D intake to increase the level of Vitamin D in pregnant women will prevent asthma and allergy in their children at age 3 years. Currently, 70 percent of the participants in one project are from racial and ethnic minority populations.

The Institute also supports investigator-initiated projects on the etiology and pathophysiology of asthma. One study will identify genetic, biologic, and immunologic characteristics and environmental exposures that interact in children who experience severe bronchiolitis caused by the respiratory syncytial virus early in life and determine their role in the subsequent development of asthma, airway hyperreactivity, and allergy. Forty percent of participants will be black. Another study will examine the relationship between selected genetic and environmental factors and asthma in Puerto Rican children. A third study will identify the genetic basis for differences between blacks and whites in asthma susceptibility and development (e.g., risk of exacerbations).

A new study is focused on the possible common genetic determinants for obesity and asthma. It will identify single nucleotide polymorphisms (SNPs) that are jointly associated with asthma and obesity, using data from the CAMP study, and subsequently validate the SNPs in three independent and ethnically diverse (Hispanic, black, and white) cohorts.

Environmental factors are known to trigger asthma symptoms. An investigator-initiated study is focusing on understanding the mechanisms by which occupational or environmental factors trigger the onset of asthma among low-income, urban blacks and Hispanics. Another study is examining multiple environmental stressors in a predominantly disadvantaged population to determine the effects of maternal stressors and environmental factors in the onset of asthma in early childhood. A third study is examining the reasons why children from lower SES groups suffer from worse asthma than children from higher SES groups. The goal is to develop models of how the social environment affects the onset and severity of childhood asthma and eventually build interventions to ameliorate these effects.

Treatment and Control

The Institute has initiated research to identify optimal drug strategies for treatment and management of asthma. Because the burden of asthma disproportionately affects minority children, it is important for them to be well represented in clinical trials.

- AsthmaNet (see Chapter 11): To develop and conduct multiple clinical trials to identify optimal therapies for a variety of asthma phenotypes, genotypes, and racial and ethnic backgrounds in pediatric and adult populations. Approximately 30 percent of participants will be from minority populations.
- STAN (see Chapter 9): To determine whether treatment of chronic rhinitis and sinusitis with nasal steroids will improve the control of asthma. One-third of participants are expected to be from minority populations.
- SOYA (see Chapter 9): To determine whether supplementation with soy isoflavones among persons with poorly controlled asthma improves both lung function and markers of airway inflammation. One-third of participants are expected to be from minority populations.
- Study of Acid Reflux Therapy for Children With Asthma (see Chapter 9): To investigate whether an

approved proton-pump inhibitor lansoprazole will reduce asthma exacerbations in children with poorly controlled asthma. Two-thirds of participants are from racial and ethnic minority populations.

The Institute is also supporting investigator-initiated studies focusing on finding effective treatment for various populations. One study in whites, blacks, and Hispanics is creating an asthma self-management skills training program for children and their parents. The program is being created for Web, CD-ROM, and DVD formats and focuses on improving understanding of asthma, preventing asthma attacks, and creating an asthma management plan. Another study will assess an asthma self-management intervention in Puerto Rican children; the intervention is delivered to families by Puerto Rican community health workers. The intervention will tailor a standard asthma core curriculum to family needs and cultural beliefs. A third study will seek to improve health among urban black adolescents with asthma. This study will use peer support—enhanced by a culturally sensitive, technology-based MP3 player platform—to increase adherence to daily controller medications. A fourth study will evaluate a Web-based intervention program that addresses asthma management and avoidance of tobacco use in rural, black adolescent boys.

Many individuals with asthma have poor disease management. A new study will determine whether a multifaceted prompting intervention, administered in urban primary care offices, reduces morbidity among urban children with asthma. Fifty percent of participants will be black. The intervention, designed to stimulate communication between caregivers and clinicians, includes information about the patient's asthma severity or level of control and individualized guideline-based recommendations for care. Another study to improve asthma management will use a highly tailored telephone counseling approach to foster a partnership between women and a clinician. Black women will be the target of this study. A third study will evaluate the efficacy of an evidence-based lifestyle weight loss intervention on asthma control among obese adults. Thirty-six percent of participants will be from minority populations.

Education

The Institute is supporting several education activities. It has developed easy-to-read materials on asthma treatment and control directed to English and Spanish audiences with low literacy:

- *Facts About Controlling Your Asthma*
- *El Asma: Cómo Controlar Esta Enfermedad* (Facts About Controlling Your Asthma)
- *¿Qué Es el Asma?* (What Is Asthma?)

The Institute also disseminates clinical practice guidelines for the treatment and monitoring of asthma, patient education materials, and information on environmental control of allergens in the United States and throughout the world. It has developed several asthma education programs that are directed at controlling asthma in black and Hispanic children. For example, A Tailored Asthma Education Program for Urban Teens II is evaluating a school-based approach to motivate black students to change negative behaviors related to asthma management. The Institute supports projects that focus on innovative techniques to improve adherence to medical regimes among minorities and people living in poverty and address methods to improve physician adherence to clinical practice guidelines.

Chronic Obstructive Pulmonary Disease

COPD—a disease in which the lungs are damaged, making breathing difficult—is the fourth leading cause of death in the United States. It is responsible for more than 500,000 hospitalizations and 100,000 deaths in the United States each year.

Etiology

The NHLBI is supporting a large, investigator-initiated study of genetic factors that determine the risk of developing COPD or that influence the type and extent of damage done to the body by the disease. The COPDGene™ study will enroll approximately 3,500 blacks with a substantial history of cigarette smoking, obtain extensive baseline clinical and phenotypic data regarding the individuals, and compare the severity and character of COPD in the subjects to analyses of their DNA. Genome-wide genetic assays will be performed on a substantial fraction of this cohort.

Although COPD is less common among blacks than among whites, it is nevertheless the seventh leading cause of death among blacks. Any disparity, whether higher or lower in the minority group, may reflect racial differences in the biology of the disease that would require use of different treatments or drugs for optimal disease management. If the genes found to be determinants of

COPD risk differ in blacks and whites, this will provide clues to how the roles of specific pathogenetic pathways of COPD differ among races.

Treatment and Control

The Institute has established a research network to determine effective disease management approaches for individuals with moderate-to-severe COPD:

- COPD Clinical Research Network (see Chapter 11): To perform collaborative, therapeutic interventional trials of medications, devices, and disease management strategies in individuals with moderate-to-severe COPD. In addition to evaluating treatment efficacy, network studies include examinations of genetic factors, biomarkers, or genomic/proteomic profiles that may identify patients who are more or less likely to benefit from various treatments.

Education

The NHLBI has developed a number of outreach activities associated with COPD. Several publications and Web-based products have been developed for and distributed to health professionals, patients, and the public. Some examples include:

- COPD education Web site: <http://www.nhlbi.nih.gov/health/public/lung/copd/index.htm>
- COPD Learn More Breathe Better Campaign

Sarcoidosis

Sarcoidosis is an inflammatory disease of unknown etiology characterized by persistent granulomas with damage to surrounding tissue. The Institute has initiated a program to determine the immunopathogenesis of granulomatous inflammation found in sarcoidosis, including the role of predisposing factors, the immune components involved in the formation of granulomas, and the defective regulatory immune response.

Sarcoidosis occurs more frequently and with more severity in blacks than in whites, suggesting the presence of genetic determinants to disease predisposition. To increase understanding of the disease, researchers are seeking to identify genes of African ancestry that play a significant role in the etiology and pathogenesis of sarcoidosis. Other possible causes of sarcoidosis are also being investigated. One study is examining the potential role of a mycobacterial etiology of sarcoidosis, and

another study is seeking to elucidate mechanisms involved in the immunologic and inflammatory processes that ultimately lead to end-stage fibrosis in progressive pulmonary sarcoidosis. Most participants are black.

A mentored research project conducted within the Black Women's Health Study is investigating potential risk factors for sarcoidosis.

Sleep Disorders

Etiology

Sleep-disordered breathing (SDB), a condition characterized by repetitive interruption in breathing, is a common disorder that disproportionately affects blacks. It is associated with an increased risk of CVD, including hypertension and stroke, and is particularly prevalent in patients with heart failure. Ongoing programs are assessing the interrelationship between sleep disorders and heart failure and the mechanisms leading to cardiovascular stress when the two intersect.

The Institute also supports investigator-initiated projects to elucidate cardiovascular and other health consequences of SDB, sleep deprivation, and shift work in various community settings. Characterization of how SDB occurs within family groups is helping to identify potential genetic risk factors that may allow early identification and treatment of high-risk individuals. A community-based study of sleep in Hispanics is assessing the prevalence of sleep apnea.

Treatment and Control

The Institute initiated a clinical trial to determine whether adenotonsillectomy is an effective treatment for SDB in children:

- **Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea (see Chapter 9):** To assess the efficacy of adenotonsillectomy as a treatment for SDB in children aged 5 to 9 years. Seventy percent of participants are from minority and ethnic populations.

Investigator-initiated research will assess treatment strategies in minorities. One study is seeking to develop in-home personalized sleep plans that can improve nightly sleep duration, neurocognitive function, and behavioral disorders in lower income minority children (ages 5 to 6 years). Another study is examining the effect

of a sleep apnea treatment (positive airway pressure therapy) on biological markers of CVD risk, including inflammation and metabolism. More than 50 percent of study participants are from minority populations.

Education

The NHLBI published *Your Guide to Healthy Sleep*, which provides the latest information about sleep apnea and other sleep disorders, including insomnia, restless legs syndrome, and narcolepsy.

HIV-Related Lung Diseases

HIV infection disproportionately affects minority populations in the United States and due to multidrug antiretroviral therapy, has become a chronic condition for many patients. Among them, HIV-associated lung complications are frequent causes of illness and death. But the long-term consequences of HIV infection and HIV-associated lung infections and complications are unknown. Little is known about drug-resistant *Pneumocystis*, the prevalence and pathogenesis of HIV-associated COPD, HIV-associated pulmonary hypertension, and immune reconstitution syndromes. In developing countries where millions of people are HIV-infected, many have serious or fatal lung complications, including TB and bacterial pneumonias, that have never been well characterized.

Etiology

In addition to supporting investigator-initiated research on the etiology and pathogenesis of HIV-associated lung diseases, the Institute has initiated research to understand their causes and impact and to identify potential therapeutic targets and preventive strategies:

- **The Mechanisms of HIV-Related Pulmonary Complications:** To encourage innovative research on the roles of co-infections, immune factors, and genetic predisposition in the pathogenesis of HIV-related pulmonary diseases. A number of the projects have strong minority participation.
- **Longitudinal Studies of HIV-Associated Lung Infections and Complications:** To accelerate research on lung complications associated with HIV-infection by characterizing lung infections, other HIV-associated lung complications, and their consequences in longitudinal studies in existing HIV-infected cohorts and other established groups of patients who are HIV-infected. Depending on the center, participation

from minority populations ranges from approximately 40 to 100 percent.

- **Mechanisms and Management of Cardiovascular and Metabolic Complications of HIV/AIDS:** To elucidate the underlying mechanisms of metabolic and anthropometric abnormalities seen in HIV infection and highly active antiretroviral therapy and their relationship to CVD risk; to evaluate new and existing biomarkers and imaging modalities in the assessment of coronary artery disease and risk in HIV patients; and to identify treatment strategies and interventional approaches to reduce cardiovascular risk while optimizing the medical management of HIV infection. Enrollment from minority populations is expected to range from approximately 30 to more than 70 percent.
- **Microbiome of the Lung and Respiratory Tract in HIV-Infected Individuals and HIV-Uninfected Controls (see Chapter 9):** To characterize the microbiome of the lung alone or in combination with the upper airways in HIV-infected individuals and matched HIV-uninfected controls using molecular techniques to identify bacteria and if possible other organisms (e.g., viruses, cell-wall deficient organisms, protozoa, and fungi). Enrollment from minority populations is expected to range from 35 to 76 percent.

Tuberculosis

TB is a common and often deadly infectious disease caused by the bacteria *Mycobacterium tuberculosis*. In the United States, an estimated 10 to 15 million people are infected with the TB bacteria. The rates among minorities and in the foreign-born remain high. In 2008, according to the CDC, more than 58 percent of all active TB cases in the United States were among the foreign-born. Racial disparity in TB rates was greatest for U.S.-born blacks, whose rate was 7-times higher than the rate for U.S.-born whites.

Etiology

The immune response to TB infection is complex and involves the formation of granulomas in the lungs of infected individuals. In 2008, as part of the NHLBI Exploratory Program in Systems Biology, the Institute initiated a study that uses multiscale computational models and multisystem approaches to improve understanding of the role of granuloma formation in TB. In 2010, it began a systems biology approach to the mechanisms of TB latency and reactivation.

- **Systems Biology Approach to the Mechanisms of TB Latency and Reactivation:** To investigate mechanisms of latency and reactivation of TB in the host using integrated systems biology approaches. A collaborative program consisting of five Tuberculosis Systems Biology Centers and a Data Coordinating Center will integrate data from humans and animal models with computational and mathematical models in a comprehensive systems biology approach to increase understanding of latent TB and the factors that lead to its reactivation. Depending on the center, minority enrollment in the U.S. populations being studied is expected to range from approximately 30 to 66 percent. Several of the grants in this program will study international populations in Africa and Asia.

The Institute also supports investigator-initiated research that characterizes genes associated with TB susceptibility; investigates host lung defenses, including immune responses to infection; and examines the effect of TB on HIV disease. A new genetics study will fine-map chromosomal regions that have been linked to resistance to TB. Investigators will also analyze innate immune responses and model genetic predictors of resistance using data from a long-term household contact study conducted in Uganda.

Treatment and Control

The NHLBI supports a number of investigator-initiated studies focused on understanding the relationship between the immune system and TB. Most of the studies are being conducted among patients from minority populations. Included among them are studies to compare susceptibility to TB in populations in Mexico and Peru and examine the role of interferon-gamma in the pathogenesis of TB among Hispanics with and without HIV.

Blood Diseases

The NHLBI supports basic, translational, and clinical research on SCD and thalassemia (Cooley's anemia) with the goal of curing the disorders and improving patient care. The Institute also supports a deep vein thrombosis and venous disease program.

Sickle Cell Disease

Basic and Translational Research

SCD, the most common inherited blood disorder in the United States, affects an estimated 70,000 to 100,000 Americans, most of whom are black. SCD occurs in about 1 in 500 blacks and 1 in 36,000 Hispanics. The disease is characterized by anemia, severe infections, acute and chronic pain, and organ damage. SCD, the first molecular disease described, was shown to be due to a single amino acid substitution on the beta chain of hemoglobin.

Since 1972, the NHLBI has supported an extensive research program to improve understanding of the pathophysiology of SCD, identify better approaches for its diagnosis and treatment, and prevent complications.

Basic and translational research currently focuses on genetic influences on disease manifestations, regulation of hemoglobin synthesis, discovery of drugs to increase fetal hemoglobin production, transplantation of blood-forming stem cells, gene therapy, pain research, and development of animal models for preclinical studies. Institute-initiated programs include:

- BTRP (see Chapter 9): To conduct comprehensive research, training, and education efforts related to SCD. The BTRP seeks to improve understanding of SCD pathophysiology and develop cures or improved medical management of the disease.
- Genome-Wide Association Studies in Sickle Cell Anemia and in Centenarians: To investigate common genes involved in subphenotypes of SCD and centenarians. Scientists seek to identify genetic associations with specific clinical features in the two populations and subsequently compare the two datasets for differences and similarities. Research results could lead to improved treatment for SCD and increased understanding of the genetic components that enhance healthy aging.
- Ancillary Studies in Clinical Trials: To conduct time-sensitive ancillary studies in conjunction with ongoing Phase II-III clinical trials or network clinical trials related to heart, lung, and blood diseases and sleep disorders. One study seeks to identify genetic variations underlying Rh antigenic diversity in patients who have SCD. Research findings will be used to develop high throughput microchips to screen for matching donors and recipients prior to

blood transfusion. Another study employs proteomic approaches to identify biomarkers of early cerebral ischemia in children who have SCD. Identifying such circulating biomarkers could allow earlier therapeutic intervention in these children.

Investigator-initiated studies include a project to examine the relationships between analgesia, biomarkers, and pain levels in adults with SCD. Researchers are seeking to understand the efficacy of analgesic treatment and determine whether novel serum biomarkers can be identified as useful tools for future studies in SCD pain crisis. Another project is investigating the mechanisms underlying pain in SCD to develop more effective pain therapies. Scientists are using a mouse model of SCD to examine peripheral and spinal mechanisms that contribute to pain related to SCD.

Gene therapy is another area of focus. One project is exploring lentiviral gene therapy for SCD, and another is studying the application of induced pluripotent stem cell technology to replace the defective sickle beta-globin gene with a normal gene in a SCD mouse model. Researchers are seeking to translate their results to human cells that will become the foundation for future clinical trials.

Clinical Research

The NHLBI is committed to finding improved treatments and ultimately a cure for SCD and other hemoglobinopathies. Institute-initiated studies have begun to yield therapies that will alleviate the symptoms of sickle cell anemia and procedures that should ultimately provide a cure.

- BABY HUG (see Chapter 11): To assess the effectiveness of hydroxyurea over a 2-year treatment period in preventing onset of chronic organ damage in young black children who have sickle cell anemia. Although the primary goals of preserving spleen and renal function were not achieved, data show markedly reduced numbers of vaso-occlusive events and improved hematologic counts. An observational study is following the cohort to learn more about the long-term effects of hydroxyurea.
- Adult Sickle Cell Quality of Life Measurement Information System: To develop, validate, and disseminate a sickle cell-specific quality-of-life measurement tool that is a partner with and complementary to the NIH Roadmap Patient-Reported Outcomes Measurement Information System.

- Exploratory Studies in the Neurobiology of Pain in Sickle Cell Disease: To conduct basic and translational research on the neurobiology of pain in SCD and develop effective pharmacology treatments.

The NHLBI terminated two Institute-initiated studies early. The Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension was stopped in July 2009, nearly 1 year early, based on recommendations from the Data and Safety Monitoring Board. After a review of interim data, the Board found that patients who received sildenafil were more likely to have serious medical problems compared with patients who received a placebo. The large multicenter cohort with a well-characterized cardiovascular phenotype continues to be monitored as an off-study drug in an observational follow-up study that includes clinical monitoring, development and maintenance of a biorepository, and DNA analyses (with consent) for GWASs.

The SWITCH study was stopped in June 2010, after the Data and Safety Monitoring Board reviewed interim results and raised safety concerns. The trial compared an experimental treatment of hydroxyurea and phlebotomy versus standard treatment of blood transfusions plus chelation in children with SCD who had both experienced a stroke and iron overload. The new approach was no better than the standard treatment and did not reduce the risk of recurrent stroke.

The NHLBI supports several transplant-related clinical studies that seek to reach minority populations:

- Blood and Marrow Transplant Clinical Research Network (BMT CRN) (see Chapter 11): In collaboration with the NCI, to perform clinical trials to advance hematopoietic stem cell transplantation. To reach minority populations, the Network supports bilingual transplant center personnel and provides public Web pages and educational materials. In addition, the Network is working with the National Marrow Donor Program to develop strategies and implement procedures to enhance enrollment of patients from minority groups.
- The Sickle Cell Unrelated Transplant Trial: To assess unrelated donor marrow and umbilical cord blood transplantation for severe SCD. The trial, supported by the BMT CRN and the Sickle Cell Disease Clinical Research Network, is the first Phase II study to assess the promise of this therapy

as a curative option for patients who are severely affected by SCD.

The Institute is supporting two investigator-initiated treatment clinical trials for children with sickle cell anemia. One trial in children with abnormal transcranial Doppler (TCD) velocities is comparing standard therapy (transfusions) with alternative therapy (hydroxyurea) for maintenance of TCD velocities. The other trial is seeking to determine the effect of hydroxyurea treatment on the cumulative incidence of conversion from conditional to abnormal TCD velocities.

Education

The NHLBI has developed a number of publications on SCD that target minorities:

- *Datos Sobre La Anemia Falciforme* (Facts About Sickle Cell Anemia)
- *Fact Sheet: Hydroxyurea in Pediatric Patients With Sickle Cell Disease*
- *Facts About Sickle Cell Anemia*
- *Patient Fact Sheet: The Multicenter Study of Hydroxyurea in Sickle Cell Anemia (MSH)*
- *Management and Therapy of Sickle Cell Disease*

Thalassemia

Thalassemia is an inherited disorder of red blood cells whereby abnormal forms of hemoglobin are produced. The disorder, which results in excessive destruction of red blood cells and anemia, affects primarily people of African, Asiatic Indian, Chinese, Mediterranean, and Southeast Asian origin.

The Institute recently entered into an Interagency Agreement with the CDC to develop a registry of patients with hemoglobinopathies:

- RuSH (see Chapter 10): To establish a national surveillance system to determine the number of individuals diagnosed with hemoglobinopathies—including SCD, thalassemia, and hemoglobin E diseases—in the United States. During the initial phase, investigators will collect public health surveillance data—such as demographic information (e.g., sex, race, and ethnicity), birth and death records, and newborn screening data—and information on availability and use of health care services. During the second phase, investigators will develop

a registry and biorepository to make available knowledge about disease management and natural history and to provide consented research specimens for genetic and clinical studies.

The NHLBI supports research efforts that include developing oral chelators to remove iron overload by repetitive transfusion therapy, testing drugs to enhance fetal hemoglobin production, and examining hematopoietic transplantation and gene therapy approaches to cure the disease.

In 2006, the Institute established the NHLBI Clinical Hematology Research Career Development Program to support career development of clinical researchers in non-malignant clinical hematology, including Cooley's anemia.

Deep Vein Thrombosis and Venous Disease

Deep vein thrombosis (DVT) is a serious condition that can cause significant disability and death if not promptly diagnosed and effectively treated. Approximately 2 to 3 million individuals in the United States develop venous

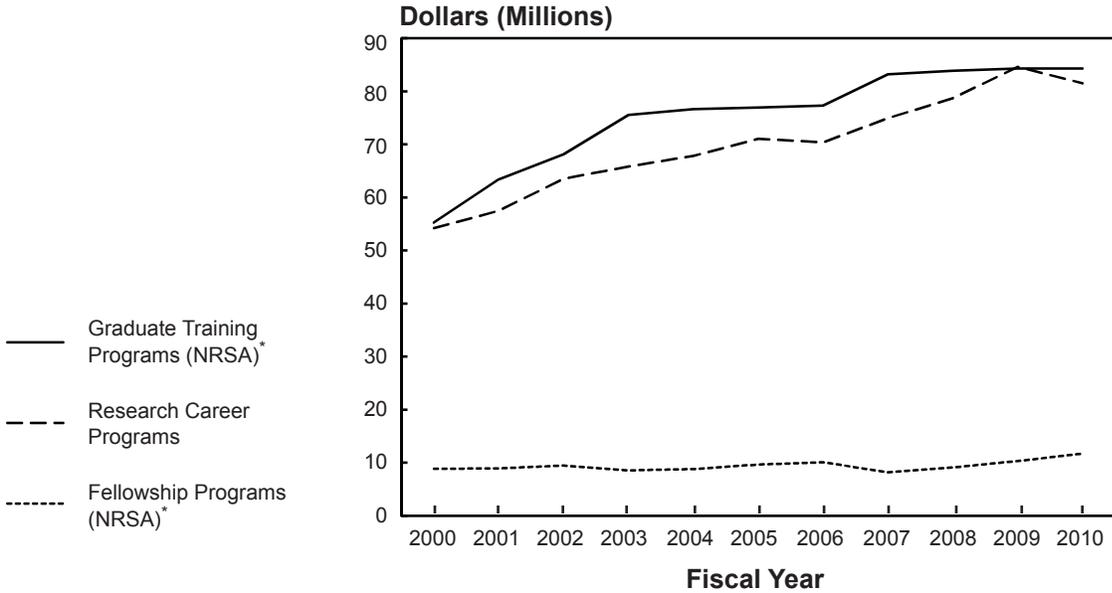
thromboembolism each year, and of them, 60,000 die primarily of pulmonary embolism. The Institute initiated a program to improve the understanding of DVT and venous disease.

- **Deep Vein Thrombosis and Venous Disease:** To improve diagnosis, therapy, and prevention of venous thrombotic diseases to enhance patient health and well-being. One of the eight projects is assessing the safety, efficacy, dosing, and pharmacokinetics of bivalirudin, a direct thrombin inhibitor, in children who have an acute DVT. Seventy percent of participants are from racial and ethnic minority populations.

Warfarin sodium, an anticoagulant drug, is prescribed to millions of patients each year to prevent thromboembolism. However, warfarin has an unusually narrow therapeutic range and is difficult to dose properly. To address this problem, the Institute is supporting several investigator-initiated studies to determine environmental and genetic factors that influence patient response to warfarin. Fifty to 60 percent of participants are from racial and ethnic minority populations.

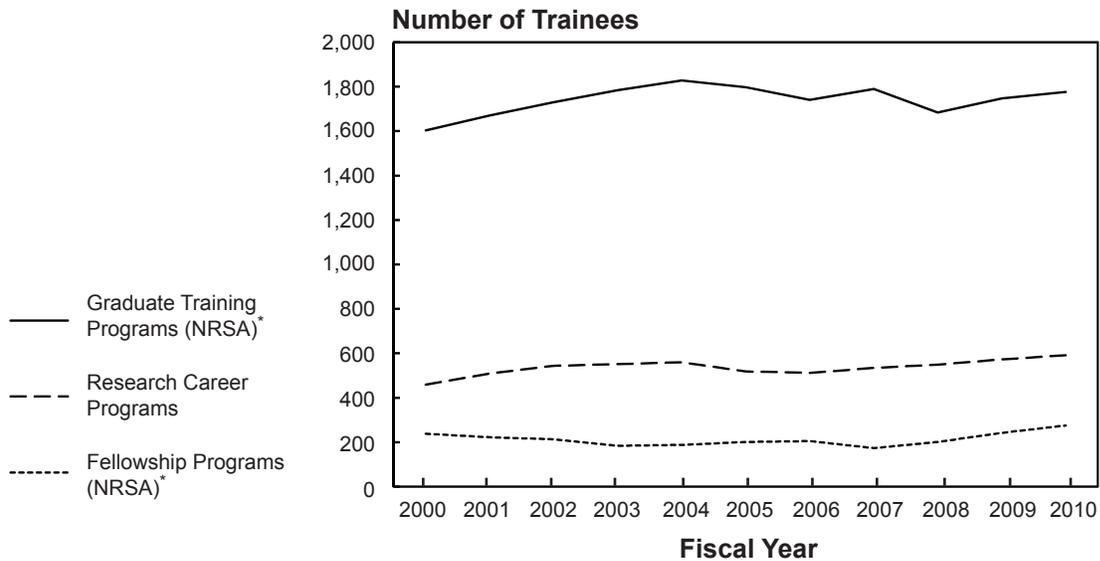
13. Research Training and Career Development Programs

NHLBI Research Training and Career Development Obligations: Fiscal Years 2000–2010



* National Research Service Awards (NRSA).

NHLBI Full-Time Training Positions: Fiscal Years 2000–2010



* National Research Service Awards (NRSA).

Note: Numbers of awards and trainees may not agree with other tables due to the method of counting supplements.

Training Awards, Full-Time Training Positions, and Obligations by Activity: Fiscal Year 2010

	Number of Awards Obligated	Trainees (Full-time Training Positions)	Direct Cost	Indirect Cost	Total Cost	Percent of Total NHLBI Training Program Dollars
Fellowship Programs						
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	85	85	\$ 3,024,002	\$ —	\$ 3,024,002	3.2%
Predoctoral Individual NRSA (F31)	62	62	2,094,564	—	2,094,564	2.2
Postdoctoral Individual NRSA (F32)	128	128	6,558,839	—	6,558,839	6.8
Senior Fellowships NRSA (F33)	—	—	—	—	—	—
Subtotal, Fellowships	275	275	11,677,405	—	11,677,405	9.0
Graduate Training Programs						
Institutional NRSA (T32)	240	1,660	75,071,965	6,246,260	81,318,225*	85.8
Minority Institutional NRSA (T32)	4	26	990,147	59,938	1,050,085	1.1
Off-Quarter Professional Student Training NRSA (T34, T35)	15	91	1,771,638	169,619	1,941,257	2.0
Short-Term Training for Minority Students (T35M)	—	—	—	—	—	—
Subtotal, Graduate Training Programs	259	1,777	77,833,750	6,475,817	84,309,567	88.9
Total, Training Programs	534	2,052	\$89,511,155	\$6,475,817	\$95,986,972	100.0%

* Excludes assessment of \$1,976,000.

History of Training Obligations by Activity: Fiscal Years 2000–2010

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Fellowship Programs											
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 641	\$ 2,191	\$ 3,024
Predoctoral Individual NRSA (F31)	248	264	478	563	549	794	1,202	1,509	1,888	2,009	2,094
Postdoctoral Individual NRSA (F32)	8,517	8,515	8,887	7,868	8,128	8,813	8,790	6,684	6,487	6,012	6,559
Senior Fellowships NRSA (F33)	92	147	84	112	144	58	53	—	59	118	—
Subtotal, Fellowships	8,857	8,926	9,449	8,543	8,821	9,665	10,045	8,193	9,075	10,330	11,677
Graduate Training Programs											
Institutional NRSA (T32)	50,507 ^A	58,516 ^B	62,999 ^C	69,951 ^D	71,229 ^E	70,524 ^F	71,831 ^G	78,343 ^H	80,373 ^I	81,453 ^J	81,319 ^K
Minority Institutional NRSA (T32)	1,167	996	1,092	1,006	734	1,184	743	780	688	349	1,050
Off-Quarter Professional Student Training NRSA (T34, T35)	966	1,974	1,987	1,975	1,993	2,233	2,215	2,411	2,021	2,202	1,941
MARC (T36)	5	5	—	—	—	—	—	—	—	—	—
Short-Term Training for Minority Students (T35M)	2,570	1,877	2,057	2,594	2,671	2,976	2,527	1,673	804	283	—
Subtotal, Training Grants	55,215	63,368	68,135	75,526	76,627	76,917	77,316	83,207	83,886	84,287	84,310
Total, Training Programs	\$64,072^A	\$72,294^B	\$77,584^C	\$84,069^D	\$85,448^E	\$86,582^F	\$87,361^G	\$91,400^H	\$92,961^I	\$94,617^J	\$95,987^K

A Excludes Assessment of \$1,280,000.

B Excludes Assessment of \$1,424,000.

C Excludes Assessment of \$1,584,000.

D Excludes Assessment of \$1,716,000.

E Excludes Assessment of \$1,744,000.

F Excludes Assessment of \$1,764,000.

G Excludes Assessment of \$1,818,000.

H Excludes Assessment of \$1,916,000.

I Excludes Assessment of \$1,912,000.

J Excludes Assessment of \$1,960,000.

K Excludes Assessment of \$1,976,000.

Full-Time Training Positions by Activity: Fiscal Years 2000–2010

	Number of Positions										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Fellowship Programs											
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	—	—	—	—	—	—	—	—	20	63	85
Predoctoral Individual NRSA (F31)	11	12	18	19	18	25	32	44	56	59	62
Postdoctoral Individual NRSA (F32)	225	208	194	164	168	176	171	130	125	118	128
Senior Fellowships NRSA (F33)	2	3	2	2	3	1	2	—	1	2	—
Subtotal, Fellowships	238	223	214	185	189	202	205	174	202	242	275
Graduate Training Programs											
Institutional NRSA (T32)	1,368	1,425	1,482	1,542	1,578	1,540	1,512	1,585	1,525	1,602	1,660
Minority Institutional NRSA (T32)	48	43	39	42	32	35	26	23	18	19	26
Off-Quarter Professional Student Training NRSA (T34, T35)	51	109	179	93	99	95	104	105	93	102	91
Short-Term Training for Minority Students (T35M)	136	93	30	107	119	128	99	77	48	24	—
Subtotal, Training Grants	1,603	1,670	1,730	1,784	1,828	1,798	1,741	1,790	1,684	1,747	1,777
Total, Training Positions	1,841	1,893	1,944	1,969	2,017	2,000	1,946	1,964	1,886	1,989	2,052

NHLBI Research Career Programs: Fiscal Years 2000–2010

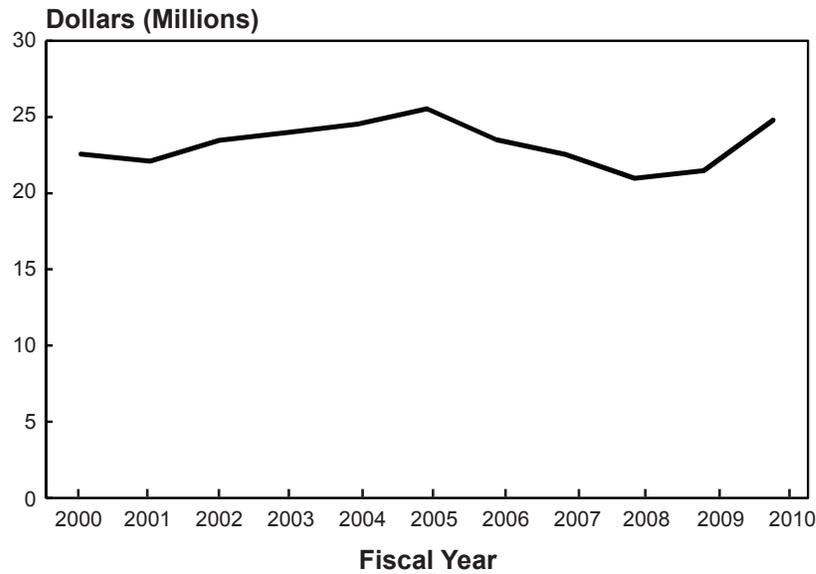
	Number of Awards										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mentored Research Scientist Development Award for Minority Faculty (K01)	29	44	54	47	46	45	40	35	35	37	47
Minority Institution Faculty Mentored Research Scientist Development Award (K01)	11	9	2	7	6	4	4	5	7	5	6
Mentored Scientist Development Award in Research Ethics (K01)	—	—	—	2	2	3	3	3	1	1	—
Independent Scientist Award (K02)	27	34	33	32	31	32	24	25	22	19	19
Research Career Development Award (K04)	1	—	—	—	—	—	—	—	—	—	—
Research Career Award (K06)	2	2	2	2	1	1	1	—	—	—	—
Systemic Pulmonary and Vascular Disease Academic Award (K07)	1	—	—	—	—	—	—	—	—	—	—
Tuberculosis Academic Award (K07)	9	5	—	—	—	—	—	—	—	—	—
Sleep Academic Award (K07)	20	12	8	—	—	—	—	—	—	—	—
Nutrition Academic Award (K07)	19	19	19	9	9	—	—	—	—	—	—
Pediatric Transfusion Medicine Academic Award (K07)	—	—	—	—	—	—	—	4	4	4	4
Cultural Competence and Health Disparities Academic Award (K07)	—	—	—	—	8	14	18	18	18	9	4
Clinical Investigator Development Award (K08)	257	241	236	240	229	239	226	214	210	232	218
Vascular Medicine Research Career Development Program (K12)	—	—	—	—	—	—	2	7	7	7	—
Clinical Hematology Research Career Development Program (K12)	—	—	—	—	—	—	6	6	6	6	6
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	—	—	8	8	8	8
Minority School Faculty Development Award (K14)	4	1	—	—	—	—	—	—	—	—	—
Research Development Award for Minority Faculty (K14)	7	—	—	—	—	—	—	—	—	—	—
Career Enhancement Award for Stem Cell Research (K18)	—	—	—	1	5	3	2	4	6	3	4
NHLBI Career Transition Award (K22)	—	—	—	—	1	2	1	1	1	1	1
Mentored Patient-Oriented Research Career Development Award (K23)	36	58	90	110	122	127	122	120	133	149	160
Midcareer Investigator Award in Patient-Oriented Research (K24)	20	27	37	38	32	32	33	29	29	34	35
Mentored Quantitative Research Career Development Award (K25)	—	2	7	9	12	17	16	15	15	15	15
Clinical Research Curriculum Award (K30)	16	55	55	55	55	—*	14	16	—	—	—
Career Transition Award (K99)	—	—	—	—	—	—	—	24	47	42	64
Total, Research Career Programs	459	509	543	552	559	519	512	534	549	572	591

* In FY 2005, NHLBI relinquished management of the K30 program and as a result did not receive the grant count.

NHLBI Research Career Program Obligations: Fiscal Years 2000–2010

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mentored Research Scientist Development Award for Minority Faculty (K01)	\$ 3,650	\$ 5,556	\$ 5,711	\$ 6,156	\$ 6,150	\$ 6,088	\$ 5,453	\$ 4,718	\$ 4,574	\$ 4,745	\$ 6,089
Minority Institution Faculty Mentored Research Scientist Development Award (K01)	1,300	1,143	1,703	991	867	588	567	698	949	663	804
Mentored Scientist Development Award in Research Ethics (K01)	—	—	—	255	253	355	358	357	102	164	62
Independent Scientist Award (K02)	2,350	3,202	3,130	3,099	3,079	3,218	2,421	2,511	2,184	1,880	1,847
Research Career Development Award (K04)	69	—	—	—	—	—	—	—	—	—	—
Research Career Award (K06)	70	70	69	69	34	34	34	—	—	—	—
Systemic Pulmonary and Vascular Diseases Academic Award (K07)	113	—	—	—	—	—	—	—	—	—	—
Tuberculosis Academic Award (K07)	745	396	—	—	—	—	—	—	—	—	—
Sleep Academic Award (K07)	1,760	1,081	722	—	—	—	—	—	—	—	—
Nutrition Academic Award (K07)	2,829	2,869	2,906	1,472	1,516	—	—	—	—	—	—
Pediatrics Transfusion Medicine Academic Award (K07)	—	—	—	—	—	—	—	486	486	486	486
Cultural Competence and Health Disparities Academic Award (K07)	—	—	—	—	925	1,620	2,109	2,232	2,197	1,138	562
Clinical Investigator Development Award (K08)	30,189	29,263	29,295	30,288	29,037	30,429	28,973	27,286	27,005	29,706	28,165
Vascular Medicine Research Career Development Program (K12)	—	—	—	—	—	—	772	3,206	5,499	7,325	—
Clinical Hematology Research Career Development Program (K12)	—	—	—	—	—	—	2,360	2,367	2,364	2,375	2,371
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	—	—	3,154	3,190	3,190	3,194
Minority School Faculty Development Award (K14)	862	98	—	—	—	—	—	—	—	—	—
Research Development Award for Minority Faculty (K14)	393	—	—	—	—	—	—	—	—	—	—
Career Enhancement Award for Stem Cell Research (K18)	—	—	—	243	980	512	213	652	1,014	477	706
NHLBI Career Transition Award (K22)	—	—	—	—	185	364	178	160	162	162	162
Mentored Patient-Oriented Research Career Development Award (K23)	4,619	7,570	11,909	14,571	16,216	17,086	16,720	16,419	18,556	20,831	22,368
Midcareer Investigator Award in Patient-Oriented Research (K24)	2,072	2,877	4,058	4,368	3,815	3,929	4,315	4,037	4,161	5,078	5,942
Mentored Quantitative Research Career Development Award (K25)	—	272	921	1,195	1,622	2,206	2,184	2,077	2,082	1,996	2,134
Clinical Research Curriculum Award (K30)	3,163	3,073	3,090	3,110	3,115	4,589	3,708	2,520	—	—	—
Career Transition Award (K99)	—	—	—	—	—	—	—	2,074	4,190	4,430	6,652
Total, Research Career Program Obligations	\$54,184	\$57,470	\$63,514	\$65,817	\$67,794	\$71,018	\$70,365	\$74,954	\$78,715	\$84,646	\$81,544

**NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements
 Program Obligations: Fiscal Years 2000–2010**



**NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements
 Program Obligations: Fiscal Years 2000–2010**

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
MARC Summer Research Training Program	\$ 4	\$ 20	\$ 15	\$ 4	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Mentored Research Scientist Development Award for Minority Faculty	3,650	5,556	5,711	6,156	6,150	6,088	5,453	4,718	4,574	4,745	6,089
MARC	5	5	—	—	—	—	—	—	—	—	—
Minority Biomedical Research Support (MBRS)	3,873	3,165	2,793	3,600	2,806	2,846	2,403	2,475	1,527	2,167	2,540
Minority Institution Faculty Mentored Research Scientist Development Award	1,300	1,143	1,703	991	867	588	567	698	949	663	804
Minority Institution Research Training Program	1,167	996	1,092	1,006	734	1,184	743	780	688	349	1,050
Minority Predoctoral Fellowship	248	264	278	308	374	545	1,012	1,115	1,728	1,979	2,064
Minority Research Supplements Program	8,304	8,587	9,822	9,323	10,938	11,214	10,680	10,834	10,303	10,412	11,198
Minority School Faculty Development Award	862	98	—	—	—	—	—	—	—	—	—
Reentry Supplements	176	384	—	—	—	96	132	245	401	887	1,050
Research Development Award for Minority Faculty	393	—	—	—	—	—	—	—	—	—	—
Short-Term Training for Minority Students	2,570	1,876	2,057	2,594	2,671	2,976	2,526	1,673	804	283	—
Total, Minority Programs	\$22,552	\$22,094	\$23,471	\$23,982	\$24,540	\$25,537	\$23,516	\$22,538	\$20,974	\$21,485	\$24,795

NHLBI Research Supplements Program by Award Type on Grants: Fiscal Years 2000–2010

	Number of Awards										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Minority Supplements											
Investigator	33	33	46	47	35	29	27	31	25	22	17
Postdoctoral	42	41	33	38	37	52	49	43	42	45	50
Graduate	47	43	45	57	61	80	74	73	69	71	71
Undergraduate	19	12	17	18	17	12	11	16	17	18	13
High School	—	3	3	4	3	7	3	3	3	2	7
Post-Master/Post-Baccalaureate	—	—	2	8	17	16	11	4	9	21	21
Reentry Supplements	1	3	—	—	3	2	1	1	3	9	8
Disability Supplements	5	4	5	4	3	2	2	4	1	—	2
Total, Research Supplements Program	147	139	151	176	176	200	178	175	169	188	189

NHLBI Research Supplements Program by Award Type on Contracts: Fiscal Years 2000–2010

	Number of Awards										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Minority Supplements											
Investigator	—	—	—	—	1	2	1	2	2	4	3
Postdoctoral	—	—	—	2	1	2	1	1	0	1	4
Graduate	—	—	—	2	7	7	2	5	2	5	5
Undergraduate	—	—	—	—	—	—	1	1	1	1	1
High School	—	—	—	1	—	—	—	—	—	—	—
Post-Master/Post-Baccalaureate	—	—	—	—	1	—	—	—	—	—	—
Total, Research Supplements Program	—	—	—	5	10	11	5	9	5	11	13

NHLBI Research Supplements Program Obligations by Award Type on Grants: Fiscal Years 2000–2010

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Minority Supplements											
Investigator	\$3,262	\$3,430	\$5,046	\$3,844	\$4,256	\$3,552	\$3,343	\$3,719	\$3,285	\$2,679	\$2,183
Postdoctoral	3,053	3,086	2,554	2,655	2,713	3,432	3,542	3,284	3,074	3,284	3,928
Graduate	1,791	1,818	1,864	2,181	2,439	3,208	3,114	3,021	3,029	3,212	3,533
Undergraduate	198	235	260	301	282	179	178	350	424	386	240
High School	—	18	33	33	13	30	18	16	26	28	61
Post-Master/Post-Baccalaureate	—	—	65	309	597	618	352	156	367	823	1,076
Reentry Supplements	176	384	—	—	495	96	132	245	401	887	1,050
Disability Supplements	282	187	474	360	143	99	133	288	98	—	177
Total, Research Supplements Program	\$8,762	\$9,158	\$10,296	\$9,683	\$10,938	\$11,214	\$10,812	\$11,079	\$10,704	\$11,299	\$12,248

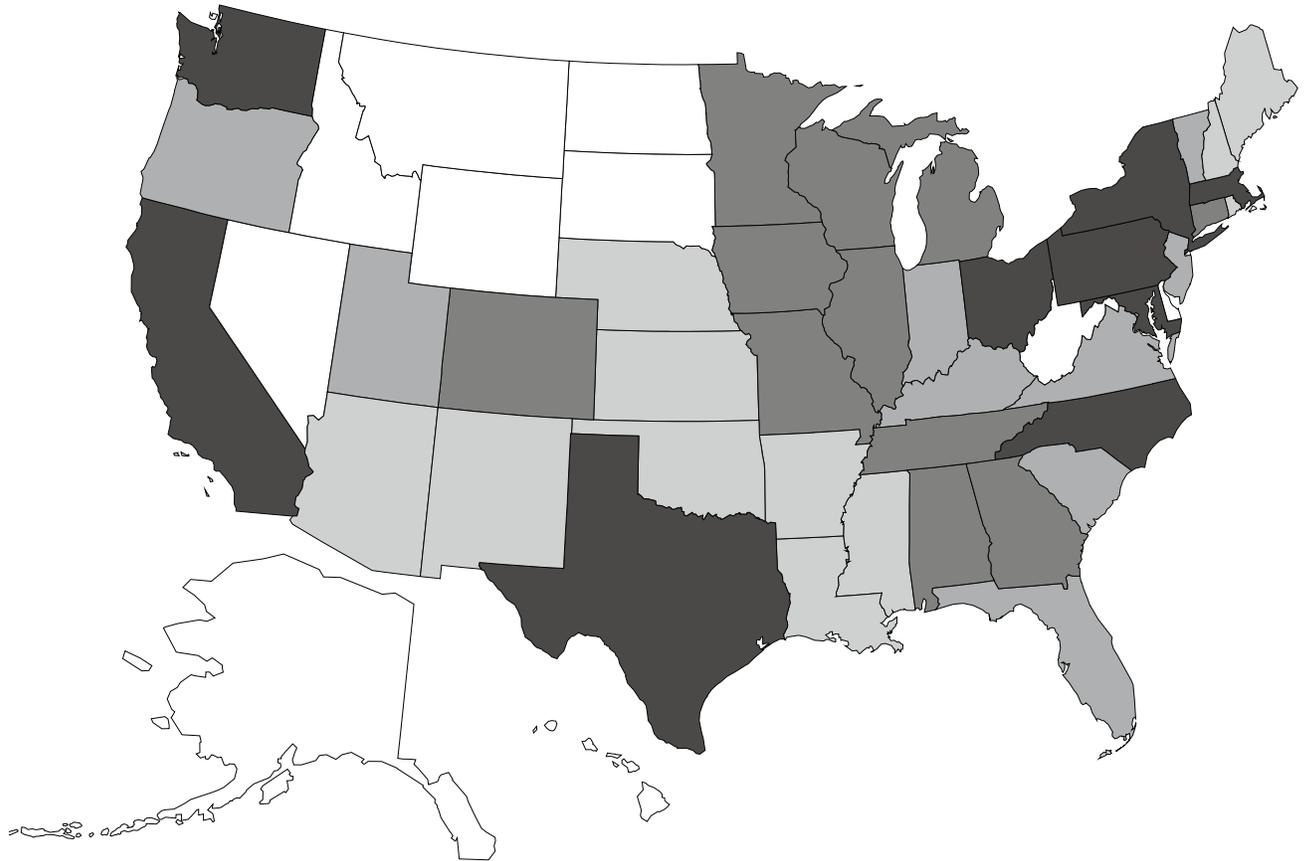
NHLBI Research Supplements Program Obligations by Award Type on Contracts: Fiscal Years 2000–2010

	Dollars (Thousands)										
	Fiscal Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Minority Supplements											
Investigator	\$—	\$—	\$—	\$—	\$142	\$296	\$148	\$261	\$271	\$541	\$376
Postdoctoral	—	—	—	246	71	137	62	62	—	155	391
Graduate	—	—	—	108	323	229	101	294	79	155	143
Undergraduate	—	—	—	—	—	—	26	13	20	16	8
High School	—	—	—	7	—	—	—	—	—	—	—
Post-Master/Post-Baccalaureate	—	—	—	—	51	—	—	—	—	—	—
Total, Research Supplements Program	\$—	\$—	\$—	\$361	\$587	\$662	\$337	\$630	\$370	\$867	\$918



14. Geographic Distribution of Awards: Fiscal Year 2010

Geographic Distribution of Awards by State: Fiscal Year 2010



Dollars in Millions	
■ \$100.0 to \$316.7	(9)
■ \$35.0 to \$99.9	(11)
■ \$15.0 to \$34.9	(9)
■ \$4.0 to \$14.9	(11)
□ \$0.0 to \$3.9	(10)

Geographic Distribution of Awards by State or Country: Fiscal Year 2010

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Alabama								
Auburn University	1	\$ 723,801	1	\$ 723,801	—	\$ —	—	\$ —
Elgavish Paramagnetics, Inc.	1	590,498	1	590,498	—	—	—	—
University of Alabama	1	459,740	—	—	—	—	1	459,740
University of Alabama at Birmingham	68	30,816,231	56	23,528,182	9	1,437,784	3	5,850,265
University of South Alabama	14	5,904,784	13	5,708,408	1	196,376	—	—
Total Alabama	85	38,495,054	71	30,550,889	10	1,634,160	4	6,310,005
Arizona								
Arizona State University, Tempe	1	479,739	1	479,739	—	—	—	—
Carl T. Hayden Medical Research Foundation	1	641,550	1	641,550	—	—	—	—
Hope Pharmaceuticals	1	236,917	1	236,917	—	—	—	—
Mayo Clinic Arizona	4	1,858,773	4	1,858,773	—	—	—	—
Northern Arizona University	2	638,765	2	638,765	—	—	—	—
Translational Genomics Research Institute	2	837,603	2	837,603	—	—	—	—
University of Arizona	23	8,207,804	19	7,503,359	4	704,445	—	—
Western Research Company, Inc.	1	495,151	1	495,151	—	—	—	—
Total Arizona	35	13,396,302	31	12,691,857	4	704,445	—	—
Arkansas								
Arkansas Children's Hospital Research Institute	4	1,302,034	4	1,302,034	—	—	—	—
University of Arkansas, Fayetteville	1	316,951	1	316,951	—	—	—	—
University of Arkansas for Medical Sciences, Little Rock	11	3,741,141	10	3,687,331	1	53,810	—	—
Total Arkansas	16	5,360,126	15	5,306,316	1	53,810	—	—
California								
Avantgen, Inc.	2	427,066	1	277,115	—	—	1	149,951
Blood Systems Research Institute	6	2,543,612	4	2,075,618	—	—	2	467,994
Burnham Institute for Medical Research	14	6,624,773	14	6,624,773	—	—	—	—
California Institute of Technology	2	140,474	1	90,000	1	50,474	0	0
California Pacific Medical Center Research Institute	2	2,654,486	2	2,654,486	—	—	—	—
California State University, Northridge	1	331,535	1	331,535	—	—	—	—
California University, San Francisco	1	1,210,341	—	—	—	—	1	1,210,341
Cedars-Sinai Medical Center	9	4,154,688	9	4,154,688	—	—	—	—
Ceremed, Inc.	1	100,000	1	100,000	—	—	—	—
Children's Hospital and Research Center at Oakland	10	4,580,076	8	4,280,562	1	251,156	1	48,358
Children's Hospital Los Angeles	6	2,471,682	6	2,471,682	—	—	—	—
City of Hope/Beckman Research Institute	6	3,193,857	5	1,627,415	—	—	1	1,566,442

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Claremont Graduate University	1	927,231	1	927,231	—	—	—	—
Cytograft Tissue Engineering, Inc.	2	430,327	2	430,327	—	—	—	—
Diagnostics for the Real World, Ltd.	1	1,075,162	1	1,075,162	—	—	—	—
Heartvista, Inc.	1	509,354	1	509,354	—	—	—	—
Intelligent Optical Systems, Inc.	1	154,996	—	—	—	—	1	154,996
J. David Gladstone Institutes	9	8,638,078	9	8,638,078	—	—	—	—
Kaiser Foundation Research Institute	7	4,080,747	6	3,844,291	—	—	1	236,456
LA Biomedical Research Institute/Harbor UCLA Medical Center	2	336,318	2	336,318	—	—	—	—
La Jolla Bioengineering Institute	3	1,386,185	3	1,386,185	—	—	—	—
La Jolla Institute for Allergy and Immunology	4	3,354,163	4	3,354,163	—	—	—	—
Loma Linda University	3	1,095,578	3	1,095,578	—	—	—	—
Los Angeles Biomedical Research Institute	1	172,686	—	—	—	—	1	172,686
Mercator Medsystems, Inc.	1	217,409	1	217,409	—	—	—	—
Nanovasc, Inc.	1	883,936	1	883,936	—	—	—	—
National Childhood Cancer Foundation	1	201,530	1	201,530	—	—	—	—
Northern California Institute for Research and Education	7	2,965,131	7	2,965,131	—	—	—	—
Organovo, Inc.	1	125,114	1	125,114	—	—	—	—
Orthopaedic Hospital	1	414,026	1	414,026	—	—	—	—
Palo Alto Institute for Research and Education, Inc.	3	1,024,867	3	1,024,867	—	—	—	—
Palo Alto Medical Foundation Research Institute	1	769,820	1	769,820	—	—	—	—
Panorama Research, Inc.	1	230,586	1	230,586	—	—	—	—
Phoenix Biosystems	1	145,590	—	—	—	—	1	145,590
Physical Optics Corporation	1	99,990	1	99,990	—	—	—	—
Rand Corporation	6	2,942,586	6	2,942,586	—	—	—	—
Regents of University of California	1	370,425	—	—	—	—	1	370,425
Salk Institute for Biological Studies	1	120,726	1	120,726	—	—	—	—
San Diego State University	13	5,965,979	12	5,936,834	1	29,145	—	—
San Diego State University Research Foundation	—	83,720	—	—	—	—	—	83,720
Scripps Research Institute	20	9,261,193	18	8,847,082	2	414,111	—	—
Stanford University	70	32,006,006	57	27,893,674	12	1,578,466	1	2,533,866
Systems Micro Technologies, Inc.	1	95,283	1	95,283	—	—	—	—
Theron Pharmaceuticals, Inc.	1	163,800	1	163,800	—	—	—	—
Torrey Pines Institute for Molecular Studies	1	270,000	1	270,000	—	—	—	—
University of California, Lawrence Berkeley Lab	2	1,208,315	2	1,208,315	—	—	—	—
University of California, Berkeley	11	3,178,924	8	3,089,233	3	89,691	—	—
University of California, Davis	33	14,366,690	31	13,675,365	2	691,325	—	—
University of California, Irvine	17	6,375,428	17	6,375,428	—	—	—	—
University of California, Los Angeles	84	44,439,463	69	36,502,883	12	1,836,318	3	6,100,262

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of California, Merced	5	964,200	3	870,666	2	93,534	—	—
University of California, Riverside	3	781,368	2	751,348	1	30,020	—	—
University of California, San Diego	92	44,620,101	79	42,656,967	13	1,963,134	—	—
University of California, San Francisco	105	40,467,755	91	35,889,262	12	1,831,073	2	2,747,420
University of California, Santa Barbara	1	573,443	1	573,443	—	—	—	—
University of Southern California	11	4,801,428	11	4,801,428	—	—	—	—
Vala Sciences, Inc.	1	270,126	1	270,126	—	—	—	—
Veterans Medical Research Foundation, San Diego	8	4,742,119	8	4,742,119	—	—	—	—
Virogenics, Inc.	1	785,649	1	785,649	—	—	—	—
Total California	602	276,526,141	523	251,679,187	62	8,858,447	17	15,988,507
Colorado								
Colorado State University, Fort Collins	6	1,682,126	5	1,652,913	1	29,213	—	—
Cosmid Corporation, LLC	1	338,124	1	338,124	—	—	—	—
Denver Health and Hospital Authority	2	545,974	1	175,684	—	—	1	370,290
Keystone Symposia	5	74,000	5	74,000	—	—	—	—
National Jewish Health	30	19,753,117	29	19,702,643	1	50,474	—	—
Rocky Mountain Biosystems, Inc.	1	826,749	1	826,749	—	—	—	—
Taiga Biotechnologies, Inc.	2	812,083	2	812,083	—	—	—	—
University of Colorado, Boulder	7	2,194,264	6	1,948,476	1	245,788	—	—
University of Colorado, Denver	56	22,584,967	49	20,052,704	6	1,690,789	1	841,474
University of Colorado Health Science Center	2	955,992	—	—	—	—	2	955,992
ValveXchange, Inc.	2	631,922	2	631,922	—	—	—	—
Total Colorado	114	50,399,318	101	46,215,298	9	2,016,264	4	2,167,756
Connecticut								
Connecticut Children's Medical Center	1	132,030	1	132,030	—	—	—	—
Hartford Hospital	3	1,287,447	3	1,287,447	—	—	—	—
Helix Therapeutics, LLC	1	228,490	1	228,490	—	—	—	—
John B. Pierce Laboratory, Inc.	2	814,007	2	814,007	—	—	—	—
SibTech, Inc.	1	385,462	1	385,462	—	—	—	—
University of Connecticut School of Medicine and Dentistry	8	3,997,915	8	3,997,915	—	—	—	—
University of Connecticut, Storrs	3	624,015	2	592,915	1	31,100	—	—
Yale University	83	37,045,962	70	34,766,255	13	2,279,707	—	—
Total Connecticut	102	44,515,328	88	42,204,521	14	2,310,807	—	—
Delaware								
Alfred I. Du Pont Hospital for Children	1	179,510	1	179,510	—	—	—	—
Compact Membrane Systems, Inc.	1	127,123	1	127,123	—	—	—	—
University of Delaware	3	762,957	2	710,803	1	52,154	—	—
Total Delaware	5	1,069,590	4	1,017,436	1	52,154	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
District of Columbia								
Academy for Educational Development	2	1,746,392	—	—	—	—	2	1,746,392
American Institutes for Research	3	6,360,068	—	—	—	—	3	6,360,068
American Society of Hematology	1	20,000	1	20,000	—	—	—	—
Children's Research Institute	9	3,626,692	9	3,626,692	—	—	—	—
Department of Veterans Affairs	2	237,891	—	—	—	—	2	237,891
Georgetown University	8	4,399,217	8	4,399,217	—	—	—	—
George Washington University	9	5,668,540	9	5,668,540	—	—	—	—
Howard University	4	682,200	2	563,986	1	41,380	1	76,834
National Academy of Sciences	1	200,000	—	—	—	—	1	200,000
Ogilvy Public Relations	3	4,122,171	—	—	—	—	3	4,122,171
Porter Novelli, Inc.	—	777,814	—	—	—	—	—	777,814
U.S. Bureau of the Census	1	609,000	—	—	—	—	1	609,000
Total District of Columbia	43	28,449,985	29	14,278,435	1	41,380	13	14,130,170
Florida								
ArchieMD, Inc.	2	586,038	1	486,090	—	—	1	99,948
Biopsy Sciences, LLC	1	181,979	1	181,979	—	—	—	—
Nemours Children's Clinic	2	282,915	2	282,915	—	—	—	—
Nova Southeastern University	1	336,980	1	336,980	—	—	—	—
Self-Determined Health, Inc.	1	670,861	1	670,861	—	—	—	—
University of Central Florida	2	717,500	2	717,500	—	—	—	—
University of Florida	35	13,293,405	31	12,785,820	4	507,585	—	—
University of Miami, Coral Gables	3	3,476,952	2	3,045,141	1	344,377	—	82,434
University of Miami School of Medicine	28	10,259,811	25	9,802,704	3	457,107	—	—
University of South Florida	5	1,083,342	3	645,136	2	438,206	—	—
Total Florida	80	30,884,783	69	28,955,126	10	1,747,275	1	182,382
Georgia								
Emory University	59	26,786,556	52	25,518,479	6	902,012	1	366,065
Expression Therapeutics	2	995,593	2	995,593	—	—	—	—
Georgia Institute of Technology	9	3,401,145	9	3,401,145	—	—	—	—
Georgia State University	1	30,881	—	—	1	30,881	—	—
Georgia Tech Research Corp.	1	14,615,641	—	—	—	—	1	14,615,641
Medical College of Georgia	35	14,542,698	31	14,138,013	4	404,685	—	—
Morehouse School of Medicine	10	2,899,528	8	2,477,970	2	421,558	—	—
U.S. Centers for Disease Control & Prevention	3	5,775,679	—	—	—	—	3	5,775,679
University of Georgia	2	740,000	2	740,000	—	—	—	—
Total Georgia	122	69,787,721	104	47,271,200	13	1,759,136	5	20,757,385
Hawaii								
University of Hawaii, Manoa	6	2,819,399	6	2,819,399	—	—	—	—
Total Hawaii	6	2,819,399	6	2,819,399	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Illinois								
Academic Pharmaceuticals, Inc.	1	102,910	1	102,910	—	—	—	—
Acoustic MedSystems, Inc	1	188,384	—	—	—	—	1	188,384
American College of Chest Physicians	1	11,000	1	11,000	—	—	—	—
American Society of Pediatric Hematology/ Oncology	1	5,000	1	5,000	—	—	—	—
Children's Memorial Hospital (Chicago)	6	1,120,068	5	1,091,906	1	28,162	—	—
Illinois Institute of Technology	1	420,313	1	420,313	—	—	—	—
International Society for Experimental Hematology	—	5,000	—	5,000	—	—	—	—
Loyola University, Chicago	10	2,912,673	7	2,777,045	3	135,628	—	—
Northshore University HealthSystem Research Institute	2	622,862	2	622,862	—	—	—	—
Northwestern University	72	26,786,999	58	24,757,865	13	1,695,335	1	333,799
Rosalind Franklin University of Medicine and Science	1	154,000	1	154,000	—	—	—	—
Rush University Medical Center	13	6,682,103	13	6,682,103	—	—	—	—
SonoGene, LLC	1	356,959	1	356,959	—	—	—	—
University of Chicago	48	17,420,831	40	15,492,623	8	1,928,208	—	—
University of Illinois, Chicago	56	26,398,669	50	24,188,346	6	2,210,323	—	—
University of Illinois, Urbana-Champaign	12	5,676,034	9	5,546,797	3	129,237	—	—
Total Illinois	226	88,863,805	190	82,214,729	34	6,126,893	2	522,183
Indiana								
Clarian Health Partners, Inc.	1	168,750	1	168,750	—	—	—	—
General Biotechnology, LLC	1	142,441	1	142,441	—	—	—	—
Indiana University-Purdue University, Indianapolis	46	18,374,847	40	17,433,179	6	941,668	—	—
Purdue University, West Lafayette	1	138,215	1	138,215	—	—	—	—
Rimedion, Inc.	1	223,172	1	223,172	—	—	—	—
SonarMed, Inc.	1	224,379	1	224,379	—	—	—	—
University of Notre Dame	2	760,694	2	760,694	—	—	—	—
Total Indiana	53	20,032,498	47	19,090,830	6	941,668	—	—
Iowa								
Exemplar Genetics, LLC	2	753,552	2	753,552	—	—	—	—
Iowa State University	1	708,654	1	708,654	—	—	—	—
Maharishi University of Management Research Institute	1	640,752	1	640,752	—	—	—	—
University of Iowa	66	34,240,895	55	30,201,810	10	2,626,800	1	1,412,285
Vida Diagnostics, Inc.	1	602,467	1	602,467	—	—	—	—
Total Iowa	71	36,946,320	60	32,907,235	10	2,626,800	1	1,412,285

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Kansas								
Kansas State University	2	248,914	1	222,000	1	26,914	—	—
University of Kansas Medical Center	13	4,684,161	12	4,656,552	1	27,609	—	—
Total Kansas	15	4,933,075	13	4,878,552	2	54,523	—	—
Kentucky								
Pharmacogenetics Diagnostic Laboratories	1	991,524	1	991,524	—	—	—	—
SCR, Inc.	2	1,066,413	2	1,066,413	—	—	—	—
University of Kentucky	29	11,405,914	23	10,721,642	6	684,272	—	—
University of Louisville	23	7,175,776	22	6,839,762	1	336,014	—	—
Total Kentucky	55	20,639,627	48	19,619,341	7	1,020,286	—	—
Louisiana								
Life Recovery System, Inc.	—	230,000	—	230,000	—	—	—	—
Louisiana State University and A&M College, Baton Rouge	1	334,643	1	334,643	—	—	—	—
Louisiana State University Health Sciences Center, New Orleans	10	2,758,622	8	2,374,932	1	33,173	1	350,517
Louisiana State University Health Sciences Center, Shreveport	8	2,064,644	7	2,012,490	1	52,154	—	—
Louisiana State University Pennington Biomedical Research Center	3	1,558,372	3	1,558,372	—	—	—	—
NuPotential, Inc.	1	269,754	1	269,754	—	—	—	—
Tulane University of Louisiana	14	5,150,797	12	4,920,236	2	230,561	—	—
Total Louisiana	37	12,366,832	32	11,700,427	4	315,888	1	350,517
Maine								
Jackson Laboratory	6	2,237,224	5	2,186,750	1	50,474	—	—
Maine Medical Center	5	1,525,514	4	1,473,900	1	51,614	—	—
University of Maine, Orono	1	578,902	1	578,902	—	—	—	—
University of New England	1	19,340	—	—	1	19,340	—	—
Total Maine	13	4,360,980	10	4,239,552	3	121,428	—	—
Maryland								
Arginetix, Inc.	1	365,333	1	365,333	—	—	—	—
CDM Group	1	1,700,000	—	—	—	—	1	1,700,000
Center for Disease Control	3	558,000	—	—	—	—	3	558,000
CIT	1	258,959	—	—	—	—	1	258,959
Clinical Trials and Surveys Corporation	3	1,528,344	2	1,234,866	—	—	1	293,478
EMMES Corporation	2	1,559,843	—	—	—	—	2	1,559,843
Engineering and Scientific Research Association	1	271,337	1	271,337	—	—	—	—
Federation of American Societies for Experimental Biology	3	45,000	3	45,000	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
GeneCopoeia, Inc.	1	107,000	1	107,000	—	—	—	—
GlycoMimetics, Inc.	1	159,562	1	159,562	—	—	—	—
Henry M. Jackson Foundation for the Advancement of Military Medicine	2	922,459	2	922,459	—	—	—	—
Information Management Services, Inc.	1	599,990	—	—	—	—	1	599,990
Intelligent Automation	1	100,000	—	—	—	—	1	100,000
J. Craig Venter Institute, Inc.	1	287,702	—	—	—	—	1	287,702
Johns Hopkins University	167	82,707,871	140	73,107,164	22	4,511,218	5	5,089,489
Key Technologies, Inc.	1	567,530	1	567,530	—	—	—	—
Lockheed Martin	1	144,810	—	—	—	—	1	144,810
MedStar Research Institute	1	807,837	1	807,837	—	—	0	0
National Human Genome Research Institute	2	2,710,000	—	—	—	—	2	2,710,000
National Institutes of Health	3	2,170,670	—	—	—	—	3	2,170,670
National Library of Medicine	1	240,000	—	—	—	—	1	240,000
New Health Sciences, Inc.	1	986,267	1	986,267	—	—	—	—
North American Vascular Biology Organization	1	15,000	1	15,000	—	—	—	—
Operation Technology Corporation	1	99,991	—	—	—	—	1	99,991
Pulmonary Hypertension Association	1	10,000	1	10,000	—	—	—	—
SeraCare Bioservices	2	1,668,235	—	—	—	—	2	1,668,235
Social and Scientific Systems, Inc.	1	1,500,000	—	—	—	—	1	1,500,000
U.S. Department of Health and Human Services, Supply Service Center	1	897,950	—	—	—	—	1	897,950
U.S. Food and Drug Administration	—	260,000	—	—	—	—	—	260,000
U.S. National Center for Health Statistics	1	2,603,048	—	—	—	—	1	2,603,048
U.S. Public Health Service Indian Health Service	1	730,982	—	—	—	—	1	730,982
University of Maryland, Baltimore	46	27,055,880	41	24,237,019	4	811,541	1	2,007,320
University of Maryland, College Park	3	837,553	3	837,553	—	—	—	—
Validus Biopharma, Inc.	1	178,857	1	178,857	—	—	—	—
Weinberg Medical Physics, LLC	1	730,407	1	730,407	—	—	—	—
Westat, Inc.	3	7,693,620	—	—	—	—	3	7,693,620
Total Maryland	260	142,904,797	202	104,583,191	26	5,322,759	32	32,998,847
Massachusetts								
ABIOMED, Inc.	4	1,123,252	4	1,123,252	—	—	—	—
Barth Syndrome Foundation	1	5,000	1	5,000	—	—	—	—
Baystate Medical Center	1	1,003,256	—	—	—	—	1	1,003,256
Beth Israel Deaconess Medical Center	51	26,592,985	46	24,816,115	5	1,776,870	—	—
Boston Biomedical Research Institute	4	2,801,922	4	2,801,922	—	—	—	—
Boston Medical Center	11	6,712,605	11	6,712,605	—	—	—	—
Boston University	7	5,683,075	6	3,606,670	—	—	1	2,076,405
Boston University Medical Campus	48	26,843,345	42	22,377,469	5	1,821,466	1	2,644,410
Brandeis University	1	346,500	1	346,500	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Brigham and Women's Hospital	167	83,123,791	149	79,338,210	17	3,760,581	1	25,000
CardioFocus, Inc.	1	190,890	1	190,890	—	—	—	—
Cardiovascular Engineering, Inc.	1	614,035	1	614,035	—	—	—	—
Cell Imaging Systems, LLC	—	89,375	—	89,375	—	—	—	—
Charles Stark Draper Laboratory	1	186,477	1	186,477	—	—	—	—
Children's Hospital Boston	49	25,005,254	46	23,579,006	3	1,426,248	—	—
Dana-Farber Cancer Institute	10	3,618,223	10	3,618,223	—	—	—	—
DecImmune Therapeutics, Inc.	1	1,119,082	1	1,119,082	—	—	—	—
DNA Medicine Institute	1	100,000	1	100,000	—	—	—	—
E.P., Ltd.	1	1,189,143	1	1,189,143	—	—	—	—
Giner, Inc.	1	390,338	1	390,338	—	—	—	—
GLSynthesis, Inc.	1	779,748	1	779,748	—	—	—	—
Harvard Pilgrim Health Care, Inc.	4	1,373,812	4	1,373,812	—	—	—	—
Harvard University	4	2,163,564	3	1,742,147	1	421,417	—	—
Harvard University Medical School	13	5,160,709	10	4,573,979	3	586,730	—	—
Harvard University School of Public Health	15	6,806,281	12	6,187,976	3	618,305	—	—
Immune Disease Institute, Inc.	5	5,358,019	4	3,934,562	1	47,606	—	1,375,851
Immunetics, Inc.	2	517,468	1	299,989	—	—	1	217,479
Infocitex Corporation	1	985,602	1	985,602	—	—	—	—
Joslin Diabetes Center	2	1,085,205	2	1,085,205	—	—	—	—
Levitronix, LLC	1	998,327	1	998,327	—	—	—	—
Massachusetts General Hospital	65	47,509,589	59	27,045,627	4	1,445,743	2	19,018,219
Massachusetts Institute of Technology	5	4,289,763	4	4,242,157	1	47,606	—	—
MedMinder Systems, Inc.	1	234,055	1	234,055	—	—	—	—
New England Research Institutes, Inc.	4	21,138,801	3	21,039,006	—	—	1	99,795
Northeastern University	2	2,203,810	2	2,203,810	—	—	—	—
Phoenicia Biosciences, Inc.	1	350,566	1	350,566	—	—	—	—
Progeria Research Foundation, Inc.	1	10,000	1	10,000	—	—	—	—
Radiation Monitoring Devices, Inc.	3	1,200,495	3	1,200,495	—	—	—	—
Spaulding Rehabilitation Hospital	1	359,595	1	359,595	—	—	—	—
Springfield College	—	23,385	—	23,385	—	—	—	—
The Broad Institute	1	2,351,820	—	—	—	—	1	2,351,820
Tufts Medical Center	20	6,844,982	19	6,343,964	1	501,018	—	—
Tufts University, Boston	8	2,817,502	6	2,558,703	2	258,799	—	—
Tufts University, Medford	1	249,000	1	249,000	—	—	—	—
University Health Network	1	270,000	1	270,000	—	—	—	—
University of Massachusetts Medical School, Worcester	26	13,063,921	25	13,013,447	1	50,474	—	—
University of Massachusetts, Boston	1	192,500	1	192,500	—	—	—	—
University of Massachusetts, Lowell	1	330,570	1	330,570	—	—	—	—
Valley Medical Associates, Inc.	1	176,205	1	176,205	—	—	—	—
VasoTech, Inc.	1	593,706	1	593,706	—	—	—	—
Whitehead Institute for Biomedical Research	1	90,000	1	90,000	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Worcester Polytechnic Institute	1	184,380	1	184,380	—	—	—	—
Worcester State College	1	206,302	1	206,302	—	—	—	—
Total Massachusetts	556	316,658,230	500	275,083,132	47	12,762,863	9	28,812,235
Michigan								
Accord Biomaterials, Inc.	1	515,403	1	515,403	—	—	—	—
AlphaCore Pharma, LLC	1	1,022,830	1	1,022,830	—	—	—	—
Altarum Institute	1	317,162	1	317,162	—	—	—	—
Henry Ford Health System	8	6,377,582	7	6,321,792	1	55,790	—	—
MC3, Inc.	3	672,141	3	672,141	—	—	—	—
MedArray, Inc.	1	1,000,000	1	1,000,000	—	—	—	—
Michigan State University	9	3,646,124	8	3,607,415	1	38,709	—	—
Michigan Technological University	2	460,517	2	460,517	—	—	—	—
MRI Institute for Biomedical Research	1	430,559	1	430,559	—	—	—	—
Oakland University	1	242,943	1	242,943	—	—	—	—
Phrixus Pharmaceuticals, Inc.	1	306,708	1	306,708	—	—	—	—
Pixel Velocity, Inc.	1	988,260	1	988,260	—	—	—	—
University of Michigan at Ann Arbor	122	55,784,321	108	49,165,627	11	2,104,224	3	4,514,470
Van Andel Research Institute	1	455,000	1	455,000	—	—	—	—
Wayne State University	16	6,146,621	15	6,113,350	1	33,271	—	—
Total Michigan	169	78,366,171	152	71,619,707	14	2,231,994	3	4,514,470
Minnesota								
Advanced Circulatory Systems, Inc.	1	651,337	1	651,337	—	—	—	—
Advanced Medical Electronics Corporation	1	100,000	1	100,000	—	—	—	—
Gel-Del Technologies, Inc.	1	1,047,181	1	1,047,181	—	—	—	—
HealthPartners Research Foundation	5	3,089,618	5	3,089,618	—	—	—	—
Immune Disease Institute, Inc.	1	1,375,850	—	—	—	—	1	1,375,850
Mayo Clinic, Rochester	52	23,389,082	47	22,226,036	2	433,132	3	729,914
Powerscope, Inc.	1	381,289	1	381,289	—	—	—	—
University of Minnesota	1	828,232	—	—	—	—	1	828,232
University of Minnesota, Twin Cities	66	34,355,894	57	29,545,423	7	1,726,919	2	3,083,552
Total Minnesota	129	65,218,483	113	57,040,884	9	2,160,051	7	6,017,548
Mississippi								
Jackson State University	1	219,631	1	182,500	—	—	—	37,131
Tougaloo College	—	18,763	—	—	—	—	—	18,763
University of Mississippi Medical Center	20	9,756,405	18	8,315,787	1	375,224	1	1,065,394
Total Mississippi	21	9,994,799	19	8,498,287	1	375,224	1	1,121,288
Missouri								
APT Therapeutics, Inc.	1	439,052	1	439,052	—	—	—	—
Children's Mercy Hospital, Kansas City	1	267,012	1	267,012	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Mediomics, LLC	1	97,680	—	—	—	—	1	97,680
Saint Louis University	9	3,092,698	9	3,092,698	—	—	—	—
Saint Luke's Hospital	2	560,860	2	560,860	—	—	—	—
University of Missouri, Columbia	29	14,334,914	28	14,282,760	1	52,154	—	—
Washington University	111	66,474,048	92	44,721,288	17	3,559,859	2	18,192,901
Total Missouri	154	85,266,264	133	63,363,670	18	3,612,013	3	18,290,581
Montana								
Montana State University, Bozeman	3	1,068,750	3	1,068,750	—	—	—	—
Resodyn Corporation	1	370,783	1	370,783	—	—	—	—
Total Montana	4	1,439,533	4	1,439,533	—	—	—	—
Nebraska								
Creighton University	2	686,375	2	686,375	—	—	—	—
LNK Chemsolutions	1	199,997	1	199,997	—	—	—	—
University of Nebraska, Lincoln	1	309,852	1	309,852	—	—	—	—
University of Nebraska Medical Center	10	4,768,548	10	4,768,548	—	—	—	—
Total Nebraska	14	5,964,772	14	5,964,772	—	—	—	—
Nevada								
Nevada Cancer Institute	—	44,161	—	44,161	—	—	—	—
University of Nevada, Reno	6	1,898,448	5	1,870,814	1	27,634	—	—
Total Nevada	6	1,942,609	5	1,914,975	1	27,634	—	—
New Hampshire								
Celdara Medical, LLC	1	413,428	1	413,428	—	—	—	—
Dartmouth College	12	3,584,063	12	3,584,063	—	—	—	—
Xemed, LLC	1	374,983	1	374,983	—	—	—	—
Total New Hampshire	14	4,372,474	14	4,372,474	—	—	—	—
New Jersey								
Allied Innovative Systems, LLC	1	184,784	1	184,784	—	—	—	—
Artann Laboratories, Inc.	1	223,492	1	223,492	—	—	—	—
CircuLite, Inc.	1	1,698,956	1	1,698,956	—	—	—	—
DVX, LLC	2	803,221	2	803,221	—	—	—	—
Hackensack University Medical Center	1	264,150	1	264,150	—	—	—	—
Menssana Research, Inc.	1	1,000,000	1	1,000,000	—	—	—	—
Newark Beth Israel Medical Center	1	151,881	1	151,881	—	—	—	—
NovaFlux Technologies, Inc.	1	299,989	1	299,989	—	—	—	—
PharmaSeq, Inc.	1	998,481	1	998,481	—	—	—	—
Provid Pharmaceuticals, Inc.	1	175,200	1	175,200	—	—	—	—
Rutgers, The State University of New Jersey, New Brunswick	4	924,774	4	924,774	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Medicine & Dentistry of New Jersey, Robert Wood Johnson Medical School	5	2,441,931	5	2,441,931	—	—	—	—
University of Medicine & Dentistry of New Jersey, New Jersey Medical School	28	12,801,335	25	12,450,828	3	350,507	—	—
Vasade Biosciences, Inc.	2	683,348	2	683,348	—	—	—	—
Viocare, Inc.	1	877,714	1	877,714	—	—	—	—
Total New Jersey	51	23,529,256	48	23,178,749	3	350,507	—	—
New Mexico								
Lovelace Biomedical and Environmental Research Institute	2	1,113,935	2	1,113,935	—	—	—	—
Southwest Sciences, Inc.	1	375,162	1	375,162	—	—	—	—
University of New Mexico	10	3,326,311	9	2,939,818	1	386,493	—	—
University of New Mexico Health Sciences Center	2	514,495	2	514,495	—	—	—	—
Total New Mexico	15	5,329,903	14	4,943,410	1	386,493	—	—
New York								
Albany College of Pharmacy	1	338,554	1	338,554	—	—	—	—
Albany Medical College	7	2,317,015	6	2,259,910	1	57,105	—	—
Albert Einstein College of Medicine, Yeshiva University	32	12,532,172	27	12,091,112	4	361,525	1	79,535
Angion Biomedica Corporation	2	2,384,167	2	2,384,167	—	—	—	—
Biomedica Management Corporation	1	474,943	1	474,943	—	—	—	—
City College of New York	5	2,201,456	5	2,201,456	—	—	—	—
Cold Spring Harbor Laboratory	—	5,000	—	5,000	—	—	—	—
Columbia University of New York, Morningside	8	3,045,477	8	3,045,477	—	—	—	—
Columbia University Health Sciences	77	40,328,843	68	35,857,071	8	1,283,261	1	3,188,511
Cornell University, Ithaca	7	3,583,159	7	3,583,159	—	—	—	—
Dawkins Productions, Inc.	1	358,430	1	358,430	—	—	—	—
Feinstein Institute for Medical Research	2	829,499	2	829,499	—	—	—	—
Glycotek, LLC	—	13,566	—	13,566	—	—	—	—
Herbert H. Lehman College	1	285,250	1	285,250	—	—	—	—
Hospital for Special Surgery	2	555,924	2	555,924	—	—	—	—
Ithaca College	1	141,753	1	141,753	—	—	—	—
Jarvik Heart, Inc.	1	2,538,264	—	—	—	—	1	2,538,264
Mohawk Innovative Technology, Inc.	1	373,846	1	373,846	—	—	—	—
Montefiore Medical Center (Bronx)	1	314,327	1	314,327	—	—	—	—
Mount Sinai School of Medicine	38	37,749,531	32	20,467,068	5	834,948	1	16,447,515
New York Blood Center	3	1,113,686	3	1,113,686	—	—	—	—
New York Medical College	14	5,838,608	12	5,782,632	2	55,976	—	—
New York University	2	184,386	1	143,006	1	41,380	—	—
New York University School of Medicine	32	14,005,650	26	13,140,950	6	864,700	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Porter Novelli, Inc.	1	1,035,812	—	—	—	—	1	1,035,812
Pulmokine, Inc.	2	662,637	2	662,637	—	—	—	—
Queens College	1	373,835	1	373,835	—	—	—	—
Regeneron Pharmaceuticals, Inc.	0	1,000,000	0	1,000,000	—	—	—	—
Rensselaer Polytechnic Institute	2	1,004,048	2	1,004,048	—	—	—	—
Rockefeller University	2	1,014,081	2	1,014,081	—	—	—	—
Roswell Park Cancer Institute Corp.	3	2,476,107	3	2,476,107	—	—	—	—
Sloan-Kettering Institute for Cancer Research	5	1,683,433	5	1,683,433	—	—	—	—
St. Luke's-Roosevelt Institute for Health Sciences	1	657,191	1	657,191	—	—	—	—
State University of New York, Stony Brook	5	1,990,524	5	1,990,524	—	—	—	—
State University of New York, Buffalo	15	5,547,122	15	5,547,122	—	—	—	—
SUNY Downstate Medical Center	6	2,171,040	6	2,171,040	—	—	—	—
Syracuse University	1	236,795	1	236,795	—	—	—	—
Tartis, Inc.	1	112,885	1	112,885	—	—	—	—
Therasource, LLC	1	500,425	1	500,425	—	—	—	—
Transonic Systems, Inc.	1	375,035	1	375,035	—	—	—	—
University of Rochester	63	26,037,449	56	24,782,287	7	1,255,162	—	—
Upstate Medical University	7	2,666,101	7	2,666,101	—	—	—	—
VentriNova, Inc.	1	249,999	1	249,999	—	—	—	—
Wadsworth Center	1	380,704	1	380,704	—	—	—	—
Weill Medical College of Cornell University	35	18,531,064	30	17,964,840	5	566,224	—	—
Winifred Masterson Burke Medical Research Institute	1	450,844	1	450,844	—	—	—	—
Winthrop-University Hospital	1	93,009	1	93,009	—	—	—	—
Total New York	395	200,763,646	351	172,153,728	39	5,320,281	5	23,289,637
North Carolina								
Advanced Liquid, Inc.	1	168,208	—	—	—	—	1	168,208
BioMarck Pharmaceuticals, Ltd.	—	80,000	—	80,000	—	—	—	—
BioMedomics, Inc.	1	99,932	—	—	—	—	1	99,932
Duke University	99	50,871,800	87	48,359,476	10	1,855,481	2	656,843
East Carolina University	4	1,077,903	4	1,077,903	—	—	—	—
Gramercy Research Group, LLC	1	907,635	1	907,635	—	—	—	—
KeraNetics, LLC	1	232,644	1	232,644	—	—	—	—
LifeSciTech, LLC	1	672,857	1	672,857	—	—	—	—
North Carolina Central University	2	541,645	2	541,645	—	—	—	—
North Carolina State University, Raleigh	5	1,524,319	3	1,161,519	2	362,800	—	—
Research Triangle Institute	3	5,814,534	—	500,000	—	—	3	5,314,534
Rho Federal Systems Division, Inc.	—	625,534	—	625,534	—	—	—	—
University of North Carolina, Chapel Hill	87	51,093,569	74	38,333,077	10	1,860,434	3	10,900,058
Vascular Pharmaceuticals	1	470,596	1	470,596	—	—	—	—
Wake Forest University	4	4,179,017	1	352,491	—	—	3	3,826,526

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Wake Forest University Health Sciences	39	32,642,160	32	16,702,363	4	1,137,084	3	14,802,713
Wake Forest University School of Medicine	1	907,669	—	—	—	—	1	907,669
X-In8 Biologicals Corporation	1	321,746	1	321,746	—	—	—	—
Total North Carolina	251	152,231,768	208	110,339,486	26	5,215,799	17	36,676,483
North Dakota								
North Dakota State University	1	215,250	1	215,250	—	—	—	—
Total North Dakota	1	215,250	1	215,250	—	—	—	—
Ohio								
Arteriocyte, Inc.	1	1,609,381	1	1,609,381	—	—	—	—
Athersys, Inc.	1	99,302	1	99,302	—	—	—	—
Battelle Memorial Institute	1	20,950,000	—	—	—	—	1	20,950,000
Case Western Reserve University	69	28,324,758	60	22,329,029	7	1,106,672	2	4,889,057
ChanTest, Inc.	1	149,275	1	149,275	—	—	—	—
Children's Hospital Medical Center (Cincinnati)	70	24,798,170	62	24,103,355	8	694,815	—	—
Cleveland Clinic-Lerner College of Medicine	54	33,136,763	48	31,679,058	4	439,903	2	1,017,802
Cleveland Medical Devices, Inc.	1	915,032	1	915,032	—	—	—	—
Cleveland State University	3	694,725	2	661,900	1	32,825	—	—
Faraday Technology, Inc.	1	100,000	1	100,000	—	—	—	—
Frantz Medical Development, Ltd.	1	100,121	1	100,121	—	—	—	—
Great Lakes Pharmaceuticals, Inc.	1	1,264,939	1	1,264,939	—	—	—	—
Kent State University, Kent	3	1,713,363	3	1,713,363	—	—	—	—
Nanomimetics, Inc.	1	105,774	1	105,774	—	—	—	—
NeuroWave Systems, Inc.	1	642,779	1	642,779	—	—	—	—
Northeastern Ohio Universities College of Medicine	2	827,785	2	827,785	—	—	—	—
NovelMed Therapeutics, Inc.	2	936,313	2	936,313	—	—	—	—
Ogilvy Public Relations Worldwide	1	138,358	—	—	—	—	1	138,358
Ohio State University	43	13,243,222	39	13,030,405	4	212,817	—	—
Ohio University, Athens	1	356,130	1	356,130	—	—	—	—
P2d, Inc.	1	318,654	1	318,654	—	—	—	—
Peritex Biosciences	1	481,527	1	481,527	—	—	—	—
Research Institute at Nationwide Children's Hospital	6	1,554,806	4	1,241,032	2	313,774	—	—
University of Cincinnati	35	12,131,589	32	11,480,795	2	506,482	1	144,312
University of Toledo Health Science Campus	4	5,098,788	4	5,098,788	—	—	—	—
Wright State University	5	1,524,310	5	1,524,310	—	—	—	—
Total Ohio	310	151,215,864	275	120,769,047	28	3,307,288	7	27,139,529
Oklahoma								
Oklahoma Medical Research Foundation	6	3,916,169	6	3,916,169	—	—	—	—
Oklahoma State University, Stillwater	1	357,658	1	357,658	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Selexys Pharmaceuticals Corporation	1	2,091,208	1	2,091,208	—	—	—	—
University of Oklahoma Health Sciences Center	13	6,533,741	13	6,533,741	—	—	—	—
Total Oklahoma	21	12,898,776	21	12,898,776	—	—	—	—
Oregon								
Aronora, LLC	1	398,147	1	398,147	—	—	—	—
Gamma Therapeutics, Inc.	1	514,223	1	514,223	—	—	—	—
Oregon Center for Applied Science, Inc.	1	654,051	1	654,051	—	—	—	—
Oregon Health and Science University	39	16,189,104	33	14,844,242	6	1,344,862	—	—
Oregon State University	2	638,116	2	638,116	—	—	—	—
Portland State University	2	731,250	2	731,250	—	—	—	—
University of Oregon	2	568,190	2	568,190	—	—	—	—
Total Oregon	48	19,693,081	42	18,348,219	6	1,344,862	—	—
Pennsylvania								
Carnegie Mellon University	4	1,589,077	4	1,589,077	—	—	—	—
Children's Hospital of Pittsburgh	1	115,356	—	—	—	—	1	115,356
Children's Hospital of Philadelphia	35	16,458,124	33	15,696,032	2	762,092	—	—
Department of Veterans Affairs	1	91,339	—	—	—	—	1	91,339
Drexel University	2	442,388	2	442,388	—	—	—	—
Enson, Inc.	1	1,625,005	—	—	—	—	1	1,625,005
Industrial Science and Technology Network	—	249,500	—	249,500	—	—	—	—
Institute for Transfusion Medicine	1	383,135	—	—	—	—	1	383,135
Magee-Women's Research Institute and Foundation	1	326,009	1	326,009	—	—	—	—
National Disease Research Interchange	—	255,000	—	255,000	—	—	—	—
Pennsylvania State University Hershey Medical Center	21	15,960,259	21	15,960,259	—	—	—	—
Pennsylvania State University, University Park	4	983,707	3	947,845	1	35,862	—	—
Philadelphia College of Osteopathic Medicine	1	396,250	1	396,250	—	—	—	—
PolyMedix, Inc,	1	369,685	1	369,685	—	—	—	—
Progenra, Inc.	2	782,912	2	782,912	—	—	—	—
RNARx	1	400,120	1	400,120	—	—	—	—
Salus University	1	347,202	1	347,202	—	—	—	—
Shifa Biomedical	1	681,349	1	681,349	—	—	—	—
Strategic Polymer Sciences, Inc.	3	809,548	3	809,548	—	—	—	—
Temple University	40	13,805,001	35	12,597,489	4	689,120	1	518,392
Thomas Jefferson University	17	8,964,892	17	8,964,892	—	—	—	—
University of Pennsylvania	141	74,870,189	123	70,073,998	17	3,670,454	1	1,125,737
University of Pittsburgh	127	54,888,479	113	49,704,201	11	1,845,458	3	3,338,820
Wistar Institute	3	2,709,033	3	2,709,033	—	—	—	—
Total Pennsylvania	409	197,503,559	365	183,302,789	35	7,002,986	9	7,197,784

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Rhode Island								
Brown University	6	2,770,181	4	2,694,538	2	75,643	—	—
Butler Hospital (Providence)	1	494,697	1	494,697	—	—	—	—
EpiVax, Inc.	—	173,764	—	173,764	—	—	—	—
Gordon Research Conferences	8	90,000	8	90,000	—	—	—	—
Memorial Hospital of Rhode Island	1	718,575	1	718,575	—	—	—	—
Miriam Hospital	2	1,686,119	1	1,508,009	1	178,110	—	—
Pro-Change Behavior Systems, Inc.	1	247,286	1	247,286	—	—	—	—
Rhode Island Hospital	14	5,304,613	12	4,709,104	2	595,509	—	—
Roger Williams Hospital	1	415,430	1	415,430	—	—	—	—
University of Rhode Island	1	149,000	1	149,000	—	—	—	—
Total Rhode Island	35	12,049,665	30	11,200,403	5	849,262	—	—
South Carolina								
Clemson University	5	1,090,141	5	1,090,141	—	—	—	—
Medical University of South Carolina	39	12,874,219	33	10,853,676	5	995,482	1	1,025,061
MicroVide, LLC	1	117,453	1	117,453	—	—	—	—
University of South Carolina, Columbia	14	4,591,958	14	4,591,958	—	—	—	—
Winthrop University	1	417,319	1	417,319	—	—	—	—
Total South Carolina	60	19,091,090	54	17,070,547	5	995,482	1	1,025,061
South Dakota								
Black Hills Center for American Indian Health	1	301,593	1	301,593	—	—	—	—
Missouri Breaks Research, Inc.	1	313,229	1	313,229	—	—	—	—
Sanford Research—University of South Dakota	2	213,208	1	159,398	1	53,810	—	—
South Dakota State University	1	215,281	1	215,281	—	—	—	—
University of South Dakota	2	716,564	2	716,564	—	—	—	—
Total South Dakota	7	1,759,875	6	1,706,065	1	53,810	—	—
Tennessee								
Department of Veterans Affairs	1	8,875,483	—	—	—	—	1	8,875,483
East Tennessee State University	5	1,524,350	5	1,524,350	—	—	—	—
Meharry Medical College	5	910,308	2	448,722	3	461,586	—	—
St. Jude Children's Research Hospital	10	10,907,451	9	10,856,977	1	50,474	—	—
Translational Sciences, Inc.	1	167,685	1	167,685	—	—	—	—
University of Memphis	1	373,219	1	373,219	—	—	—	—
University of Tennessee Health Science Center	27	11,280,004	27	11,280,004	—	—	—	—
Vanderbilt University	105	45,397,370	94	43,273,171	10	1,774,732	1	349,467
Total Tennessee	155	79,435,870	139	67,924,128	14	2,286,792	2	9,224,950

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Texas								
Baylor College of Medicine	60	22,443,520	47	17,115,012	11	2,048,852	2	3,279,656
Biomedical Development Corporation	1	410,355	1	410,355	—	—	—	—
Indus Instruments	2	198,500	1	98,500	—	—	1	100,000
Methodist Hospital Research Institute	5	1,220,004	5	1,220,004	—	—	—	—
Noninvasix, Inc.	1	162,065	1	162,065	—	—	—	—
Rice University	3	751,263	3	751,263	—	—	—	—
Scott and White Memorial Hospital	1	136,080	1	136,080	—	—	—	—
Southern Methodist University	1	339,387	1	339,387	—	—	—	—
Southwest Foundation for Biomedical Research	6	8,685,712	6	8,685,712	—	—	—	—
Southwest Research Institute	1	191,559	1	191,559	—	—	—	—
Stellar Micro Devices, Inc.	1	99,990	1	99,990	—	—	—	—
Texas A&M University	1	93,354	1	93,354	—	—	—	—
Texas A&M University Health Science Center	13	3,148,189	12	3,096,035	1	52,154	—	—
Texas A&M University System	2	651,161	2	651,161	—	—	—	—
Texas Agrilife Research	1	353,201	1	353,201	—	—	—	—
Texas Engineering Experiment Station	2	1,135,502	2	1,135,502	—	—	—	—
Texas Heart Institute	4	2,598,450	4	2,598,450	—	—	—	—
Texas Southern University	1	328,105	1	328,105	—	—	—	—
Texas Tech University	1	180,137	1	180,137	—	—	—	—
Texas Tech University Health Sciences Center	1	91,235	1	91,235	—	—	—	—
University of Houston	3	1,049,645	3	1,049,645	—	—	—	—
University of North Texas Health Science Center	5	3,727,454	5	3,727,454	—	—	—	—
University of Texas, Arlington	1	219,000	1	219,000	—	—	—	—
University of Texas, Austin	1	359,668	1	359,668	—	—	—	—
University of Texas, Dallas	2	672,749	2	672,749	—	—	—	—
University of Texas, El Paso	1	138,115	1	138,115	—	—	—	—
University of Texas, Galveston	1	2,121,631	—	—	—	—	1	2,121,631
University of Texas Health Center, Tyler	4	4,984,563	4	1,352,245	—	—	—	—
University of Texas Health Science Center, Houston	25	16,752,334	24	15,516,963	—	—	1	1,235,371
University of Texas, Health Science Center, San Antonio	9	4,984,563	7	2,646,154	1	343,225	1	1,995,184
University of Texas M.D. Anderson Cancer Center	6	3,878,004	6	3,878,004	—	—	—	—
University of Texas Medical Branch, Galveston	6	2,697,265	6	2,697,265	—	—	—	—
University of Texas, San Antonio	3	545,264	2	515,959	1	29,305	—	—
University of Texas Southwest Medical Center, Dallas	47	22,133,709	41	20,616,230	6	1,517,479	—	—
University of the Incarnate Word	1	111,951	1	111,951	—	—	—	—
Total Texas	223	103,961,366	197	91,238,509	20	3,991,015	6	8,731,842

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Utah								
LDS Hospital	1	722,506	—	—	—	—	1	722,506
Medical Physics, Inc.	1	106,274	1	106,274	—	—	—	—
Navigen, Inc.	1	554,199	1	554,199	—	—	—	—
University of Utah	42	22,989,831	34	14,420,091	3	467,704	5	8,102,036
Total Utah	45	24,372,810	36	15,080,564	3	467,704	6	8,824,542
Vermont								
University of Vermont and State Agricultural College	33	15,702,177	29	14,699,724	4	1,002,453	—	—
Total Vermont	33	15,702,177	29	14,699,724	4	1,002,453	—	—
Virginia								
College of William and Mary	3	665,301	3	665,301	—	—	—	—
HemoShear, LLC	1	166,830	1	166,830	—	—	—	—
Hemosonics, LLC	1	298,626	1	298,626	—	—	—	—
Luna Innovations, Inc.	2	686,032	1	164,348	—	—	1	521,684
Mcguire Research Institute, Inc.	1	295,452	1	295,452	—	—	—	—
Prognosys, LLC	1	100,000	—	—	—	—	1	100,000
SonoMedica, LLC	1	376,437	1	376,437	—	—	—	—
Systems Research and Applications Corporation	1	418,999	—	—	—	—	1	418,999
University of Virginia, Charlottesville	56	19,245,839	49	18,116,510	7	1,129,329	—	—
Virginia College of Osteopathic Medicine	1	229,050	1	229,050	—	—	—	—
Virginia Commonwealth University	26	7,670,198	21	7,069,522	5	600,676	—	—
Virginia Polytechnic Institute and State University	1	737,860	1	737,860	—	—	—	—
Total Virginia	95	30,890,624	80	28,119,936	12	1,730,005	3	1,040,683
Washington								
Asthma, Inc.	1	194,124	1	194,124	—	—	—	—
Axio Research, LLC	1	5,078,168	1	5,078,168	—	—	—	—
Barlow Scientific, Inc.	1	283,561	1	283,561	—	—	—	—
Battelle Pacific Northwest Laboratories	1	1,688,292	1	1,688,292	—	—	—	—
Benaroya Research Institute at Virginia Mason	2	3,047,061	2	3,047,061	—	—	—	—
Fred Hutchinson Cancer Research Center	22	15,466,282	19	13,924,656	1	40,663	2	1,500,963
Group Health Cooperative	1	360,000	1	360,000	—	—	—	—
Iasis Molecular Sciences, LLC	1	277,838	1	277,838	—	—	—	—
Insilicos	1	400,000	1	400,000	—	—	—	—
Institute for Systems Biology	1	155,374	1	155,374	—	—	—	—
Puget Sound Blood Center	1	470,575	1	470,575	—	—	—	—
Seattle Biomedical Research Institute	1	41,233	—	—	1	41,233	—	—
Seattle Children's Hospital	12	5,600,626	12	5,600,626	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Seattle Institute for Biomedical and Clinical Research	1	215,657	1	215,657	—	—	—	—
Syntrix Biosystems, Inc.	—	218,812	—	218,812	—	—	—	—
University of Washington	122	69,377,816	101	60,773,667	16	3,772,299	5	4,831,850
VPDiagnostics, Inc.	1	222,249	1	222,249	—	—	—	—
Washington State University	2	751,216	2	751,216	—	—	—	—
Western Washington University	1	274,457	1	274,457	—	—	—	—
Total Washington	173	104,123,341	148	93,936,333	18	3,854,195	7	6,332,813
West Virginia								
West Virginia University	8	2,893,449	7	2,538,857	1	354,592	—	—
Total West Virginia	8	2,893,449	7	2,538,857	1	354,592	—	—
Wisconsin								
American Society of Gene Therapy	2	20,000	2	20,000	—	—	—	—
Bellbrook Labs, LLC	2	823,368	2	823,368	—	—	—	—
BloodCenter of Wisconsin, Inc.	9	4,897,775	8	4,725,804	1	171,971	—	—
Clinical MR Solutions, LLC	1	157,589	1	157,589	—	—	—	—
Marquette University	1	249,696	1	249,696	—	—	—	—
Medical College of Wisconsin	63	30,124,299	57	29,219,725	6	904,574	—	—
Platypus Technologies, LLC	1	199,987	1	199,987	—	—	—	—
Regents of the University of Wisconsin System	1	1,213,809	—	—	—	—	1	1,213,809
Shared Medical Technology, Inc.	1	2,570,433	1	2,570,433	—	—	—	—
Society of Behavioral Medicine	—	5,000	—	5,000	—	—	—	—
Spectrocon, LLC	1	639,098	1	639,098	—	—	—	—
Syslogic, Inc.	1	699,283	1	699,283	—	—	—	—
University of Wisconsin, Madison	50	23,423,992	41	21,822,660	9	1,601,332	—	—
University of Wisconsin, Milwaukee	1	347,114	1	347,114	—	—	—	—
Total Wisconsin	134	65,371,443	117	61,479,757	16	2,677,877	1	1,213,809
Wyoming								
Softray, Inc.	1	136,960	1	136,960	—	—	—	—
Total Wyoming	1	136,960	1	136,960	—	—	—	—
Puerto Rico								
Universidad Central del Caribe	1	130,617	1	130,617	—	—	—	—
University of Puerto Rico Mayaguez	—	139,676	—	139,676	—	—	—	—
University of Puerto Rico Medical Sciences	1	217,500	1	217,500	—	—	—	—
Total Puerto Rico	2	487,793	2	487,793	—	—	—	—
Total U.S.	5,481	2,685,807,822	4,768	2,303,289,985	544	98,069,305	169	284,448,532

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Argentina								
Institute for Clinical Effectiveness and Health Policy	1	499,988	—	—	—	—	1	499,988
Total Argentina	1	499,988	—	—	—	—	1	499,988
Australia								
Baker Heart Research Institute	1	259,063	1	259,063	—	—	—	—
Total Australia	1	259,063	1	259,063	—	—	—	—
Canada								
American Society for Apheresis	1	5,000	1	5,000	—	—	—	—
Hospital for Sick Children (Toronto)	2	327,045	2	327,045	—	—	—	—
McMaster University	2	516,366	1	470,516	—	—	1	45,850
Montreal Heart Institute	2	512,170	2	512,170	—	—	—	—
Ottawa Health Research Institute	1	216,000	1	216,000	—	—	—	—
St. Michael's Hospital	1	108,000	1	108,000	—	—	—	—
University of Toronto	1	33,714	—	—	1	33,714	—	—
Total Canada	10	1,718,295	8	1,638,731	1	33,714	1	45,850
Colombia								
Malaria Vaccine Development Center	1	263,020	1	263,020	—	—	—	—
Total Colombia	1	263,020	1	263,020	—	—	—	—
Hungary								
Institute of Enzymology, Biological Research Center	—	27,000	—	27,000	—	—	—	—
Total Hungary	—	27,000	—	27,000	—	—	—	—
Iceland								
deCODE Genetics, Inc.	1	548,088	1	548,088	—	—	—	—
Total Iceland	1	548,088	1	548,088	—	—	—	—
New Zealand								
University of Auckland	1	461,826	1	461,826	—	—	—	—
Total New Zealand	1	461,826	1	461,826	—	—	—	—
Peru								
Universidad Peruana	1	499,996	—	—	—	—	1	499,996
Total Peru	1	499,996	—	—	—	—	1	499,996
Switzerland								
École Polytechnique Fédérale de Lausanne	1	270,000	1	270,000	—	—	—	—
Total Switzerland	1	270,000	1	270,000	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Uganda								
Makerere University	—	100,000	—	100,000	—	—	—	—
Total Uganda	—	100,000	—	100,000	—	—	—	—
United Kingdom								
St. Mary's Hospital Newport	1	396,996	1	396,996	—	—	—	—
University College London	1	292,970	1	292,970	—	—	—	—
University of Bristol	1	505,903	1	505,903	—	—	—	—
University of Leeds	1	76,680	1	76,680	—	—	—	—
Total United Kingdom	4	1,272,549	4	1,272,549	—	—	—	—
Zimbabwe								
University of Zimbabwe	—	100,000	—	100,000	—	—	—	—
Total Zimbabwe	—	100,000	—	100,000	—	—	—	—
Total, Other	21	\$ 6,019,825	17	\$ 4,940,277	1	\$ 33,714	3	\$ 1,045,834
Grand Total	5,502	\$2,691,827,647	4,785	\$2,308,230,262	545	\$98,103,019	172	\$285,494,366



15. Activities Supported by the American Recovery and Reinvestment Act of 2009

The American Recovery and Reinvestment Act (ARRA), also known as the Recovery Act or the Economic Stimulus Package, was signed into law by President Barack Obama on February 17, 2009. It was an unprecedented effort to jump-start the economy, create or save millions of jobs, and address national challenges so that the Nation could move forward and thrive in the 21st century.

As stated in the legislation, the ARRA has five purposes:

- Preserve and create jobs and promote economic recovery
- Assist those most affected by the recession
- Provide investments needed to increase economic efficiency by spurring technological advances in science and health
- Invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits
- Stabilize state and local government budgets to minimize and avoid reductions in essential services and counterproductive state and local tax increases

The ARRA provided the NIH with \$10.4 billion, of which \$763 million was allocated to the NHLBI. The Institute's funding plan strikes a balance between increasing the number of investigator-initiated research grants and supporting signature projects through the following mechanisms: NHLBI research grants (through expansion of FY 2008 and FY 2009 paylines), participation in NIH-wide administrative supplements, and participation in NIH-wide ARRA RFAs.

NHLBI Research Grants-Expansion of FY 2008 and FY 2009 Paylines

The NHLBI used a portion of the ARRA funds to support investigator-initiated research grant applications that had just missed the paylines in FY 2008

and FY 2009. The following proposals were funded by the NHLBI:

- Highly meritorious investigator-initiated R01 and R21 applications that ranked from the 15.1 to 25.0 percentile and were viewed as being capable of making significant advances with a 2-year grant.
- Early Stage Investigator-initiated applications up to the 35.0 percentile. The first 2 years will be supported by ARRA funds. The remaining years will be funded by regularly appropriated funds.
- New Investigator-initiated applications that ranked from the 20.1 to 30.0 percentile and were viewed as being capable of making significant advances in 2 years.

Administrative Supplements

An administrative supplement is an increment in funding to support research that is within the original scope of an active NIH research grant (parent grant). Requests for administrative supplements for NHLBI grants do not require evaluation by an initial peer-review group but are subject to review and approval by NHLBI program and grants management staff.

The NHLBI funded administrative supplements to active R01 and R21 grants. The NHLBI's supplements under the ARRA support research employment opportunities for new full-time-equivalent employees who are predoctoral students, postdoctoral trainees or fellows, or recent college and master's degree graduates. Priority was given to requests from investigators who were qualified to receive their current awards as Early Stage Investigators or New Investigators.

The NHLBI also funded administrative supplements under the following NIH-wide initiatives:

- **Administrative Supplements Providing Summer Research Experiences for Students and Science Educators:** To support summer

research opportunities for high school and college students and science educators (e.g., elementary, middle, and high school teachers; community college faculty; and faculty from non-research intensive institutions).

- **Research Supplements To Promote Diversity in Health-Related Research:** To provide supplements to research grants to improve the diversity of the research workforce by supporting and recruiting students, postdoctorates, and eligible investigators from groups that have been shown to be underrepresented in science.
- **Research Supplements To Promote Reentry Into Biomedical and Behavioral Research Careers:** To support individuals with high potential to reenter an active research career after a qualifying interruption for family or other responsibilities.

NHLBI Participation in NIH-Wide ARRA RFAs

NIH Challenge Grants in Health and Science Research (RC1)

Challenge grants support research on specific biomedical and behavioral research areas that can be substantially advanced by significant 2-year jumpstart funds. The NIH identified broad Challenge Areas focused on specific knowledge gaps, scientific opportunities, new technologies, data generation, or research methods, and the NHLBI identified specific Challenge Topics within the broad Challenge Areas that reflect the Institute's views about priority areas for funding.

Research and Research Infrastructure “Grand Opportunities” (GO) (RC2)

GO grants support projects that address large, specific biomedical and behavioral research endeavors that will benefit from significant 2-year investments without the expectation of continued funding from NIH. Research supported by this program is expected to provide a high short-term return and offer a high likelihood of enabling growth and investment in biomedical research and development, public health, and health care delivery. The NHLBI identified the following priority topics for GO grants:

- Comparative Effectiveness Research
- Novel Methods of Monitoring Health Disparities

- The NHLBI BioResource Program: Creation of Resources Designed To Accelerate Scientific Progress in the Areas of Heart, Lung, and Blood Diseases; Cellular Therapies; and Blood Safety
- Large-Scale DNA Sequencing and Molecular Profiling of Well-Phenotyped NHLBI Cohorts
- Next Steps in Gene Discovery: Building Upon GWAS (Genome-wide Association Studies)
- Characterizing Differentiated Heart, Lung, and Blood Cells Derived by Reprogramming Human Embryonic and Induced Pluripotent Stem Cells
- Testing of Mechanistic Hypotheses Generated by Findings From Genetic and Genomic Studies of Heart, Vascular, Lung, and Blood Disorders
- Translation of Fundamental Research Findings Into Clinical Treatments for Heart, Lung, and Blood Diseases (including the NHLBI Translational Research Implementation Program (TRIP); the Phase II Clinical Trials Program of Novel Therapies for Heart, Lung, and Blood Diseases; and the Ancillary Studies Program)

Supporting New Faculty Recruitment To Enhance Research Resources Through Biomedical Research Core Centers (P30)

The P30 program was designed to enable institutions to augment or expand their biomedical research efforts by hiring newly independent investigators and providing them with appropriate startup packages and the resources needed to develop pilot research projects.

Other RFAs Funded Under ARRA

Small Grants for Lung Tissue Research (R03)

This program will enable tissue-based research on two common but complex and difficult-to-treat lung diseases: interstitial fibrotic lung disease and COPD. Funds from the ARRA will expand substantially the Institute's lung tissue research program by enabling support for nine additional grants.

Functional Characterization of Genetic Variants and Interactions: The Genes, Environment, and Health Initiative (R21)

This program—which is part of the NIH Genes, Environment, and Health Initiative—will determine the

functional relevance of associated genetic variant(s) to common diseases. It will focus solely on functional characterization of gene variants that are strongly suggested to be associated with common but complex human diseases identified through candidate gene, genome-wide association studies, and other approaches.

Comparative Effectiveness Research (CER)

Approximately \$1.1 billion of the ARRA funds were allocated to CER, of which the NIH received \$400 million. The NIH used the funds to support 2-year investigator-initiated projects, including payline expansions, Challenge grants, GO grants, and such other activities as supplements and contracts. The projects supported by the funds met the Federal Coordinating Council definition of CER, that is:

Comparative effectiveness research is the conduct and synthesis of research comparing the benefits and harms of different interventions and strategies to prevent, diagnose, treat, and monitor health conditions in “real world” settings. The purpose of this research is to improve health outcomes by developing and disseminating evidence-based information to patients, clinicians, and other decision makers, responding to their expressed needs, about which interventions are most effective for which patients under specific circumstances.

Signature Projects

DNA Sequencing of NHLBI’s Well-Phenotyped Population Cohorts for the Identification of Disease-Causing Genetic Variants and Understanding of Biological Pathways

Although genome-wide association studies have been successful in identifying high frequency genetic variants of modest effect size that are associated with numerous common complex traits and diseases—including myocardial infarction, stroke, diabetes, obesity, hypertension, chronic pulmonary disease, and anemia—they are incapable of identifying actual disease-causing genetic variants, especially those of lower frequency and potentially larger effects. Finding such variants requires large-scale DNA sequencing of thousands of individuals from well-phenotyped populations. With recent technological advances, the feasibility of such a project is now within reach, and a strong argument can be made that the well-phenotyped NHLBI cohorts are the logical place to start.

The NHLBI is supporting six GO (RC2) grants, including two sequencing centers, under this signature program. The NIH Office of the Director is providing funds to help support one of the sequencing centers.

Stem Cell Biology and Regenerative Medicine

The NHLBI is committed to catalyzing basic and clinical stem cell research that will lead to the development of regenerative therapies for the treatment of heart, lung, and blood diseases. Recent advances, including the induction of pluripotent stem cells from adult somatic cells and the directed differentiation of stem cells into a variety of cellular derivatives, hold great promise for future therapeutic application. However, important gaps remain in understanding the characteristics of stem and progenitor cells, the mechanisms of their differentiation, and the unique attributes of resultant differentiated states. In addition, the degree to which differentiation of stem cells in the laboratory recapitulates the *in vivo* characteristics of tissues and organs remains unclear, and fundamental knowledge of cardiovascular and pulmonary stem and progenitor cell biology lags behind that for hematopoietic cells.

To address these gaps, the NHLBI is supporting four GO (RC2) grants under this signature program.

Translation of Fundamental Research Findings Into Clinical Treatments for Heart, Lung, and Blood Diseases

The ultimate goal of biomedical research is to make discoveries that can be used to improve public health. Fundamental research studies in cells, tissues, and animal models and investigations of biomarkers and functional genomics have greatly expanded understanding of the pathogenesis of many heart, lung, and blood diseases and have provided a range of potential new approaches for their prevention and treatment. Yet the translation of basic research findings to clinical testing has often been disappointingly slow, with good ideas and new findings sometimes languishing for years before being tested for efficacy in a clinical setting. ARRA funds provide an excellent opportunity to stimulate translational research and thereby hasten the transition of research findings into clinical practice. The NHLBI will fund 10 GO (RC2) grants in two program areas:

- **Stage 1 of the NHLBI Translational Research Implementation Program (TRIP):** To accelerate the translation of fundamental research ideas into proof-of-concept efficacy testing in patients. The 2-year Stage 1 TRIP awards will support preliminary studies that culminate in the development of ready-to-conduct clinical trials. The awards will fund the activities required to design clinical trials to evaluate safety and efficacy of new modalities to treat and prevent heart, lung, and blood diseases based on promising ideas that have emerged from basic research. For the Stage 2 TRIP, the NHLBI will use regularly appropriated funds to support the most meritorious trials developed in Stage 1.
- **Phase II Clinical Trials Program of Novel Therapies for Heart, Lung, and Blood Diseases:** To support Phase II clinical trials of novel therapies and diagnostic strategies for heart, lung, and blood diseases that offer the potential to change clinical practice and are ready to be tested in patients. It will also support the designs of innovative clinical trials. The supported research is expected to result in high-quality data that will lead to efficacy or Phase III trials. This program will assess only interventions and strategies that offer high promise for modifying current treatments or diagnostic approaches or altering the course of a disease.

NHLBI Participation in NIH-Wide ARRA RFAs With Award Dates in FY 2010

Academic Research Enhancement Awards (AREA) (R15)

The AREA program stimulates research in educational institutions that provide baccalaureate or advanced degrees for a significant number of the Nation's research scientists but have not been major recipients of NIH support. AREA grants support small-scale health-related research projects that are proposed by faculty members of eligible domestic institutions.

Biomedical Research, Development, and Growth To Spur the Acceleration of New Technologies Pilot Program (BRDG-SPAN) (RC3)

The BRDG-SPAN is a pilot program that addresses the funding gap between promising research and development (R&D) and transition to the market by contributing funding needed by applicants to pursue the next appropriate milestone(s) toward ultimate commercialization. The

goal of the BRDG-SPAN is to accelerate the transition of research innovations and technologies toward the development of products or services that will improve human health, help advance the mission of the NHLBI, and create significant value and economic stimulus. This program will also foster partnerships among a variety of R&D collaborators.

Small Business Catalyst Awards for Accelerating Innovative Research (R43)

This program accelerates innovation through high-risk, high-reward R&D that has commercial potential and is relevant to the mission of the NIH. The award supports entrepreneurs of exceptional creativity who are drawn from scientific and technological environments beyond those usually involved in NIH-supported research and who have proposed pioneering and possibly transformative approaches to addressing major biomedical or behavioral challenges with the potential for downstream commercial development.

Building Community-linked Infrastructure To Enable Health Science Research (RC4)

This program supports the development, expansion, or reconfiguration of infrastructures that are needed to facilitate collaborations between academic health centers and community-based organizations for health science research. These 3-year awards are funded by the NIH Office of the Director, and the NHLBI is administering two grants under this solicitation.

Methodology Development in CER (RC4)

This program supports projects to develop, enhance, or evaluate methodologies to improve the efficiency, validity, and credibility of CER. These 3-year awards are funded with NIH CER funds, and the NHLBI is administering three grants under this solicitation.

NIH Director's Opportunity for Research in Five Thematic Areas (RC4)

This program supports projects to develop and implement critical research innovations in one or more of the following five thematic areas:

- Applying Genomics and Other High Throughput Technologies

- Translating Basic Science Discoveries Into New and Better Treatments
- Using Science To Enable Health Care Reform
- Focusing on Global Health
- Reinvigorating the Biomedical Research Community

This program enables scientists to address these unique challenges by engaging in new avenues of research through which progress would produce a significant impact on the growth of and investment in biomedical or behavioral science and/or health research. These 3-year projects are supported by ARRA funds from the NIH Office of the Director, and the NHLBI is administering two grants under this solicitation.

NIH Basic Behavioral and Social Science Opportunity Network (BBSS OppNet) Short-Term Mentored Career Development Awards in the BBSSs for Mid-Career and Senior Investigators (K18)

This program supports short-term mentored career development awards for established, mid-career, and senior investigators to support their development of research capabilities in BBSS research. The NHLBI is administering two grants under this solicitation.

NHLBI Participation in NIH-Funded Competitive Revisions With Award Dates in FY 2010

Competitive Revisions Through the NIH BBSS OppNet (R01, R03, R15, R21/R33, R37)

This program supports competitive revision (formerly called competitive supplements) grants for relevant active research projects to accelerate, expand, and/or strengthen BBSS research. The grants are funded through the BBSS OppNet, and the NHLBI is administering two grants under this solicitation.

NHLBI ARRA-Supported Activities Initiated in Fiscal Year 2009

Category	Program and Mechanism*	Number of Awards	Funding (Dollars in Millions)**	NIH Support (Dollars in Millions)**
Research Grants-Expanded Paylines	R01/R21s	328	292	21
NIH-Wide Administrative Supplements	Administrative Supplements	382	88	
	Research Supplements To Promote Diversity in Health-Related Research	17	1	
	Research Supplements To Promote Reentry Into Biomedical and Behavioral Research Careers	3	1	
	Administrative Supplements Providing Summer Research Experiences for Students and Science Educators	120	1	3
NIH-Wide ARRA RFAs	Challenge Grants (RC1)	108	102	28
	Grand Opportunities (RC2)	48	199	84
	Supporting New Faculty Recruitment To Enhance Research Resources Through Biomedical Research Core Centers (P30)	35	40	
Other RFAs	Functional Characterization of Genetic Variants and Interactions: The Genes, Environment, and Health Initiative (R21)	4	3.4	
	Small Grants for Lung Tissue Research (R03)	22	3.3	

* Does not include mechanisms with funding received after 2009.

** Two-year total costs.

NHLBI ARRA-Supported Activities Initiated in Fiscal Year 2010

Category	Program and Mechanism	Number of Awards	Funding (Dollars in Millions)
NIH-Wide RFAs	Academic Research Enhancement Awards (R15)	3	1
	Biomedical Research, Development and Growth To Spur the Acceleration of New Technologies Pilot Program (RC3)	6	16
	Small Business Catalyst Awards for Accelerating Innovative Research	14	3
	Challenge Grants (RC1)—Human Embryonic Stem Cells	4	4



Appendixes

Types of Research Activity

List of Abbreviations and Acronyms

Index



Types of Research Activity

Research Projects

Research Project Grants (R01): To support discrete and specific projects to be performed by one or several investigators in areas of the investigator's particular interests and competencies.

Research Projects (Cooperative Agreements) (U01): To support discrete, circumscribed projects in areas of an investigator's specific interest and competency involving substantial programmatic participation by the NHLBI during performance of the activity.

Research Program (Cooperative Agreement) (U10): To support a research program of multiple projects, requiring a broadly-based, multidisciplinary and often long-term approach, directed toward a specific major objective, common theme, or program goal relevant to the Institute's mission. The award involves substantial programmatic involvement by NHLBI staff to assist investigators during performance of the research activities.

Research Program Projects (P01): To support broadly based, multidisciplinary, often long-term research projects that have specific major objectives or basic themes directed toward a well-defined research program goal. Usually, a relatively large, organized group of researchers conducts individual subprojects, the results of which help achieve objectives of the program project.

Small Research Grants (R03): To provide limited support for extended analyses of research data generated by clinical trials, population research, and demonstration and education studies.

Academic Research Enhancement Awards (AREA) (R15): To support small-scale research projects conducted by faculty in primarily baccalaureate degree-granting domestic institutions. Awards are for up to \$75,000 for direct costs (plus applicable indirect costs) for periods not to exceed 36 months.

Exploratory/Developmental Grants (R21): To encourage the development of new research activities in heart, lung, and blood diseases and sleep disorders program areas.

Exploratory/Developmental Grant (R33): To provide phase II support for innovative exploratory and developmental research activities initiated under the R21 mechanism.

Clinical Trial Planning Grant (R34): To support the initial development of a clinical trial, including establishment of the research team; development of tools for data management and oversight of the research; development of a trial design and other essential elements of the study, such as the protocol, recruitment strategies, and procedure manuals; and to collect feasibility data.

Clinical Planning Grant Cooperative Agreement (U34): To support the initial development of a clinical trial, including establishment of the research team; development of tools for data management and oversight of the research; development of a trial design and other essential elements of the study, such as the protocol, recruitment strategies, and procedure manuals; and to collect feasibility data. The award involves substantial programmatic involvement by NHLBI staff to assist investigators during performance of the research activities.

Method To Extend Research in Time (MERIT) Award (R37): To provide long-term research grant support to investigators whose research competency and productivity are distinctly superior and thus are likely to continue to perform in an outstanding manner. Investigators may not apply for a MERIT award; instead, they are selected by the NHLBI on the basis of their current grant applications and their present and past grant support.

NIH Director's Pioneer Award (DP1): To support individual scientists of exceptional creativity who propose pioneering approaches to major contemporary challenges in biomedical research.

NIH Director's New Innovator Award (DP2): To support exceptionally creative new investigators who propose highly innovative approaches that have the potential to produce an unusually high impact. The New Innovator Award will emphasize the importance and potential impact of the scientific problem, the novelty and innovativeness of the approach, and the applicant's potential for creative and innovative research.

Linked Research Project Grant (RL1): To support a discrete, specified, circumscribed project that is administratively linked to another project or projects.

Small Business Technology Transfer (STTR) Grants—Phase I (R41): To support cooperative R&D projects between small business concerns and research institutions, limited in time and amount, to establish the technical merit and feasibility of ideas that have potential for commercialization. Awards are made to small business concerns only.

Small Business Technology Transfer (STTR) Grants—Phase II (R42): To support in-depth development of cooperative R&D projects between small business concerns and research institutions, limited in time and amount, whose feasibility has been established in phase I and that have potential for commercialization. Awards are made to small business concerns only.

Small Business Innovation Research (SBIR) Grants, Phase I (R43): To support projects, limited in time and amount, to establish the technical merit and feasibility of research and development ideas that may ultimately lead to commercial products or services.

Small Business Innovation Research (SBIR) Grants, Phase II (R44): To support research project ideas that have been shown to be feasible in phase I and that are likely to result in commercially marketable products or services.

Research Centers

Exploratory Grants (P20): To support planning for new programs, expansion or modification of existing resources, and feasibility studies to explore various approaches to the development of interdisciplinary programs that offer potential solutions to problems of special significance to the mission of the NHLBI.

Center Core Grants (P30): To support shared resources and facilities for basic, clinical, behavioral, and translational research in the prevention, detection, and treatment of HIV infection and AIDS.

Specialized Centers of Clinically Oriented Research (SCCOR) Grants (P50): To foster multidisciplinary research on clinically relevant questions enabling basic science findings to be applied more rapidly to clinical problems. Research focuses on clinical and basic scientific issues related to diseases and disorders that are relevant to the mission of the NHLBI. The SCCOR program places more emphasis on clinical research than the SCOR program and requires at least 50 percent of the funded projects to be clinical.

Comprehensive Specialized Research Center Grants (U54): To support a large, interrelated biomedical research program focused on a disorder within the Institute's mandate; to initiate and expand community education, screening, and counseling programs; and to educate medical and allied health professionals concerning problems of diagnosis and treatment of specific diseases such as sickle cell anemia.

Research Career Programs

Mentored Research Scientist Development Award for Minority Faculty (K01): To support underrepresented minority faculty members with varying levels of research experience to prepare them for research careers as independent investigators.

Mentored Scientist Development Award in Research Ethics (K01): To provide support for training in research ethics for health professionals working at academic and other health-related institutions in biomedical, behavioral, or public health research, particularly research involving human participants.

Minority Institution Faculty Mentored Research Scientist Development Award (K01): To support faculty members at minority institutions who have the interest and potential to conduct state-of-the-art research in cardiovascular, pulmonary, or hematologic disease or in sleep disorders.

Independent Scientist Award (K02): To enhance the research capability of promising individuals in the formative stages of their careers of independent research in the

sciences related to heart, lung, and blood diseases; blood resources; and sleep disorders.

Academic Award (K07): To support an individual with an academic appointment to introduce or improve a disease curriculum that will enhance the academic or research environment of the applicant institution as well as further the individual's own career. This award series included the Systemic Pulmonary and Vascular Diseases Academic Awards, the Tuberculosis Academic Award, the Sleep Academic Award, and the Nutrition Academic Award. Currently, the Cultural Competence and Health Disparities Academic Award and the Pediatric Transfusion Medicine Academic Award programs are being supported.

Clinical Investigator Development Award (K08): To provide an opportunity for clinically trained physicians to develop research skills and gain experience in advanced research methods and experimental approaches in basic and applied sciences relevant to cardiovascular, pulmonary, and hematological diseases.

Research Career Development Program in Vascular Medicine (K12): To promote comprehensive clinical research training for physicians wanting to specialize in vascular medicine. The goal is to prepare clinicians for academic roles in mentoring and leadership in clinical research in vascular medicine.

Research Career Development Program in Clinical Hematology (K12): To develop and evaluate multidisciplinary career development programs in clinical hematology research that will equip new academic researchers with the knowledge and skills to address complex problems in blood diseases, transfusion medicine, and cellular therapies.

Research Career Development Program in the Genetics and Genomics of Lung Diseases (K12): To develop multidisciplinary career development programs in genetics and genomics of lung diseases that will equip new investigators with the knowledge and skills to elucidate the etiology and pathogenesis of such diseases.

Career Enhancement Award for Stem Cell Research (K18): To enable established investigators to acquire new research capabilities in the use of human or animal embryonic, adult, or cord blood stem cells. All candidates must have a sponsor, either within their own or at

another institution, who is a well-qualified stem cell expert to serve as a mentor.

NHLBI Career Transition Award (K22): To support the postdoctoral research training of an outstanding individual in an NHLBI intramural laboratory for up to 3 years and subsequently, to support the individual's successful transition from postdoctoral research to an extramural environment as an independent researcher.

Mentored Patient-Oriented Research Career Development Award (K23): To provide support for career development to investigators who have made a commitment to focus their research endeavors on patient-oriented research.

Midcareer Investigator Award in Patient-Oriented Research (K24): To provide support for clinicians to allow them "protected time" to devote to patient-oriented research and to act as mentors for beginning clinical investigators.

Mentored Quantitative Research Career Development Award (K25): To provide support to investigators with quantitative science or engineering backgrounds who have made a commitment to focus their research on basic or clinical biomedicine, bioengineering, bioimaging, or behavioral sciences.

Pathway to Independence (K99/R00): To provide up to 5 years support in two phases to highly promising postdoctoral scientists to pursue research relevant to the Institute. The K99 phase consists of 1 to 2 years mentored support followed by up to 3 years of independent support (R00) contingent on securing an independent research position. Award recipients will be expected to compete successfully for independent research grant support from the NIH or other Institutions during the independence phase to ensure continued support and a smooth transition to independence.

Other Research Grants

Scientific Evaluation (R09): To provide funds to the chairman of an initial review group for operation of the review group.

Cooperative Clinical Research (R10) (U10): To support studies and evaluations of relevant clinical problems. These grants usually involve collaborative efforts among

several institutions and principal investigators and are conducted under a formal protocol.

Conference Grants (R13): To support national and international scientific meetings, conferences, or workshops at which research is discussed.

Research Demonstration and Education Projects (R18): To provide support designed to develop, test, and evaluate health-related activities and to foster application of existing knowledge to the control of heart, lung, and blood diseases and sleep disorders.

Resource-Related Research Projects (R24): To support research projects that will enhance the capability of resources to serve biomedical research in areas related to cardiovascular, lung, and blood health and diseases; blood resources; and sleep disorders.

Education Projects (R25): To provide support for the development and implementation of a program as it relates to a category in one or more of the areas of education, information, training, technical assistance, coordination, or evaluation.

Minority Biomedical Research Support Grants (S06): To strengthen the biomedical research and research training capability of minority institutions and to assist in increasing the involvement of minority faculty and students in biomedical research.

Research Enhancement Award (SC1): To support individual investigator-initiated research projects aimed at developing researchers at minority-serving institutions to a stage where they can transition successfully to other extramural support.

Pilot Project Award (SC2): To support underrepresented minorities who are at the beginning stages of a research career and interested in testing a new idea or generating preliminary data, or who are more experienced investigators and interested in switching to a different field of research.

Continuing Education Training Grant (T15): To assist professional schools and other public and nonprofit institutions to establish, expand, or improve programs of continuing professional education, especially for programs dealing with new scientific developments.

Resource-Related Research Projects (U24): To support research projects contributing to improvement of the capability of resources to serve biomedical research.

National Swine Research and Resource Center (U42): To support a National Swine Research and Resource Center that will serve as a resource for depositing, maintaining, preserving, and distributing swine models for studies of human diseases, as well as cryopreservation, storage, and reconstitution of embryos and germplasm.

Historical Black College and University Scientist Award (UH1): To strengthen and augment the human resources at historically black colleges and universities (HBCU) by recruiting an established research scientist into their biomedical or behavioral sciences department; to enhance the career of the recruited research scientist; and to strengthen other HBCU resources for the conduct of biomedical or behavioral research in areas related to cardiovascular, lung, and blood health and disease; transfusion medicine; and sleep disorders.

Individual National Research Service Awards (NRSA)

Individual Predoctoral M.D./Ph.D. NRSA (F30): To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; sleep disorders leading toward a combined M.D./Ph.D. degree. Training under this award is designed to provide a foundation for a career as a physician-scientist in the areas of interest to the NHLBI.

Predoctoral Individual NRSA (F31): To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders leading toward the research degree (e.g., Ph.D.).

Postdoctoral Individual NRSA (F32): To provide postdoctoral research training to individuals to broaden their scientific background and extend their potential for research in areas related to heart, lung, and blood diseases and blood resources.

NRSA for Senior Fellows (F33): To provide experienced scientists with an opportunity to make major changes in the direction of their research careers, to broaden their scientific background, to acquire new research capabilities, to enlarge their command of an

allied research field, or to take time from regular professional responsibilities for the purpose of broadening their research capabilities.

Institutional National Research Service Awards (NRSA)

Institutional NRSA (T32): To enable institutions to make awards to individuals selected by them for predoctoral and postdoctoral research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders.

Minority Institutional Research Training Program (T32M): To support full-time research training for investigative careers at minority schools in areas of cardiovascular, pulmonary, and hematologic diseases and sleep disorders. Graduate students, postdoctoral students, or health professions students may be supported under this program.

MARC Undergraduate NRSA Institutional Grants (T34): To support institutional training grants for underrepresented minority undergraduates to obtain research training and improve their preparation for graduate training in the biomedical and behavioral sciences.

NRSA Short-Term Research Training (T35 and T35M): To provide individuals with research training during off-quarters or summer periods to encourage research careers or to encourage research in areas of national need. This program includes the Short-Term Training for Minority Students Program and short-term training for students in health professional schools.

MARC Visiting Professors for Minority Institutions (T36): To increase the number of well-trained minority scientists in biomedical disciplines and to strengthen the research and teaching capabilities of minority institutions.

Other Support

Research and Development Contracts (N01): To develop or apply new knowledge or test, screen, or evaluate a product, material, device, or component for use by the scientific community.

Small Business Innovation Research (N43): To support projects, limited in time and amount, to establish the technical merit and feasibility of R&D ideas that may ultimately lead to a commercial product(s) or service(s).

NIH Inter-Agency Agreements (Y01): To provide a source of funds to another Federal Agency to acquire specific products, services, or studies.

NIH Intra-Agency Agreements (Y02): To provide a source of funds to another NIH component to acquire specific products, services, or studies.

Minority Research Supplements Programs: To provide supplemental funds to active NHLBI grants to support the research of minority high school, undergraduate, and graduate students; postdoctoral trainees; and investigators.

List of Abbreviations and Acronyms

ACCORD	Action To Control Cardiovascular Risk in Diabetes	CF	cystic fibrosis
ACE	angiotensin-converting enzyme	CHD	coronary heart disease
AHEAD	Action for Health in Diabetes	CHS	Cardiovascular Health Study
AIDS	acquired immunodeficiency syndrome	COPD	chronic obstructive pulmonary disease
ALLHAT	Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial	COPTR	Childhood Obesity Prevention and Treatment Research
AMI	acute myocardial infarction	CPHHD	Centers for Population Health and Health Disparities
ARDS	acute respiratory distress syndrome	CVD	cardiovascular diseases
AREA	Academic Research Enhancement Awards	DARD	Division for the Application of Research Discoveries
ARIC	Atherosclerosis Risk in Communities	DASH	Dietary Approaches To Stop Hypertension
ARRA	American Recovery and Reinvestment Act	DBDR	Division of Blood Diseases and Resources
ATP III	Adult Treatment Panel III	DCVS	Division of Cardiovascular Sciences
BABY HUG	Pediatric Hydroxyurea Phase III Clinical Trial	DERA	Division of Extramural Research Affairs
BARI 2D	Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics	DIR	Division of Intramural Research
BEE	Board of Extramural Experts	DLD	Division of Lung Diseases
BTRP	Basic and Translational Research Program	EARLY	Early Adult Reduction of Weight Through Lifestyle Intervention
CABG	coronary artery bypass graft	EDTA	ethylene diamine tetra-acetic acid
CAMP-CS/ Phase II	Childhood Asthma Management Program-Continuation Study/Phase II	FY	fiscal year
CARDIA	Coronary Artery Risk Development in Young Adults	GO	Grand Opportunity (ARRA grants)
CDC	Centers for Disease Control and Prevention	GOCADAN	Genetics of Coronary Artery Disease in Alaska Natives
		GTRP	Gene Therapy Resource Program

GWAS	genome-wide association study	NHLBI	National Heart, Lung, and Blood Institute (formerly NHI and NHLI)
HBCU	historically black college and university	NHLI	National Heart and Lung Institute
HCHS	Hispanic Community Health Study	NICHHD	National Institute of Child Health and Human Development
HEW	Department of Health, Education, and Welfare (now HHS)	NIH	National Institutes of Health
HHS	Health and Human Services (formerly HEW)	NINDS	National Institute of Neurological Disorders and Stroke
HIV	human immunodeficiency virus	NRSA	National Research Service Award
ICD	International Classification of Diseases	OSA	obstructive sleep apnea
JHS	Jackson Heart Study	PA	Program Announcement
JNC V	Fifth Report of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure	PHS	Public Health Service
MARC	Minority Access to Research Careers	POWER	Practice-Based Opportunity for Weight Reduction
MCSD	mechanical circulatory support device	REDS-II	Retrovirus Epidemiology Donor Study-II
MESA	Multi-Ethnic Study of Atherosclerosis	RFA	Request for Applications
NAEPP	National Asthma Education and Prevention Program	RFP	Request for Proposals
NCEP	National Cholesterol Education Program	RPG	research project grant
NCHS	National Center for Health Statistics	RuSH	Registry and Surveillance System in Hemoglobinopathies
NCI	National Cancer Institute	SBIR	Small Business Innovation Research
NCSDR	National Center on Sleep Disorders Research	SCD	sickle cell disease
NHANES	National Health and Nutrition Examination Survey	SCCOR	Specialized Center of Clinically Oriented Research
NHBPEP	National High Blood Pressure Education Program	SCOR	Specialized Center of Research
NHI	National Heart Institute	SDB	sleep disordered breathing
NHLBAC	National Heart, Lung, and Blood Advisory Council	SES	socioeconomic status
		SIDS	sudden infant death syndrome

SOYA	Study of Soy Isoflavones in Asthma	SWITCH	Stroke With Transfusions Changing to Hydroxyurea
SPRINT	Systolic Blood Pressure Intervention Trial	TB	tuberculosis
STAN	Study of Asthma and Nasal Steroids	WHI	Women's Health Initiative
STTR	Small Business Technology Transfer		

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